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BO'RAX, or BIBO'RATE OF SODA, is found native as a saline incrustation on the shores of certain lakes in Persia and Thibet. It also occurs in India, China, Ceylon, Saxony and South America. When collected on the banks of the lakes, it is impure, and goes by the name of *tincal*. The latter is purified by acting upon it with a solution of caustic soda, which removes the fatty matter that the crystals are coated with, to prevent evaporation of the water they contain, and thereafter dissolving in hot water and recrystallizing.

B. is likewise prepared from boracic acid (BO_3), (q. v.), by solution in boiling water, and the addition of a boiling solution of ordinary carbonate of soda ($NaOCO_2$), when B. ($NaO,2BO_3$) is formed, and carbonic acid (CO_2) is disengaged, and on cooling in wooden tanks lined with lead, the crystals of B. separate. The common crystalline variety of B. contains 10 equivalents of water ($NaO,2BO_3 + 10HO$); but if a stronger than ordinary solution be allowed to cool, crystals begin to separate at a higher temperature than usual, which contain only 5 atoms of water ($NaO,2BO_3 + 5HO$). B. is soluble in water to the extent of one part of the salt in two parts of hot water, and in twelve of cold, yielding a clear solution with a sweetish taste. It is readily reduced to powder, and is then known as *powdered borax*. It is of great use in the chemical arts. As an assistant agent in experimenting with the blow-pipe (q. v.), B. is of great service, from the readiness with which it forms colored glasses with the various metallic oxides. It is also employed in the manufacture of enamel, and for glazing or coating vessels in English pottery, as also in the formation of the paste for artificial gems. To the metallurgist, it is an aid in the readiness with which it promotes the fusion of metallic mixtures, and the separation of the metals; and to the solderer of all metals it is of service in forming a thin glassy coating over the edges of the metals, which prevents their oxidation at the time they are being joined together. B. is also used in dyeing.

Crystal of Borax.

BORDA, JEAN CHARLES, an eminent practical mathematician and astronomer, was born on 4th May 1733 at Dax, in the department of the Landes, in France. In 1771, he was associated with Verdun and Pingré in proving the accuracy of chronometers. He also devoted much attention to the subject of ship-building, and suggested great improvements in the form of vessels. In 1787 he took an active part in bringing the observatories of Paris and Greenwich into closer relations with one another. Along with Delambre and Méchain, he was a leading member of the French commission intrusted with the measurement of a meridian arc. He rendered essential service in the commission on the new system of weights and measures. He invented a new instrument for measuring the inclination of the magnetic needle; and his corrections of the seconds pendulum are still in use. But his reputation depends most of all on his improvement of the reflecting circle, on which instrument he published a work in two volumes (Par. 1787). He died at Paris on the 20th February 1799.

BORDEAUX, an important seaport town of France, chief town in the province of Gironde, beautifully situated in a plain on the left bank of the Garonne, about 60 miles from its mouth in the Atlantic. Ships of more than 1000 tons burden can easily ascend the river at high-water to B., which is accessible at all times to vessels of 600 tons. Its harbor is very capacious; and, by the Garonne, its commerce very extensive. The river is crossed by a noble bridge of 17 arches and 532 yards in length, erected by the elder Deschamps in 1811—1821. The old town, consisting partly of high wooden houses of the 15th c., has narrow crooked streets; but the newer parts of the city and the suburbs have wide streets, fine squares, and pleasant promenades lined with trees. The cathedral, which was consecrated in 1096, is remarkable for its beautiful towers. The church of St. Croix is a building of the 10th c.; that of St. Seurin is also very old, and has rare Gothic ornaments. The former archiepiscopal palace is now the town-hall. The Great Theater is one of the largest and finest buildings of its kind in France. B. has many other fine public buildings, and learned associations, and educational and benevolent institutions, with a public library of upwards of 140,000 volumes. The university, founded by Pope Eugenius IV. in 1441, has been, since 1839, an *Académie Universitaire*, with fifteen professorships. Pop. in 1881, 220,955.

Among the principal branches of industry are the production or preparation of sugar, brandy, liquors, vinegar, nitric acid, printed calicoes, woollen goods, carpets, hats, paper, earthenware, glass bottles, metallic wires, madder, and resinous articles. The rope-works, cooperages, and dock-yards are extensive and full of activity. The Canal du Midi, connecting B. with the Mediterranean, enables it to supply the whole south of France with the colonial produce which it imports; and also with English tin, lead, copper, coal, dye-stuffs, herrings, &c. Wine, brandy, vinegar, dried fruits, hams, turpentine, and glass bottles are among its principal exports.

Except the wines of Champagne, no French wines are so much exported to foreign countries as those grown in the district of B., and known as BORDEAUX WINES. Some of them are red (known in England as *Claret*), others white. Of the red wines, the Medoc is one of the best known. The red wines produced by the vineyards of Lafitte, Latour, Château-Margaux, and Haut-Briou, are particularly celebrated for their quality. The white wines of Graves, and those of Sauternes, Barsac, Preignac, and Langon are in highest repute.

In former times, B. was called *Burdigala*, and was the capital of the *Bituriges Vivisci*. It was a very prosperous town in the times of the Romans, was made by Hadrian the capital of Aquitania Secunda, and was both the principal emporium of the south-west of Gaul, and the seat of its best educational institutions. It was taken by Charles Martel in 735; but was again spoiled by Norman plunderers in the 9th century. It became the capital of the duchy of Guienne; and in 1152 passed, by the marriage of Eleanor of Guienne with Henry of Normandy (afterwards Henry II. of England), under the dominion of England. B. was for a considerable time the seat of the splendid court of Edward the Black Prince. During the Revolution, B. was the principal seat of the Girondists, and suffered fearfully at the hands of the Terrorists. Its inhabitants, disaffected to Napoleon's government, were the first to declare for the Bourbons in 1814. During the Franco-Prussian war, a delegation of the Government of National Defence, retreating before the advancing German army, stationed itself, December, 1870, at B.; and the first sittings of the National Assembly in 1871 were held there. Since the restoration of peace, the export trade of B. has increased greatly. In wines, there was an increase, between 1859 and 1871, of 124 per cent. in the quantity, and 73 per cent. in the value—arising from the amount of cheap wine shipped from the port during the two previous years. About one-sixth of the total export of this article goes to the British dominions.

BORDELAIS, a district of France, once forming part of the old province of Guienne, and having Bordeaux for its capital, but now included in the departments of Gironde and Landes.

BO'RDER, THE, is a term employed in historical as well as popular phraseology to signify the common frontier of England and Scotland. At present, the dividing boundary of the two countries consists partly of natural and partly of imaginary outlines. It is customary to speak of Scotland as a country 'north of the Tweed;' but the Tweed is the boundary only in a small part of its course, on the east, and large portions of several Scottish counties lie to the south of that river. Even at its mouth, the Tweed is not the division; for north of the river at its estuary lies the ancient town of Berwick, with the district known as its 'bounds,' which belong to England. The Tweed forms the division only for about 16 to 18 miles.

Leaving the river at Carham Burn, a few miles above Coldstream, the line proceeds towards the Cheviot mountains, the ridge of which is the boundary for about 25 miles; descending thence, the line strikes on Kershope Water, a tributary of the Esk. That river is the boundary for a number of miles to a point above Longtown. The line now quits the Esk abruptly in a northern direction, and taking into England part of what was known as the 'Debatable Land' (q. v.), strikes on the small river Sark, which is the boundary to the Solway Firth, the great natural division on the west. Such, in general terms, is the entire boundary, extending from sea to sea for about 100 miles, in which length the Tweed obviously plays an inferior part. The counties lying on the English side of the border are Northumberland and Cumberland; on the Scottish side, Berwickshire, Roxburgshire, and Dumfriesshire. Readers of history are aware that the division here indicated is comparatively modern; in former times, the frontier shifted according to the surging tide of war or diplomacy. For several ages prior to the 11th c., the kingdom of Northumbria, forming a part of what we now call England, included all that portion of Scotland south of the Firth of Forth as far west as Stirling. As a result of some warlike operations, this district was ceded by the Earl of Northumberland to Malcolm II., king of Scots, 1018, and ever since the Tweed, in its lower part, has been the boundary. What, however, was gained by Scotland on the east was lost on the west; for William the Conqueror wrenched Cumberland from the northern sovereign; and with little intermission the boundary in this quarter was settled according to its present limits.

It may be said that from the 11th till the end of the 17th c., there was almost constant disturbance on the border. Ruthless wars on a great scale between English and Scots sometimes caused the most frightful devastation, and became the source of lasting ill-will on both sides. History abounds in events of this kind, and the feuds and forays of clans and families are commemorated in a series of balads, for ever embalmed in the *Minstrelsy of the Scottish Border*, by Sir Walter Scott. The most notable of these forays from the Scotch side is narrated in the ballad of the *Battle of Otterburne*, or, as it is sometimes called, *Chevy Chase*. The event referred to occurred in 1388. Among the latest of the regular inva-

sions from England was that in 1543, in the reign of Henry VIII., conducted by the Earl of Hertford.

The invasion was by the eastern marches, and in their devastating course, the English army set fire to and destroyed all the towns, villages, monasteries, and numerous castles within a wide range of country. At an early date, wardens and commissioners had been appointed to repress petty insurrections, and punish the moss-troopers who made cattle-lifting from their neighbors on the opposite side of the border a kind of profession. For these measures of police, the border was divided into three parts—the east, middle, and western marches. Such was the lawlessness in the early part of the 16th c., that in 1511, Sir Robert Kerr, warden of the eastern marches, was slain at a border meeting by three Englishmen. The principal murderer escaped as far as York, and for a time tried to conceal himself; but he was sought out by two of Sir Robert's followers, who brought his head to their new master, by whom, in memorial of their vengeance, it was exposed at the cross of Edinburgh (Scott's *Essay on Border Antiquities*). Sometimes the Scottish borderers met ostensibly to amuse themselves with the ancient sport of football, but in reality to plan and execute daring military exploits. During the reigns of Elizabeth and James VI., strenuous efforts were made to preserve peace on the border, and this was attained only by extraordinary severities. Many of the more audacious reivers were hanged, and great numbers were banished. Some account of the measures adopted at this period to suppress border outrages will be found in the *Memoirs of Sir Robert Cary*, who long acted as English warden on the marches; also in the *Domestic Annals of Scotland*, by R. Chambers, vol. i. After the accession of James to the English throne, a sweeping clearance of the Scottish border was effected. The laird of Buccleuch collected under his banners the most desperate of the border marauders, whom he formed into a legion for the service of the states of Holland. At the same time, the Debatable Land was cleared of the Græmes, a daring sept of freebooters, who were transported to Ireland, and their return prohibited under pain of death. The legislative union of 1707, and the firm administration of justice, along with a general improvement in manners, finally terminated the long course of misrule.

In the present day, there is nothing to distinguish the border from other districts of the country, unless it be the prevalence of picturesque ruins of old castles, generally roofless, but, from the vast thickness and strength of the walls, still in a good state of preservation. The border strengths were of three kinds—regular fortresses, large baronial castles, and the lesser kind of towers. On the east, the English owned the fortified town of Berwick, and at no great distance Newcastle-on-Tyne; and on the west, Carlisle. The chief Scottish border fortresses were the royal castles of Roxburgh, Jedburgh, and Lochmaben; and we might almost include Edinburgh Castle, for it is only 60 miles distant. Among the baronial castles on the English side were numbered Norham, Alnwick, Bamborough, Naworth, Brougham, Penrith, and Cockermouth. Among the Scottish fortlets of the baronial class may be mentioned Newark, Hermitage, and Caerlaverock. The smaller kind of towers on both sides of the frontier appear to have been exceedingly numerous, and it is their remains that form the more conspicuous memorials of old border strife. These buildings consist of a single square tower, usually of three floors; the lower vaulted, for the reception of cattle; while the two upper, consisting of but one small apartment each, with narrow slit-hole windows, comprised the accommodation for the family. It is conjectured, however, that retainers lived in thatched huts outside, which are now obliterated, and were brought into the tower, along with the cattle, only in the case of an anticipated attack. These towers, known as bastel-houses or peels, once the residences of a warlike yeomanry, are thickly studded over the south of Scotland, more particularly along the vale of the Tweed; and by the lighting of beacons on their summits, the whole country between the border and the Forth could be speedily summoned to arms. On the English side, there are similar towers, such as those of Thirlwall, Fenwick, and Widdrington. The English border castles of every kind appear to have been of greater splendor and strength than those on the Scottish side. 'Raby Castle, still inhabited, attests the magnificence of the great Nevilles, Earls of Westmoreland; and the lowering strength of Naworth shows the power of the Dacres' (*Scott*). On the English side, however, there is nothing which can be compared to the ruins of that remarkable group of Scottish border abbeys—Melrose, Dryburgh, Kelso, and Jedburgh, not to speak of the remains of various other religious houses. For an account of these and other architectural remains on the border, we must refer to the *Border Antiquities of England and Scotland*, by Sir Walter Scott, 2 vols. folio, illustrated with plates; also to Billing's *Baronial and Ecclesiastical Antiquities of Scotland*, 4 vols. 4to, illustrated with plates.

Assimilated in habits to the rest of the population, the old Scottish border families are still distinguishable by their surnames—as, for example, the Maxwells, Johnstons, and Jardines on the west, and the Elliotts, Armstrongs, Scotts, and Kerrs on the middle and eastern marches. The principal Scottish border families of rank are the Scotts, Dukes of Buccleuch, descendants of a famed border chief, Sir Walter Scott of Buccleuch; and the Kerrs, Dukes of Roxburgh, who are sprung from an equally celebrated borderer, Sir Robert Kerr of Cessford. The possessions of both families are extensive, particularly those of Buccleuch (q. v.), which spread through several counties. The family of corresponding rank within the English border is that of the Percies, Dukes of Northumberland. Local intercourse across the border is considerably obstructed by the long range of hills and the moors which generally lie on the line of boundry; and the circumstance of the peculiar civil and ecclesiastical institutions of the two kingdoms shedding off here towards different centers, still further tends to lessen community of feeling. At no distant day, certain exciseable articles were charged with a less duty in Scotland than England, and the consequence was an active contraband trade on the border, chiefly by the mountain-passes and the Solway. Now, these duties are assimilated, and this demoralizing kind of traffic has disappeared. The great channels of communication across the border are two railway routes, one by the way of Berwick, and the other by Carlisle. There are also good roads in various directions for those who wish to explore this interesting district of country. Besides the books relative to the border already referred to, there are some works of local note, among which the most comprehensive is Richardson's *Borderer's Table-book*, 8 vols. royal 8vo (New-castle-on-Tyne); we may also refer to Jeffrey's *History and Antiquities of Roxburghshire*, 3 vols.; and Ridpath's *Border History*, 1 vol. 4to.

BO'RDER-WARRANT, in the law of Scotland, is a warrant issued by the judge ordinary—that is, by the sheriff or county court judge, or by magistrates of royal burghs within the royalty, or by justices of the peace—on the borders between Scotland and England, on the petition of a creditor who desires to arrest the person or effects of a debtor residing on the English side, and to detain him until he finds bail for his appearance in, and abiding the result of, any action which may be brought for the debt within six months. The creditor must swear to the truth of the debt, and before resorting to imprisonment of the debtor, it is proper to examine him as to his domicile, or usual residence, and occupation. These warrants are in use in the counties of Dumfries, Roxburgh, and Berwick.

They are more used in the country districts than in the burghs, though not frequently even in the country districts. In Dumfriesshire and Berwickshire, border-warrants are granted exclusively for arresting the persons of alleged debtors. In Roxburghshire—save in Kelso and Melrose districts—the warrants are granted for the purpose of arresting both the debtor's person and goods.

In English practice, the warrant to arrest an absconding debtor, which includes any foreigner who may be in England on business or pleasure, is very similar. See ARRESTMENT FOR FOUNDING JURISDICTION; DEBTORS, ABSCONDING; FOREIGN ATTACHMENT; JURISDICTION.

BORDIGHERA, a small town of the Riviera, North Italy, frequented as a health-resort. It is on a hill overlooking the Mediterranean, between Mentone and San Remo.

BO'RDURE, or BORDER, in Heraldry. Coats of arms are frequently surrounded with a B., the object of which is generally to show that the bearer is a cadet of the house whose arms he carries. The character of the B. often has reference to the profession of the bearer: thus, a B. *embattled*, is granted to a soldier; and a B. ermine, to a lawyer.

BORE is a tidal phenomenon at the estuaries of certain rivers. When a river expands gradually towards a very wide mouth, and is subject to high tides, the spring flood-tide drives an immense volume of water from the sea into the river; the water accumulates in the estuary more rapidly than it can flow up into the river; and thus there is gradually formed a kind of watery ridge stretching across the estuary, and rushing up towards the river with great violence. In some cases, this ridge, or B., is many feet in height, and contends against the descending stream with frightful noise. This phenomenon is observable in several British rivers, as the Severn, Trent, Wye, and Solway. The most celebrated bores are those of the Ganges, Brahmaputra, and Indus; in the Hoogly branch of the Ganges, the B. travels 70 miles in 4 hours, and sometimes appears suddenly as a liquid wall 5 feet high. The Bay of Fundy has the largest B.

BORE is a name for the internal cavity of a cannon, mortar, howitzer, rifle, musket, fowling-piece, pistol, or other kind of firearm. It is in most cases cylindrical; but in the Lancaster gun the B. is oval; in the Whitworth gun, it is hexagonal; while in the Armstrong, and many other kinds of gun, it is furrowed by spiral grooves. Technically, the B. of a gun often means simply the diameter of the cavity, as when we speak of a gun ' of 8-inch bore;' and in that case its meaning is equivalent to ' calibre.'

The BORING of a cannon is a process which may best be de-

scribed in connection with CANNON FOUNDING. It is desirable to mention in the present place, however, that there is an operation called 'boring-up' conducted at Woolwich Arsenal, for enlarging the bore of a gun. It has been found in recent years that many of the old cannon are thicker and heavier than needful for the size of shot propelled, and that they could be fitted for the discharge of larger shot without danger. A change was begun in the armament of the British fleet in 1839 by substituting heavier broadsides; and as one part of the process, many of the old 24-pounders were 'bored-up' to 32s.; even some of the 18-pounders were found to be thick and strong enough to undergo this process. More than 2000 iron naval guns were thus treated at Woolwich preparatory to the change in 1839; and many others have since been similarly bored-up. About 1860, important experiments were carried on at Woolwich, to determine whether the old smooth-bore iron guns could not only be bored-up, but *rifled* at the same time. There were 15,000 of such guns belonging to the British government, and it was suggested that they ought to be improved, instead of being cast aside as useless in the event of the success of the Armstrong and Whitworth guns. The process has not proved altogether satisfactory.

BO'REAS, the Greek name of the north-east wind, blowing towards Hellas from the Thracian mountains, and personified in mythology as the son of Astræus and of Eos or Aurora, and the brother of Notus, Zephyrus, and Hesperus. B. was said to dwell in a cave of the Thracian Hæmus, to which he carried Oreithyia, the daughter of the Athenian king Erechtheus, who bore him Zetes and Calaïs—employed as the symbols of swiftness—and Cleopatra, the wife of Phineus. According to Homeric fable, he begat, with the mares of Erichthonius, twelve horses of extraordinary fleetness. The rape of Oreithyia was represented on the ark of Cypselos, where B. instead of feet has the tails of serpents. He had a temple in Athens, because he destroyed the ships of the Persians under Xerxes; and at Megalopolis, a yearly festival was celebrated in his honor, because upon one occasion he helped the Megalopolitans against the Spartans.

BO'RECOLE. See KALE.

BORELLI, GIOVANNI ALFONSO, a distinguished mathematician and astronomer, and the founder of the iatro-mathematical school, born at Naples in 1608, was educated at Florence, and became professor of mathematics at Pisa, and afterwards at Messina. Having taken part in a revolt, he was obliged to leave Messina, and spent the remainder of his life at Rome, where he enjoyed the patronage of Queen Christina of Sweden, and where he died in 1679. He carefully observed the motions of the satellites of Jupiter, then little known, and seems to have been the first to discover the parabolic paths of comets. He made many valuable observations on a malignant fever in Sicily, and wrote a treatise on the causes of such fevers. He wrote also an account of an eruption of Etna, and a number of works on subjects of applied mathematics, of which the most celebrated is that *De Motu Animalium* (Rome 1680—1681). In this work, he applies the laws of mechanics to the motions of animals, regarding the bones as levers, in which the power acts between the weight and the fulcrum, and endeavoring to calculate the power of muscles from a consideration of their fibrous structure, and the manner in which they are united to the tendons. All more recent authors on the same subject have been much indebted to Borelli.

BORER, a name common to many insects of the Linnæan genus *Ptinus*, the tribe *Ptiniores* of Latreille, coleopterous (q. v.) insects of small size, the larvæ of which—small, white, soft, worm-like creatures with six minute feet—are furnished with strong cutting jaws (*maxillæ*), by means of which they eat their way in old wood, and similar substances, boring little holes as round as if made with a fine drill. Every one is familiar with the appearance of these holes, and with the injury done by these insects to furniture, &c. The holes are filled, as the insect works its way onward, with a fine powder, formed from the wood which it has eaten; and finally it constructs for itself a little silky cocoon, and having passed through the pupa state in the bottom of its hole, comes forth a winged insect—a small beetle in the widest popular sense of that term. One of the most common British species is *Anobium striatum*, a dark-brown insect, not much above one line in length. The thorax, as in the whole tribe, is proportionately very large, and has a swollen hood-like appearance, the head being, as it were received within it. This insect has long been noted for the pertinacity with which it simulates death. This instinct appears to be common to the whole tribe, as it is also to many other insects.—Another species of the same genus, *Anobium tesselatum*, has become an object of interest as one of the insects which, being sometimes heard to make a peculiar ticking noise, are connected with superstitious fancies and fears, and receive the name of Death-watch (q. v.).

Borer (*Anobium striatum*), Natural size, and magnified.

BORGE'TTO, a town of Sicily in the province of Palermo, and 13 miles west-south-west from Palermo. It is a long straggling town, of mean houses, but picturesquely situated on a wooded cliff overhanging a plain, and itself overhung by a lofty precipice of red rock. Pop. 6000.

BORGHE'SE, a family of great distinction in the republic of Siena, and afterwards at Rome. CAMILLO B. ascended the papal throne in 1605 as Paul V., and by him other members of the family were advanced to high positions. A marriage with the heiress of the family of Aldobrandini brought the B. family into the possession of great wealth. CAMILLO FILPPO LUDOVICO B., Prince B., born at Rome in 1775, joined the French army when it invaded Italy; and in 1803 married Pauline, the sister of Napoleon Bonaparte, and widow of General Leclerc. His wife subsequently received the principality of Guastalla, and he was created Duke of Guastalla, and under the French Empire he was for some time governor-general of the provinces beyond the Alps. He held his court at Turin, and was very popular among the Piedmontese. He sold the B. collection of artistic treasures to Napoleon for 13,000,000 francs, receiving in part payment the Piedmontese national domains; but when these were reclaimed by the king of Sardinia in 1815, he received back some of the works of ancient art. After the overthrow of Napoleon, he separated from his wife, and broke off all connection with the Bonaparte family. He lost Guastalla, but retained the principalities of Sulmona and Rossano his hereditary possessions. He died in 1832.—The *Borghese Palace* is one of the most magnificent at Rome. The noble portico of the inner court is composed of 96 granite columns; the collection of paintings is remarkably fine.

BORGHE'SI, BARTOLOMMEO, COUNT, a distinguished antiquarian, born at Savignano, Central Italy, on the 11th July 1781. His father, Pietro Borghesi, who was one of the most accomplished scholars of his time, trained him to an early delight in learned pursuits. He studied at Bologna, and afterwards devoted himself to archæological researches. He arranged the numismatic collection in Milan, and that of the Vatican, of which he drew up a catalogue. In 1821 he fixed his residence in the republic of San Marino, where he died in 1860. The French government undertook the publication of his works, of which 7 vols. appeared in 1862—1871. His principal work is his *Nuovi Frammenti Dei Fasti Consolari Capitolini Illustrati* (2 vols., Milan, 1818—1820). His contributions to Forcellini's Latin Lexicon are very highly prized.

BO'RGIA, a family originally Spanish, but which acquired great eminence in Italy after the elevation of Alfonso Borgia to the popedom, as Calixtus III., in 1455. He had previously been a privy-councillor of the king of Aragon. He died in 1458.—Rodrigo B. ascended the papal throne in August 1492, under the name of Alexander VI. (q. v.). Before his elevation to the popedom, he had a number of children by a Roman woman named Vanozza (Giovanna de' Catanei), of whom two, Cesare and Lucrezia, share their father's extraordinary historic infamy.—CESARE or CÆSAR B. was one of the greatest monsters of a time of depravity, when the court of Rome was the scene of all the worst forms of crime. He unscrupulously made use of the most sacred things as means to the most iniquitous ends. He had early received high ecclesiastical preferment, and his father, soon after becoming pope, invested him with the purple. But his father conferring upon his brother Giovanni the Duchy of Benevento, with the counties of Terracina and Pontecorvo, Cæsar, as was believed, moved with envy, caused his brother to be assassinated. He obtained the duchy and counties for himself, and was permitted by his father to resign the purple and to devote himself to the profession of arms. He was sent in 1498 to France, to convey to Louis XII. a bill of divorce and dispensation from his marriage with Anne of Brittany. Louis rewarded him for the pope's complaisance with the Duchy of Valentinois, a body-guard of 100 men, 20,000 livres of yearly revenue, and a promise of support in his schemes of ambition. In 1499, Cæsar married a daughter of the king of Navarre; and accompanied Louis XII. to Italy, where he undertook the conquest of the Romagna for the Holy See. The rightful lords of that country, who fell into his hands, were murdered, notwithstanding that their lives had been guaranteed by his oath. In 1501 he was named by his father, Duke of Romagna. In the same year, he wrested the principality of Piombino from Jacopo D'Appiano, but failed in an attempt to acquire Bologna and Florence. He took Camerino, and caused Giulio Di Varano, the lord of that town, to be strangled along with his two sons. By treachery as much as by violence he made himself master of the Duchy of Urbino. A league of Italian princes was formed to resist him, but he kept them in awe by a body of Swiss troops, till he succeeded in winning some of them over by advantageous offers, employed them against the others, and then treacherously murdered them on the day of the victory, 31st December 1502, at Sinigaglia.

He now seized their possessions, and saw no obstacle in the way of his being made king of Romagna, of the March, and of Umbria, when, on 17th August 1503, his father died, probably of poison which he had prepared for twelve cardinals. Cæsar, also, who was a party to the design (and who, like his father, had long been familiar with that mode of despatching those who stood in the way of his ambition, or whose wealth he desired to obtain), had himself partaken of the poison, and the consequence was a severe illness, exactly at a time when the utmost activity and presence of mind were requisite for his affairs. Enemies rose against him on all hands, and one of the most inveterate of them ascended the papal throne as Julius II. Cæsar was arrested and conveyed to the Castle of Medina Del Campo, in Spain, where he lay imprisoned for two years. At length he contrived to make his escape to the king of Navarre, whom he accompanied in the war against Castile, and was killed on the 12th March 1507 by a missile from the Castle of Biano. With all his baseness and cruelty, B. was temperate and sober. He loved and patronized learning, and possessed in a remarkable degree a ready and persuasive eloquence. Macchiavelli has delineated his character in his *Principe*.—LUCREZIA B. was a woman of great beauty. She was married first to Giovanni Sforza, Lord of Pesaro, but this marriage was dissolved by the Pope. She was said, without ground, to have lived in incest with her brothers and father. She next married in 1498, Alfonso, Duke of Bisceglie, a natural son of Alfonso II. of Naples; but he was assassinated by her brother Cæsar in 1501. In September of the same year, she married Alfonso of Este, who afterwards inherited the Duchy of Ferrara. She died in 1520. Like her brother Cæsar, she shrank from no crime; but she also was a patroness of art and learning, and was therefore adulated by several poets. See Gregorovius, *Lucrezia B.* (1874).

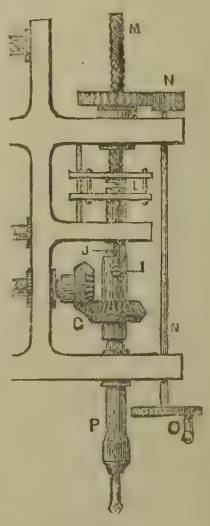
BO'RGO, a name given to a number of towns and villages in Italy and Southern Tyrol, and indicating the growth of the town or village around a castle or castellated rock, the original Borgo. See BOROUGH. Thus, *B. di val Sugana* is a place of (1869) 4092 inhabitants, with a castellated hill, in Tyrol; *B. Lavezzaro* is an Italian town in the province of Novara, with about 3000 inhabitants; *B. San Donnino*, in the province of Parma, with 6000 inhabitants; *B. San Sepolchro*, in the province of Arezzo, with 8000 inhabitants, &c.

BORGOMANE'RO, a town of North Italy, in the province of Novara, and 19 miles north-north-west from Novara, situated near the left bank of the Agogna. It is a walled town, well built, and contains a communal college and an hospital. It has little trade. Pop. 5320.

BO'RGO SAN DONI'NO, a city of North Italy, in the province of Parma, situated in a plain, 14 miles north-west from Parma, on the railway between Parma and Piacenza. It is surrounded by walls, has several good streets, is an episcopal see, and has a cathedral (the oldest part of which is in the Lombard style), several churches, and several educational institutions. Manufactures of silken linen, and woollen fabrics are carried on; and oil and wine are produced in considerable quantities. The city derives its name from a saint, who is said to have been a soldier in the army of the Emperor Maximian, and to have suffered martyrdom here. The shrine of St. Donino has long been one of the most frequented in Italy. There are curious remains of very rude medieval sculpture in the cathedral. Pop. about 4200.

BORGOTA'RO, a town of North Italy, in the province of Parma, and 35 miles south-west from Parma, on the left bank of the Taro, a tributary of the Po. It is encircled by walls, and is well built. Pop. (including commune 6938. The surrounding district is hilly and wooded.

BORING, as a process in carpentry and in the working of metals, is performed in a variety of ways. For boring holes in wood the carpenter makes use of *awls*, which simply displace a portion of the wood, and of *gimlets*, *augers*, and *bits* of various kinds, these last being applied by means of the crank-shaped instrument called a *brace*. All these are too familiar to need description. The boring of holes in metal plates for making attachments, is effected by means of *drills* driven by machinery. The annexed figure shows the essential parts of such a boring machine. The drill is inserted in the end of a vertical spindle P, which revolves in a fixed frame, and is driven by the bevel-wheels, G. The metal to be bored is placed on a table or other support below the drill; and the up and down motion, or end-pressure and off-action, of the drill is effected by the hand-gear, O, N, turning the screw M; which being coupled to the top of the spindle at L, presses it down or raises it, according to the way it is turned. The spindle slides vertically in the collar forming the axis of the bevel wheel, but is carried round with it by means of the pin I, which projects into a groove seen at J.



Boring Machine.

The Boring of Cannon and of Cylinders for steam-engines is most conveniently described under CANNON-FOUNDING; see also LATHE.

BORING, applied to the earth and to rocks, has two chief uses. 1. *For Draining*.—In some districts, owing to the existence, near the surface, of a bed of clay impervious to water, surface-water is retained in hollows, of greater or less extent. The expense of deep draining has been so great as to induce proprietors to neglect such land, but this expense has lately been avoided by leading drains to the lowest portion of the hollow, and then opening a bore through the clay to the pervious strata of sand or gravel beneath. This is done by a simple instrument, an auger of 2½ or 3½ inches in diameter, wrought by means of a cross-bar by one or two men.

2. *For Artesian wells, and for the discovery of the mineral contents of the earth*.—As the borings for these purposes are performed in the same manner, it is unnecessary to give them separate notices. The object in boring for Artesian wells is to open a passage for the escape of water from water-logged strata. See ARTESIAN WELLS. In the search for minerals, B. is had recourse to as a cheap method of discovering the mineral wealth of a district, and whether the quantity and quality of the contained minerals are such as to make the working remunerative. It should, however, never be undertaken without a previous geological survey of the locality; the neglect of this has caused an immense loss of time and money in futile searches for minerals, as in the innumerable cases of bores driven into Silurian and Old Red Sandstone strata, in search for coal. B. is also of use even after the presence of coal has been ascertained, to determine the most advantageous position for sinking the shaft by which the coal is to be drawn up. The general method of operating is as follows: The boring instrument consists of an iron shank, having a cross-bar at the top and a hollow screw at the bottom; to this all the successive B. instruments are fastened. A simple chisel is first attached to the screw, and one or two men press upon the cross-bar, and at the same time force it round like an auger; while another workman, by means of a lever erected overhead, with a chain descending from it to the cross-bar, gives an up and down motion to the instrument. When the chisel becomes clogged, from the accumulation of material which it has loosened, it is exchanged for a cylindrical auger, provided with a valve, which scoops out the separated material; and thus by alternate chopping and scooping the work is carried on. The nature of the strata is determined with considerable facility and certainty by examining the fragments brought up by the auger. As the work advances, successive lengths of rod are screwed on at the upper end. Three poles are erected over the well, for the purpose of elevating the rods, to permit the change of the tools.

The cost of B. varies with the material through which the operation is carried on. In strata of moderate hardness, the cost is about 10*s*. a fathom for the first 10 fathoms, and an additional 6*s*. for each 5 fathoms beyond.

A simple method of B. has been long in use among the Chinese, by which the great loss of time, arising from the screwing and unscrewing the rods, at each elevation of the chisel or auger, is saved. The chisel and scooping instrument are fastened to a rope, which is alternately elevated and allowed to descend by the simple force of gravity; the instrument thus forces its way through the ground. In the softer rocks of the newer formations this method has been successfully employed in boring for Artesian wells.

A still greater saving in time and money has been obtained by a process invented by M. Fauvelle, and described by him before the British Association in 1846. His apparatus consists of a hollow boring-rod, formed of wrought-iron tubes screwed end to end, armed at the lower end with a hollow perforating tool. The upper end of the hollow rod is connected with a force-pump by a flexible tube. By means of the force-pump a current of water is sent down the rod into the bore hole as it is sunk, and the water coming up again brings with it all the drilled particles, so that, except for the renewal of the perforating tool, the rods do not require to be elevated. M. Fauvelle found, by experience, that when he was passing through gravel, or required to bring up considerable masses of broken-off rock, it was better to inject the water by the bore-hole and let it rise through the hollow tube. In this way he has succeeded in raising stones 2½ inches long by 1¼ inch thick. For B. in tunnels, see TUNNEL.

BORLASE, REV. WILLIAM, an English antiquarian, was born at Pendeen, Cornwall, February 2, 1696. Ordained a priest in the English Church in 1720, he was, in 1732, presented to the vicarage of his native parish of St. Just. Devoting himself to a study of the natural history and antiquities of Cornwall, he in 1753 published, at the Oxford press, a volume, entitled *Observations on the Antiquities, Historical and Monumental, of the County of Corn-*

wall. This was followed, in 1758, by the *Natural History of Cornwall,* printed at the same press. B. paraphrased the book of Job, and wrote several pieces of a religious nature, was active in the supervision of his parish, and took an especial interest in the improvement of its highways. But that which makes his name most interesting now, is the fact that he was one of Pope's correspondents, and furnished to the poet most of the curious fossils of which the Twickenham grotto was composed. He died August 31, 1772.

BO'RNEENE, FLUID BORNEO CAMPHOR, or OIL OF CAMPHOR, is a thin liquid, lighter than water, with a fragrant odor (somewhat resembling turpentine), obtained by distilling native oil of Borneo camphor, or oil of Valerian. The B. is employed in perfumery.

BO'RNEO, (called by the natives *Pulo Kalamantin* or *Klemantin,* which is the name of an indigenous fruit), next to Australia and Papua, the largest island in the world, is situated in the Indian Archipelago, in 7° N.—4° 20′ S. lat., and 106° 40′—116° 46′ E. long. It is bounded on the E. by the Sea of Celebes and the Macassar Strait, S. by the Sea of Java, W. and N. by the Gulf of Siam and the China Sea. Its length is about 800 miles, with a breadth of 700, and an area of about 300,000 square miles. The population is under 2,000,000. The largest part, ruled by the Dutch, had, in 1873, 457 Europeans and 1,235,187 natives; the independent kingdom of Borneo or Brunaï, in the north, between Sambas and Maludu, 225,000; Sarawak, 50,000; and the unexplored regions of the interior are sparsely peopled. The coasts of B., which are often low and marshy, and rendered dangerous to navigation by numerous islets and rocks, present no deep indentations, though they are pierced by numerous small bays and creeks. Two chains of mountains run through the island in a nearly parallel direction from south-west to north-east; the one rising in Sarawak (q. v.), gradually increases in elevation until it attains, in its termination in Mount Kini Balu, on the north-east coast, a height of 13,698 feet; a cross chain, branching off in about lat. 2° N., extends in a south-east direction through Banjermassin (q. v.). The other range, which is much lower, intersects the equator in long. 113° E. Between are well-watered plains. B. has fine rivers, especially on the north and west coasts. About their upper courses, however, little is known. The principal are: on the north, the Brunaï or Borneo, the Redjang, Baram, Bintulu, Sirabas, Batang-Lupar, and Sarawak; on the east, the Kutei or Mahakkan, Bulungan and Kuran, or Beru. The Barito, or river of Banjermassin, Kahaijan, Kapuas-Murung, Mendawei, Sampit, and other smaller streams, flow through the south-east part; while the Pontianak, or Kapuas-Bohang, Sambas, Simpang, Succadana, and Pawan, are the most important on the west. All the rivers of B. have banks at their mouths, which render them unfit for large ships; the Brunaï, however, is navigable 15 miles for vessels of considerable tonnage. There are numerous lakes, abounding in fish, the largest being Kini Balu, south-east of the mountain of the same name, 100 miles in circumference, beautified with islands, and having many Dyak villages on its bank. The climate, in the low grounds, is humid, hot, and unhealthy for Europeans; but in the higher parts towards the north, the temperature is generally moderate, the thermometer at noon varying from 81° to 91° F. During the rainy season, from November to May, heavy storms of wind and loud thunder are experienced on the west coast. Vegetation is extremely luxuriant. The forests produce iron-wood, teak, gutta-percha, ebony, sandal-wood, ratans, dye-woods, benzoin, wax, dragon's blood, sago, various resins, vegetable oils and gums. The camphor is the best in Asia, of which 4500 pounds are exported annually. The Mohor tree, well adapted for making native boats, attains a height of 80 feet, and the Kaladang, suited for large masts, to 200.

Nutmegs, cloves, cinnamon, pepper, betel, ginger, rice, millet, sweet potatoes, yams, cotton, sugar-cane, indigo, tobacco, coffee, melons, citrons, pine-apples, bananas, coco-nuts, &c., are largely grown. The mountains and forests contain many monkeys, among which is the orang-outang. Tapirs, tigers, bears, swine, wild oxen, and various kinds of deer abound. The elephant is only found on the north coast, and the rhinocerous on the north-west. The few domesticated animals are buffaloes, sheep, goats, dogs and cats. A few horses are seen in Banjermassin. The birds are remarkable for their plumage. The principal are eagles, vultures, Argus-pheasants, peacocks, flamingoes, pigeons, parrots, and the swallows (*Collocalia esculenta*) which construct the edible nests prized by the Chinese for making soup. The rivers, lakes, and lagoons swarm with crocodiles, and many kinds of snakes, frogs, lizards, and leeches. Fish is plentiful, and the coasts are rich in tortoises, pearl mussels, oysters, and bêche-de-mer, or trepang. Brilliant butterflies and moths are in great variety, and silk-worms are found. Among the mineral products are coal, gold, antimony, iron, tin, platina, nickel, diamonds, precious stones, rock-crystals, porcelain-clay, petroleum, and sulphur. The diamond mines are chiefly in Landak and Pontianak (q. v.); Sambas produces the greatest quantity of gold; the kingdom of Brunaï, Kutei, and Banjermassin, the largest amount of coal.

The population consists of three classes: the Dyaks, who are the aboriginal inhabitants, and almost all heathen; the Mohammedans or Malays, Buginese, Javans, and Arabs: and the Chinese. The Dyaks live chiefly in the interior, and employ themselves with land culture, collecting gutta-percha, resin, gums, ratans, gold dust, and wax. They are divided into numerous tribes. The Malays dwell on the coasts, are traders, and bold sailors. They are more civilized than the Dyaks, cultivate the grounds around their houses, lay out gardens, keep cattle, and live partly by fishing. The Chinese, chiefly from Canton, have penetrated far into the interior. They engage in trade and mining, are unwearied in their efforts to make money, and then return to their native country. They number about 75,000, and have always endeavored to live as an independent republic, under chiefs chosen by themselves, and according to Chinese laws. In 1857, the Chinese living in Sarawak (q. v.) rebelled against Sir James Brooke (q. v.), and were nearly exterminated. In the last years, the Dutch were also compelled to put them down by force of arms, and have imposed a poll-tax.

The women of B., except the Dyak, weave cotton fabrics, make earthenware, baskets, and mats of beautiful designs and colors. In the district of Banjermassin are factories of weapons. The principal exports are gold, gold-dust, diamonds, coal, ratans, gutta-percha, edible nests, cotton, wax, timber, dye-woods, mats, resins, sandal-wood, camphor, &c.; the imports—earthenware, iron, steel, and copper work, piece goods, yarns, woollen and silk fabrics, medicines, provisions, wines, spirits, rice, sugar, tea, tobacco, opium, trepang, gambir, gunpowder, &c.

By far the largest part of the island is ruled directly or indirectly by the Dutch, who have divided it into the residency of the western division of B., and that of the southern and eastern, the former having Pontianak (q. v.) as the seat of government; the latter, Banjermassin. The smaller portion towards the north and north-east contains Sarawak and the territories of the Sultan of B. proper. Besides a number of small dependencies, the western division contains the important kingdoms of Landak, Mampawa, and Sambas, with the mining district of Montrado, in the north. The chief towns are Sambas (10,000), Pontianak (9000), Banjermassin (30,000), Borneo or Brunaï (30,000), and Sarawak (25,000).

The Portuguese effected a settlement in 1690 at Banjermassin; from whence they were, however, soon expelled. The Dutch succeeded in concluding a treaty of commerce with the princes of Banjermassin; and in 1643 erected a fort and factory, a second in 1778 at Pontianak, and others since. The British made unsuccessful attempts in 1702 and 1774 to effect a settlement in B.; but have, within the last twenty years, acquired a preponderating influence on the north-western coast. This has been in a great measure owing to the enterprise of Sir James Brooke (q. v.) in Sarawak, and in part also to the occupation of Labuan (q. v.) as a colony and naval station. The British government refused to annex Sarawak to the British empire. In 1881 the British North Borneo Company obtained a charter from the government of the United Kingdom, which was protested against by Spain. The piracies carried on by some of the inhabitants of B. have often demanded severe punishment. See Wallace's *Malay Archipelago* (1869); Burbidge's *Garden of the Sun* (1880); Bock's *Head Hunters of Borneo* (1881).

BO'RNHOLM, an island in the Baltic Sea, belonging to Denmark, about 90 miles east of Seeland, and half-way between the island of Rügen and the Swedish coast. Area, including three small islands in its vicinity, about 230 square miles, with a population above 35,000. It is rocky, and traversed from north to south by a high mountain-ridge, the slope of which is in great part a waste heath, but elsewhere it is not unfertile, and agriculture and cattle husbandry are successfully prosecuted. High cliffs, sand-banks, and breakers, make the coast dangerous. The most notable product of the island is porcelain clay, with which the porcelain manufacture of Copenhagen is carried on. The capital of the island is Rönne, or Rottum, on the western coast, a place of 7000 inhabitants.

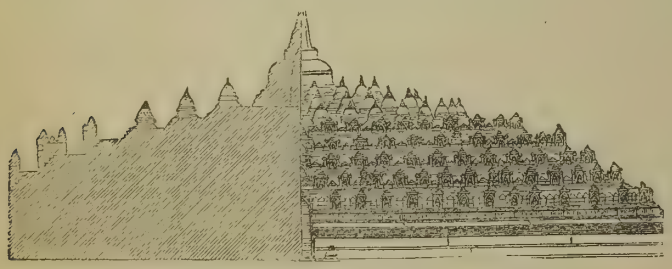
BO'RNING-PIECE (Fr. *borner,* to bound), a common and very simple implement, used by gardeners in laying out grounds, to make the surface either level or of perfectly regular slope. It consists of two slips of board, one about 18 inches long, and the other about 4 feet, the shorter fastened by the middle to one end of the longer, and at right angles to it. One B. being placed at one end of a line drawn in the piece of ground which is being laid out, with the edge of the shorter slip of board along the line, and the longer slip erect, others of the same size are similarly placed at the other end and in other parts of the line; and the requisite uniformity of surface is obtained by filling up with earth, or removing it, until on looking along their summits it appears that they are all in the same plane. The name is perhaps derived from the application of the implement to borders or edgings.

BO'RNU, a powerful state of Central Africa, extending between lat. 10° and 15° N., and long. 12° and 18° E., and bounded on the E. by Lake Tsad, S. by Mandara, W. by Hausa, and N. by Kanem and the Sahara. The greater part of the country is perfectly level, and much of it is liable to be overflowed in the rainy season, which lasts from October to April, when fevers and other diseases consequently prevail. The heat from March to June is excessive, ranging from 104° to 107° F. The two principal rivers are the Shary and the Yeou or Yo, both of which fall into Lake Tsad.

The soil is fertile, and although the cultivation is very imperfect, produces plentiful crops of maize, millet, barley, rice, various kinds of pulse, cotton, and indigo. The inhabitants possess elephants, horses, buffaloes, oxen, sheep, &c. Wild beasts, as lions, panthers, &c., are very numerous, having their chief haunts in the forests which occur only in the vicinity of the rivers, and which abound also in birds of many kinds, snakes, crocodiles, &c. Wild bees are extremely plentiful. The country produces no iron, that which is used being brought from Mandara. Much care is being bestowed upon the manufacture of coats-of-mail, both for horses and their riders. The only other manufacture carried to any considerable extent is that of cotton cloth, which is dyed with beautiful blue stripes by means of indigo, and much exported to Fezzan. The population, which is estimated at about five millions, are mostly of Negro race, and called Kanowry. The ruling race, called Shouas, are of Arab descent, and bigoted Mohammedans; but many traces of Fetishism remain among the masses. Whatever they have of civilization is derived from the Arabs. The slave-trade is eagerly prosecuted, and gives occasion to many warlike expeditions. B. appears to have existed as a state for many centuries, but in the beginning of the present century it was conquered by the Fellatahs, whose yoke, however, was soon shaken off, under the leadership of a fanatic faki, named Mohammed el Amin, whose services were called in by the sultan. On Mohammed's death, his son Omar, became ruler of B. instead of the sultan. Dr. Nachtigal, who visited B. in 1870, describes it as rapidly decaying.

BORO BUDDOR (the Great Buddha), the ruin of a splendid Buddhist temple in Java, residency Kadu, regency Magelang, and district Minoreh, near the junction of the Ello and Progo, is the most elaborate monument of the Buddhist style of architecture anywhere existing. Buddhism (q. v.) was early introduced into Java, and Javanese chronicles place the building of B. B. in the beginning of the 7th century. The figure (copied from Fergusson's *Handbook of Architecture*) represents a section through one half, and an elevation of the other half of the building. It is a pyramid of a square form, each side at the base measuring 600 feet, and consists of seven walls, which are built like the steps of a stair up a hill. Between the walls are narrow terraces running round the building. The walls are richly ornamented with statuary. Outside are niches, each of which is occupied by a statue of Buddha, larger than life, seated in the usual attitude, with his legs crossed under the body. The number of these figures is about 400. Between each of these are bas-reliefs, representing the god in the same attitude besides architectural ornaments and carvings of all sorts.

Below the niches, on the lower story, is an immense bas-relief running round the whole building, representing scenes from the life of Buddha, and religious subjects. The inner faces of the building are also profusely ornamented with bas-reliefs, seated figures, and architectural ornaments, carried to an extent unrivalled by any other building in the world. The art of sculpture



Elevation and Section of Temple of Boro Buddor.

appears in Java to have early attained the highest point of excellence. 'Above and within the upper square terrace are three circular ones, the outer ornamented with 32, the next with 24, and the upper with 16 small domes, each containing a seated statue of Buddha, which can be seen through the open work of their roofs. The whole is surmounted by what must be considered as the Pagoda (q. v.) itself, which is now empty, its center being occupied only by a sunken chamber 10 feet deep, meant originally, no doubt, to contain the relic for which this splendid temple was erected.' Mr. Fergusson considers that the five lower terraces are copied from and represent a Buddhist vihara or monastery; and that the niches containing the cross-legged figures were, in the originals, cells, each occupied by a shaven priest. The structure is thus a compound of a Tope (q. v.) with a copy, in durable architecture, of the frail cells of a vihara.

BORODI'NO, a village of Russia, in the government of Moskwa, and about 70 miles west from the city of that name. It is situated on the Kalouga, an affluent of the Moskwa, and gave name to the great battle fought between the French army under Napoleon, and the Russian under Kutusow, Barclay de Tolly, and Bagration, 7th September 1812. The battle of B. was one of the most obstinately disputed in history, and the loss on both sides was almost equally great. Out of 240,000 men engaged, between 70,000 and 80,000 were killed and wounded. The Russians retreated on the following day, but it was in the most perfect order, and without the enemy venturing to attack them. The Russians, therefore, have always held this battle as a victory, and in 1839 raised a fine mausoleum on the battle-field. To the French, however, certainly, belongs the honor, as they not only remained on the field of battle, but in seven days after, they had pushed on to Moscow. The French name it the battle of the Moskwa, from the river of that name, and it gave Marshal Ney his title of Prince of Moskwa.

BO'RON (symb. B, equiv. 11) is a non-metallic element present in Boracic Acid (q. v.) and Borax (q. v.). It was discovered in 1808 by Gay Lussac and Thenard in France, and Davy in England. The process followed in procuring B. till lately was to mix pure and dry boracic acid (BO_3) with thin slices of the metal potassium (K), and heat them in a tube, when three atoms of the potassium abstracted the oxygen, forming potash (KO), and set free the boron (B). On cooling and washing the mixture with cold water, the potash dissolved out, and left the B. as a dark greenish-brown powder, which, when heated, burned with a green flame, and was re-formed into boracic acid, by combining with the oxygen of the air. This *amorphous boron* is now obtained by heating boric anhydride with sodium. A crystalline form (Wöhler and Deville having discovered the method) is obtained by heating to a high temperature with aluminium, when B. is left as minute crystals interspersed through the earth alumina. These crystals possess great interest from their similarity in properties to pure crystallized carbon, or the diamond, and they are now known among scientific chemists as *B. diamonds*. They are remarkably transparent, are tinged yellow or red (though the colors may be accidental), and rival the ordinary diamond in their lustre and refractive power. B. diamonds not only scratch glass, but also the corundum and the sapphire; and a real diamond, with which a few B. diamonds were crushed, had its edges worn away. It is apparent, therefore, that the B. crystals possess in a high degree the characters of the ordinary diamond; and though they have as yet only been obtained in minute specks, yet it is not too much to expect that the size will be increased, and the artificial B. diamond come into market as an article of ornament, to rival the *natural* carbon diamond in its mysterious power of flashing back the rays of light. Indeed, so like are these two kinds of diamonds, that they can scarcely be distinguished by outward characters or signs; and it has been gravely suggested that some of the diamonds which now adorn the brow, the neck, or the arm, may be natural B. diamonds. They are very indestructible, requiring a high temperature to destroy them; and, like the true diamond, heat ultimately forms them into a *coke*.

BO'ROUGH (Ang. Sax. *byrig, burg, burh;* It. *borgo;* Fr. *bourg;* Scot. *burgh*). The original meaning of this word, by which we now designate a corporate township, seems to have been a hill, rising ground, or heap of earth; and it was probably from the elevated positions on which places of defence were erected, that it afterwards came to signify a fortification or castle, and latterly the aggregate of houses, churches, and other structures, which, in unsettled times, usually gathered under the walls of a castle; together with their inhabitants, and the arrangements which were made for their government. The questions whether we owe our municipal corporations to Roman, or to Saxon and other Teutonic influences, or to both; and if to both, then to what extent they have severally contributed to their formation, have been keenly discussed by constitutional historians. In so far as etymology goes, its authority is pretty equally divided, the term *municipal*, from the Latin *municipalis*, and *city*, from *civitas*, favoring the Roman view; whilst B. from the root above indicated, and *town*, from the Saxon *tun* or *dun*, a fortified hill, support the Teutonic. But the discussion forms a branch of a very wide subject, which has divided recent writers into two opposite schools, and of which we can here only indicate the existence. On the Roman side, Sir Francis Palgrave is the most uncompromising, and Mr. Allen, as it seems to us, the most judicious champion. The Teutonic side is espoused by most of the Anglo-Saxon scholars of England, and in general by German writers. But from whatever source derived, that the boroughs of England existed, not as aggregates of houses merely, but as corporate bodies, in the Saxon time, is now generally admitted. The B. system of Scotland is also of great

antiquity. 'A *Hanse*, or confederation of boroughs for mutual defence and the protection of trade, existed in Scotland, and was known by this name in the reign of David I., about a century before the formation of the Hanseatic League of the continental cities; and the famous burgh laws date from about the same period. This code of Scotch burghal regulation,' in Mr. Innes's opinion, 'though collected in the reign of David, and sanctioned by him, was the result of the experience of the towns of England and Scotland;' and he goes on to show the very close resemblance between these laws and the burghal usages of Newcastle, and even of Winchester, which seems to suggest their common Saxon origin.

Mr. Innes speaks favorably of the B. life of our ancestors; and he considers the burgh domestic architecture, of which monuments remain sufficient to show that 'the burgess of the Reformation period lived in greater decency and comfort than the laird, though without the numerous following, which no doubt gave dignity if it diminished food. I am not sure that this class has gone on progressively, either in outward signs of comfort, or in education and accomplishment, equal to their neighbors. The reason I suppose, is obvious. The Scotch burgher, when successful, does not set himself to better his condition and his family within the sphere of his success, but leaves it, and seeks what he deems a higher.' In confirmation of this view, Mr. Innes elsewhere mentions that 'many of the old citizen-merchants of Edinburgh had studied at the university, and appear in the list of graduates.'

Borough, in England, is properly a city or other town that sends burgesses to parliament—a privilege, the nature and extent of which will be explained under PARLIAMENT (q. v.); and in this sense it is also called a *parliamentary borough*. But in the interpretation clause of the Municipal Reform Act, 5 and 6 Will. c. 76, s. 142, the word *borough* is declared, for the purposes of the act, to mean a city, borough, port, cinque port, or town corporate, and whether sending representatives to parliament or not. See MUNICIPALITY.

BO'ROUGHBRIDGE, a town in West Riding, Yorkshire, on the right bank of the Ure, here navigable for small-craft, 17 miles north-west of York. It arose simultaneously with the decline of Aldborough, 1½ mile to the east, soon after the Conquest, when the great north road was diverted from Aldborough to this place. Its chief trade is in agricultural produce and hardware. Pop. (1871) 2508. Edward II., in 1321, defeated the Earl of Lancaster here. Near B. are three immense Druid stones, called the 'Devil's Arrows,' 16 to 22 feet high.

BOROUGH ENGLISH, is a custom that prevails in some ancient boroughs in England, according to which the youngest son inherits the property within borough in preference to his elder brothers. The reason assigned for it is, that the youngest son, on account of his tender age, is not so capable as his elder brothers to maintain himself. A posthumous son is entitled to this privilege, and dispossesses his elder brother. The right of representation also exists with reference to it, for should the youngest son die in his father's lifetime leaving a daughter, she will inherit the property. This custom obtains in the manor of Lambeth, Surrey, in the manors of Hackney, St. John of Jerusalem in Islington, Heston, and Edmonton in Middlesex, and in other counties. See CUSTOM, GAVELKIND, INHERITANCE.

BOROUGH FUND. This is a fund which is expressly defined by the Municipal Corporations Act, 5 and 6 Will. IV. c. 76, by which it is declared that the rents and profits of all hereditaments, and the interest, dividends, and annual proceeds of all moneys, dues, chattels, and valuable securities belonging or payable to any body corporate named in conjunction with a borough in the schedules, or to any member or officer thereof, in his corporate capacity, and every fine or penalty for every offence against this act (the application of which has not been already provided for), shall be paid to the treasurer of such borough; and all the moneys which he shall so receive shall be carried by him to the account of a fund to be called 'The Borough Fund;' and such fund, subject to certain payments and deductions, shall be applied towards the payment of the salary of the mayor, and of the recorder, police magistrate, town-clerk, treasurer, and other officers. Corporations may now, under certain checks, maintain parliamentary and legal proceedings at the expense of the borough fund, 35 and 36 Vict. c. 91. But existing gas and water companies authorized by statute are not to be competed with in this way.

The Court of Chancery exercises jurisdiction over the property of corporations in boroughs, which, since the Municipal Corporations Act, are considered to hold their property in trust for charitable uses; and the trusts are applicable as well to the personal as to the real estate. See Grant on *Corporations*, 1850; and see FUND.

BOROUGH JUSTICES were first created in the time of Charles I. Under the Municipal Corporations Act, 5 and 6 Will. IV. c. 76, these justices consist of the mayor during his year of office, and for one year after it determines; the recorder *ex officio;* and such persons as the crown may appoint by commission. Their duties cannot be delegated; and before acting, they must make the same declaration, and take the same oaths as the recorder does on entering his office. See JUSTICES.

BOROUGH LAWS, in Scottish legal history, was the name given to a collection of ancient laws relative to boroughs or *burghs*, which have long ceased to have any force, but serve to throw light on the ancient manners and customs of the country. The authenticity of these B. L. is beyond question; they are universally allowed to have been enacted in the reign of King David in the 12th century. See REGIAM MAJESTATEM.

BOROUGH RATE is a rate raised and levied within borough by order of the council of the same; and it has been decided by the Court of Exchequer that such rate is valid, though not made *in public*. By the 92d section of the Municipal Corporations Act, 5 and 6 Will. IV. c. 76, where there is a deficiency of the *borough fund* (q. v.), the borough council is authorized and required from time to time to order a B. R. in the nature of a *county rate* (q. v.) to be made within their borough, for which purpose the council shall have all the powers of county justices. As to boroughs not within the Municipal Corporations Act, the levying and application of borough rates in them is regulated by the 17 and 18 Vict. c. 71, by the first section of which it is enacted that the justices of the peace may make a B. R. in the nature of a county rate, for all the purposes for which a B. R. may be levied, such borough justices also having the same powers as county justices. The council of a borough cannot make a *retrospective* rate; and the provision of the 7 Will. IV. and 1 Vict. c. 81, s. 2, which declared lawful all such retrospective rates as might be made within six calendar months after the passing of the act, was merely for a temporary purpose. The Municipal Corporations Act directs that all sums levied in pursuance of a B. R. shall be paid over to account of the borough fund; and there is a provision as to *Watch Rates* (q. v.).

Where parties consider themselves aggrieved by a B. R., they may appeal to the recorder at the next quarter-sessions for the borough; or if there be no recorder, to the next county quarter-sessions.

BORO'VSK, or BORO'FSK, a town of Russia, in the government of Kalouga, and 49 miles north-north-east of the town of that name. Conjointly with Kalouga it gives title to a bishop. It has extensive manufactures of sail-cloth, and a trade in leather, flax, and hemp. Its onions and garlic are celebrated. In its vicinity is a convent, founded in 1444, one of the richest in the empire. Pop. (1880) 9491.

BORROME'AN ISLANDS, a group of small islands in the Lago Maggiore, Northern Italy. They are situated in the western arm of the lake, called the Bay of Tosa, and are named after the family of Borromeo, which for centuries has been in possession of the richest estates in the neighborhood. They are sometimes also called *Isole dei Conigli*, on account of the number of rabbits found on them. They were little more than naked rocks, till Vitaliano, Count Borromeo, master-general of ordnance to the king of Spain, about 1671, caused soil to be carried to them, built terraces, and converted them into gardens, the beauty of which and of their situation has won for them the name of the *Enchanted Islands*. The two most celebrated are *Isola Bella* and *Isola Madre*. On the west side of *Isola Bella* stands a palace of the Borromeo family, containing many admirable paintings and other works of art. The *Salle terrene*, a series of grottos, inlaid with stones of various colors and adorned with fountains, connect the palace with the gardens, the terraced style of which gives the whole island the appearance of a truncated pyramid; a colossal winged unicorn, the armorial device of the Borromeo family, crowning the whole. *Isola Madre* is laid out in the same terraced style, and is crowned by a castle. The odors of flowers from the islands, upon which grow many plants of tropical climates, are wafted far over the lake. The *Isola de' Pescatori* now contain a village of about 400 inhabitants, who derive their subsistence from fishing and smuggling.

BORROME'O, CARLO, COUNT, a saint of the Church of Rome, was born on the 2d October 1538, at the Castle of Arona, on the Lago Maggiore, the family seat of his ancestors. He studied law at Pavia, and took the degree of doctor in 1559. His uncle, Pope Pius IV., on being raised to the pontificate in 1560, appointed him, notwithstanding his youth, to a number of high offices, and made him a cardinal and archbishop of Milan. B. displayed great faithfulness and ability in governing Ancona, Bologna, and other parts of the States of the Church as legate, and in discharging the duties of offices connected with ecclesiastical administration at Rome. Surrounded as he was with magnificence and luxury, he was always grave, pious, and rigid in his life, studious, and a patron of letters. His uncle, the pope, made him his grand penitentiary, and did nothing considerable without his co-operation.

It was in a great measure by his influence that the re-opening of the Council of Trent was accomplished, and that its delibera-

tions were brought to a conclusion so favorable to the papal throne. He committed his decrees to memory, had the principal part in drawing up the *Catechismus Romanus* for exposition of them, and proceeded to give all possible effect to them in his archiepiscopal province. B.'s exertions, not only for the improvement of ecclesiastical discipline, but also for the reformation of morals in the archbishopric of Milan, drew upon him the hostility of the monastic orders, and also to some extent that of the Spanish authorities in Milan, who were jealous of the extension of his jurisdiction An attempt was even made upon his life in 1569. He spent great part of his income in beautifying the cathedral and other churches. With a view to provide well-qualified priests, he founded, in 1570, the Helvetic College at Milan. He brought about an alliance of the seven Catholic cantons, known as the *Golden Borromean League*, for the united defence of their faith. In the famine of 1570, and during the plague in Milan in 1576, he displayed equal energy, benevolence, and devotedness, saving the lives of multitudes by the prompt arrangements which he made for necessary relief. Exhausted by his labors and his austerities, he died on 3d November 1584. Many supposed miracles at his tomb led to his being canonized in 1616. His theological works were published at Milan in 1747, in 5 vols. folio. On the western bank of the Lago Maggiore, in the neighborhood of his birthplace, is a colossal brazen statue of him.—His brother's son, Count Frederico Borromeo, born 1563, was also a cardinal, and from 1595 to 1631 archbishop of Milan, and was the founder of the Ambrosian Library (q. v.).

BOROVI'TCHI, a town of Russia, in the government of Novgorod, 98 miles east of the town of Novgorod, on both sides of the river Msta, near some rapids. Pop. (1880) 9920. Its situation on the great canal and river waterway which connects the Volga with Lake Ladoga, renders it of considerable commercial importance.

BORROW, GEORGE, an English author, born in Norfolk in 1803. He displayed from his earliest years an extraordinary tal ent for languages, and a strong inclination for adventure. In his youth he lived for some time among gipsies, by this means acquiring an exact knowledge of their language, manners, and customs. His travels, as agent for the British and Foreign Bible Society, through almost all countries of Europe and a part of Africa, made him familiar with many modern languages, even to their dialectic peculiarities. Whatever was little known had peculiar charms for him, and he shrunk neither from toil nor danger. True to his youthful predilection, he made the gipsies scattered over every part of Europe one of the principal subjects of his study. His first work *The Zincali, or an Account of the Gipsies in Spain* (2 vols., Lond. 1841), made a favorable impression by its lively and dramatic style. It was followed by *The Bible in Spain* (2 vols., Lond. 1843), a book to which its author is chiefly indebted for his celebrity, and which consists of a narrative of personal adventures as various as it is interesting. The graphic power of the style amply compensates for the rather unmethodical arrangement of the book. After a long interval, B. published a work long before announced, *Lavengro, the Scholar, the Gipsy, and the Priest* (3 vols., Lond. 1851), which was generally regarded as an autobiography, with a spice of fancy mingling with fact. The principal character is depicted with extravagant exaggeration; and the somewhat bizarre originality which gave a peculiar zest to the author's earlier works here appears as mannerism. The book left the hero in the midst of his adventures, which were not continued until 1857, when B. published *The Romany Rye*, a sequel to *Lavengro*. He published *Wild Wales* in 1862, and *Romano Lavo-Lil* in 1874. He died 30th July 1881.

BORROWING has, in the case of *money*, several legal applications of a general nature, in which the law with regard to *bonds*, *mortgages*, and other similar *securities*, has to be considered. See the articles on these subjects. More strictly, borrowing may be described as a contract under the law of *bailments* (see CONTRACT), and may be briefly and simply defined as asking or taking a loan. The essentials of this contract are, that there must be a certain specific thing lent, such as a book, an article of furniture, a horse, or it may be a house, land, or even an incorporeal right. But in the law of England the contract is confined to goods and chattels or personal property, and does not extend to real estate.

Lord Chief-Justice Holt's definition described it as a borrowing of a thing *lent*, in contradistinction to a thing deposited, or sold, or intrusted to another for the sole benefit or purposes of the owner. Again, the borrowing must be gratuitous and for the borrower's use, which use must be the principal object, and not a mere accessory. Such use, too, may be for a limited time or for an indefinite period. The contract must also be of a legal nature, for if it is immoral, or against law, it is utterly void; this, however, is a necessary qualification of all contracts. Lastly, the property which is the subject of the contract must be borrowed or lent to be *specifically* returned to the lender at the determination of the agreement, in which respect it differs from a loan for consumption.

The persons who may borrow and lend are all those who can legally make a contract; a capacity, therefore, which excludes married women, unless they act with the consent of their husbands, when it binds the latter and not the wives.

It is not necessary that the lender should be absolute proprietor of the thing lent or borrowed; it is sufficient if he have either a qualified or a special property therein, or a lawful possession thereof. As to the borrower, he has the right to use the thing during the time and for the purpose intended, whether such intention is expressed or implied; but beyond this he cannot go. The following quotation from Mr. Justice Story's celebrated work on *bailments* (to which reference is generally made), is useful for popular information: 'A gratuitous loan is to be considered as strictly personal, unless from other circumstances, a different intention may fairly be presumed. Thus, if A lends B her jewels to wear, this will not authorize B to lend them to C to wear. So, if C lends D his horse to ride to Boston, this will not authorize D to allow E to ride the horse to Boston. But if a man lends his horses and carriage for a month to a friend for his use, there, a use by any of his family, or for family purposes, may be fairly presumed; although not a use for the benefit of mere strangers.' During the period of the loan, the borrower has no property in the thing, but a mere right of possession and use of it. But, notwithstanding, if the thing lent and borrowed be injured by a stranger, it would appear that the borrower may maintain an action for the recovery of damages; the mere possession of property without title being sufficient against a wrong-doer. See CONTRACT, LOAN, HIRE, besides the subjects above referred to.

BORROWING DAYS. The last three days of March are so called in Scotland and some parts of England. The popular notion is, that these days are borrowed or taken from April, and may be expected to consist of cold or stormy weather. Although this notion dates from a period before the change of the style, a few days of broken and unpleasant weather about the end of March still afford a sanction for old notions concerning the borrowing days. The origin of the term B. D. is lost in the mists of antiquity, though we are inclined to hazard the conjecture that it has no higher source than the popular rhyme in which it is introduced as a poetic fiction. The most dramatic form of this rhyme in Scotland is as follows:

> March said to April:
> 'I see three hoggs on yonder hill;
> And if you'll lend me days three,
> I'll find a way to gar [make] them die!'
> The first o' them was wind and weet,
> The second o' them was snaw and sleet,
> The third o' them was sic a freeze,
> It froze the birds' feet to the trees.
> But when the borrowed days were gane,
> The three silly hoggs came hirplin [limping] hame.

The superstition, if we may call it, respecting the B. D., though now little else than a jocular fancy, was so strong in Scotland in the 17th c., that when the Covenanting army, under Montrose, marched into Aberdeen on the 30th March 1639, and was favored by good weather, a minister pointed it out in his sermon as a miraculous dispensation of Povidence in behalf of the good cause. See Gordon of Rothiemay's *History of Scots Affairs from* 1637 *to* 1641. For further notice of the B. D. we refer to Brand's *Popular Antiquities*.

BORROWSTOUNNE'SS, or BONE'SS, a seaport in Linlithgowshire, on a low peninsula on the Firth of Forth, 17 miles west-north-west of Edinburgh. It has coal-mines extending under the bed of the Firth; and manufactures of salt, soap, malt, vitriol, and earthenware, and a trade in grain. Ironstone, limestone, and freestone also exist in the parish. Graham's Dike, a part of the Roman wall of Antoninus, traverses the parish. Dugald Stewart lived near Borrowstounness. Pop. (1871) 4986; (1881) 6037. In 1880, 2278 vessels, of 272,200 tons, entered the port, and 2265, of 268,210 tons, cleared it. A new dock, with an area of 7¼ acres, was opened here in 1881.

BORSAD, a town in the N. Division of the province of Bombay, in the district of Kaira. It is situated in the elevated region of Gujerat, 1900 feet above the sea level, and is connected by railway with Bombay and Baroda. Pop. (1872) 12,214.

BORY DE SAINT VINCENT, JEAN BAPTISTE GEORGE MARIE, a French traveler and naturalist, was born in 1780 at Agen, now in the department of Lot-et-Garonne. In 1798, he proceeded, along with Captain Baudin, in a scientific mission to New Holland, but separated from him before they reached their destination. On his return he wrote his *Essai sur les Iles Fortunées de l'antique Atlantide* (Par. 1803); and his *Voyage dans le quatre principales Iles des Mers d'Afrique* (Par. 1804). Having joined the army, he served at Ulm and Austerlitz, and on Soult's staff in Spain. He served as a colonel at Waterloo, and afterward had to retire to Belgium. At Brussels he edited, along with Van Mons, the *Annales des Sciences Physiques* (8 vols.). He also produced an admirable work on the subterranean quarries in the

limestone hills near Maestricht (Par. 1821). He returned to France in 1820, wrote for liberal journals, and for Courtin's *Encyclopédie*, &c. In 1827, appeared his *L'Homme, Essai Zoologique sur le Genre humain*. He wrote what relates to cryptogamic plants in Duperrey's *Voyage autour du Monde* (Par. 1828). He rendered an important service to science by editing the *Dictionnaire Classique de l'Histoire Naturelle*. When, in 1829, the French government sent a scientific expedition to the Morea and the Cyclades, the first place in it was assigned to B. de S. V.; and the results of his researches were given to the world in the *Expédition Scientifique de Morée* (Par. and Strasb. 1832, &c.), and in the *Nouvelle Flore du Péloponnèse et des Cyclades* (Par. 1838). In 1839, he undertook the principal charge of the scientific commission which the French government sent to Algeria. He died 22d December 1846.

BO'RZNA, a town of Russia, in the government of Tchernigov, 50 miles south-east of the town of Tchernigov. Pop. (1880) 7580.

BOS. See Bovidæ and Ox.

BOS, Lambert, a Dutch philologist, was born at Workum, in Friesland, 23d November, 1670, and studied at the university of Franeker, where, by the advice of Vitringa, he devoted himself especially to the Greek language. In 1704, he was appointed Greek professor in that university. He died 6th January, 1717. All his works are characterized by thorough scholarship and remarkable acuteness, and notwithstanding the advances of classical criticism since his day, some of them are still consulted, such as his *Vetus Testamentum ex Versione Septuaginta Interpretum* (Franeker, 1709; new edit., Oxford, 1805), his *Ellipses Græcæ* (Franeker, 1702), and more particularly his *Antiquitatum Græcarum præcipue Atticarum Descriptio Brevis* (Franeker, 1714).

BOSA, a town of the island of Sardinia, in the province of Cagliari, near the mouth of the Termo. Lat. 40° 17′ N., long. 8° 27′ E. Notwithstanding its fine situation, partly on the side of a hill, and partly on a plain, it is an unhealthy place. It is surrounded by decaying walls; has an old castle, a cathedral, several monasteries and churches; and a trade in wine, oil, grain, and cheese. Its port admits only vessels of small size. Pop. 6500.

BOSCAN-ALMOGA'VER, Juan, a Spanish poet, born in the year 1500 at Barcelona, of an ancient noble family. He received from his parents a careful education, and came to Granada, to the court of Charles V. The education of the celebrated Duke of Alva was afterwards intrusted to him. He spent the latter part of his life at Barcelona, and was employed in editing his own works and those of his friend Garcilasso de la Vega, when he died some time prior to to 1544. He was the first to make use of Italian measures in Spanish verse, and thus became the creator of the Spanish sonnet. By the introduction of various Italian forms, he made an epoch in Spanish poetry. His poems are still esteemed, but his other literary productions are forgotten. The best edition is that of Leon, 1549.

BOSCAW'EN, Edward, an eminent English admiral, second son of Viscount Falmouth, was born in 1711, and highly distinguished himself at the taking of Puerto-Bello, and at the siege of Carthagena in 1740. In April, 1744, he captured the French ship *Medée*, with 800 prisoners. He had an important share in the victory off Cape Finisterre (May 3, 1747), and six months after received the command of the East Indian expedition; he displayed high military skill in conducting the retreat from Pondicherry. He returned in 1750, and in the following year became a lord of the Admiralty.

In 1755 he was again afloat, and intercepted the French fleet off Newfoundland, capturing two 64-gun ships and 1500 men, including the French commander, Hoquart, whom he had twice before taken prisoner. Next year, now admiral of the blue, he was appointed commander-in-chief of the powerful expedition against Cape Breton, as the fruit of which that island and St. John's were taken after some hard fighting. B. crowned his career by his signal victory over the French Toulon fleet, in the Bay of Lagos, August 18, 1759. On his return home, he received the thanks of parliament, a pension of £3000 a year, a seat in the privy council, and the command of the marines. In the following summer, while his fleet lay idle in the Bay of Quiberon, ravaged by scurvy, B. and some of his men employed themselves in cultivating a garden on a small island, in order to supply the sick with vegetables. He died in the following year. Lord Chatham is said to have testified that when he proposed expeditions to other commanders he heard only of difficulties, but when he applied to B., he found him ready with suggestions and expedients.

BOSCH, Hieronymus de, born at Amsterdam 23d March 1740, died there 1st June 1811, was unquestionably the most distinguished Latin poet of recent times, and a philologist of varied acquirements. His *Poemata* first appeared at Leyden in 1803 (2d ed., Utr. 1808). He rendered an important service to classical literature by his edition of the *Anthologia Græca*, with a metrical translation by Hugo Grotius never before published (4 vols., Utr. 1795—1810, to which Van Lennep added a fifth volume, Utr. 1822). His Discourses and Treatises on subjects of literature, which are mostly composed in the Dutch language, display profound learning, excellent judgment, and refined taste.

BO'SCOBEL, an extra-parochial liberty of England, in the county of Shropshire, about 6 miles east-north-east of Shiffnal. The population of B. is only about 20, but the place is interesting in connection with the escape of Charles II. after his defeat at Worcester in 1651. After the battle, Boscobel House being proposed as a secure retreat, thitherwards Charles turned his steps. At White-Ladies, a seat of the Giffard family, which was reached in the early morning, the king had his long hair cut, his hands and face smeared with soot; and for his royal dress he substituted the green and greasy suit of a countryman, and a leathern doublet. Thus disguised, Charles passed through a secret door into a neighboring wood, in the thickest part of which he sat shivering in the rain until dusk, when he stole out, and along with a guide endeavored to reach Wales, where it was now thought he would be safer than at Boscobel. They reached a royalist's house at Madeley, on the banks of the Severn, at midnight, and it was then found that they could not escape to Wales, on account of the vigilance of the Puritans; and once more, after a day's rest in a stable loft, the king started for Boscobel wood, where he arrived about five o'clock in the morning.

He immediately, along with Major Carlis, who had led the forlorn-hope at Worcester, ascended a thick pollard oak, from which they could watch at intervals during the day the Roundheads in search of them passing by unaware of their near presence. In the evening, they descended from their elevated hiding-place, and made their way to the manor-house, where the king remained hidden for two days. After other adventures, Charles contrived to escape from England on the 17th October.—The title of Boscobel Tracts has been given to certain contemporaneous writings, first published in 1662, giving a graphic description of this passage of the monarch's life. The authorship is generally attributed to Thomas Blount, a loyal gentleman of Worcestershire; but Nash, his grandson, in his history of Worcestershire, denies that they were his, on the authority of Blount himself. But the author, whoever he was, was manifestly a stanch royalist, and his narrative bears evidence that he had good opportunity for ascertaining the truth of all the statements in it.

BO'SCO REA'LÉ, a town of South Italy, in the province of Naples, at the south base of Mount Vesuvius, 10 miles east-south-east of Naples city. It contains several churches and convents. Population, 4552. Good wine is produced in the neighborhood, and much silk. This town was in imminent danger of destruction by the eruption of Vesuvius in 1850, when a stream of lava advanced towards it with a front of about a mile and a half broad, and a depth of about 12 feet, enveloped the town, and consumed the wood on both sides of it, in which were many magnificent oak, ilex, and ash trees. The larger trees, as they were enveloped in the lava, poured out jets of hissing steam from every knot and branch, and then exploded with a loud noise, leaping into the air to the height of 10 or 20 feet.

BO'SCO TRE-CA'SÉ, a town of Italy, situated at the southern base of Mount Vesuvius. It has several churches and convents, and a royal manufactory of arms and gunpowder. Wine and silk are raised in the district. Pop. 2500.

BO'SCOVICH, Roger Joseph, a celebrated mathematician and astronomer, born at Ragusa, 18th May, 1711. He entered at an early age into the order of the Jesuits, and spent his life in scientific pursuits and important public labors. Before the completion of his course of studies in Rome, he was appointed teacher of mathematics and philosophy in the *Collegium Romanum* there. The pope gave him a commission to measure a degree of the meridian in the States of the Church, which he accomplished in the years 1750—1753. In 1764 he was appointed to a professorship in Pavia, but after some time retired from this office. He was subsequently appointed professor of astronomy and optics in the Palatine schools at Milan, and superintended the erection of the observatory in the Brera College, upon which he spent money of his own. After the dissolution of his order, he went to Paris in 1774, and received a pension from the king. B. afterwards went to Bassano, to superintend an edition of his works, on the completion of which he returned to Milan, but fell into a depression of spirits, which at last grew into complete insanity, and he died 12th February, 1787. His works include dissertations on a great variety of important questions in mathematical and physical science, and were published collectively under the title *Opera Pertinentia ad Opticam et Astronomiam* (5 vols., Bassano, 1785. His name is connected with a theory of physics, first published in his *Philosophiæ Naturalis Theoria, Redacta ad Unicam Legem Virium in Natura*

Existentium (Vienna, 1758). He was also a poet, and his Latin poem, *De Solis ac Lunæ Defectibus* (Lond. 1764), has been much admired.

BOSIO, FRANÇ. JOS., BARON, an eminent sculptor, was born 1769 at Monaco, in Sardinia; studied at Paris; and when only 19, returned to Italy, where he executed a multitude of commissions even at that early age. His reputation was greatly increased by the figures which, at the request of Napoleon, he executed for the column in the Place Vendôme. Louis XVIII. and Charles X. also patronized B., the former appointing him royal sculptor, the latter elevating him to the rank of baron. He also enjoyed several professional honors, being director of the Academy of Fine Arts in Paris, and member of the Berlin Academy of Arts. He died July 29, 1845. B.'s principal works are—the 'Hercules' in the garden of the Tuileries; the incomparably beautiful 'Hyacinth' in the Luxembourg; the 'Nymph Salmacis,' a figure displaying wonderful grace and purity of outline; an allegorical figure of France, 7 feet high, surrounded by the Muse of History and a group of Genii; the statue in memory of the Duc d'Enghien; the equestrian statue in the Place des Victoires, and the monument of Count Demidov, 30 feet high, composed of six figures, with bas-reliefs, &c. Besides these, B. executed a great multitude of busts of distinguished persons, such as the Emperor Napoleon, the Empress, Queen Hortensia, the king and queen of Westphalia, Louis XVIII., Charles X., &c. B.'s works are all marked by grace of form, harmony of design, and elegance of finish. His style generally reminds one of Canova.

BO'SJESMAN'S COUNTRY, a region in Africa to the north of the Cape Colony. The inhabitants, a variety of the Hottentot race, are remarkably diminutive in stature, and thoroughly savage in condition. See BUSHMAN.

Bosjesman.

BOSNA-SERAI', SERA'IO, or SARAJE'WO (Ital. Seraglio), capital of the province of Bosnia, is beautifully situated in the midst of gardens on both sides of the Miglliazza, an affluent of the Bosna, about 122 m. S.W. of Belgrade. Its pop. is estimated at 50,000, of whom the majority are Christian Bosniaks, the others Moslems and Jews. Four handsome stone bridges cross the river at different points of the city, which is adorned with many churches and mosques (among them a Christian cathedral), whose gilded domes and whitened minarets and spires give it quite an oriental appearance. B. has a palace built by Mohammed II., and an old castle on a height, erected in 1263 by the Hungarian general Cotroman; its old walls are decayed, and it is now of no military importance. B. has manufactures of tin, iron, and copper goods, and trade in dyeing. Its position makes it an important commercial entrepôt, and it is consequently a busy place. It has also valuable iron mines and mineral baths in the vicinity. The city was taken and occupied by the Austrians after a sharp engagement in August 1878.

BO'SNIA, till 1878 a Turkish vilayet, now a province of the Ottoman empire occupied and administered by Austria. Till 1876 it also included Herzegovina (q. v.), and still comprises the hitherto Turkish parts of Croatia and Dalmatia. It is bounded N. by the Save and Unna; E. by the Vrina, the mountain-chain of Jublanik, and a branch of the Argentaric Alps; S. by the Scardagh Mountains; and on the W. by the mountains of Cosman, Timor, and Steriza. At a few points in the south it reaches to the Adriatic Sea. Area, 20,000 sq. m. Pop. (1879) near 1,000,000; about ⅔ Christians, Moslems, and the rest Jews. With the exception of the northern tract, extending along the Save, it is everywhere a mountainous country, and is traversed by more or less elevated ranges of the Dinaric Alps, whose highest peaks rise to a height of from 5000 to 7700 feet above the sea, and are covered with snow from September to June. The mountain slopes are for the most part thickly covered with forests of oak, beech, lime, chestnut, &c., of magnificent growth, and only here and there exhibit meadows, pastures, and cultivated spots.

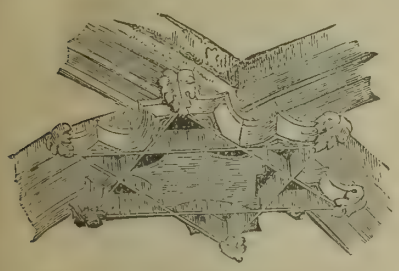
The principal river of the country is the Save, on the northern border, into which flow the Unna, the Verbas, the Bosna, and the Drin. The Narenta and the Boyana fall into the Adriatic Sea. The air is salubrious, the climate temperate and mild. It is only in the plain that agriculture is carried on to a considerable extent; grain, maize, hemp, vegetables, fruits, and grapes are produced in great abundance; and their cultivation would be much more extensively and actively prosecuted, but for the heavy impositions laid upon this branch of industry by the Turkish government. Game and fish abound, as well as wild animals, such as bears, wolves, lynxes, &c. The country is celebrated for the breeding of sheep, swine, goats, and poultry; and bees, both wild and tame, are very numerous. The gipsies and Morlacks dig for lead, quicksilver, coal, and iron; but beyond this, mining, owing to repressive government, is entirely neglected, although the country is rich in metallic ores. Commerce and manufactures—chiefly limited to the fabrication of firearms, sabre-blades, and knives—are entirely confined to the towns. The position of B. gives it the transit trade between Austria and Turkey. It has almost no good roads. The population consists of Bosnians, Croats, Morlacks, Montenegrines, Turks, &c., the much greater part of the Slavonian race. The Bosnians, or Bosniaks, who form about a third of the inhabitants, are partly Mohammedans (descendants of Slavonian Christians who changed their religion at the time of the Mohammedan conquest), and partly of the Greek and Roman Catholic Churches. They are brave, hardy, rapacious, and cruel; rude and repulsive towards strangers, yet among themselves they are peaceful and honest; they are also industrious, simple in their habits, and temperate. The Moslem women in B. are less secluded than in the other Turkish provinces, and have long enjoyed the liberty of appearing in public more or less veiled. The Croats, who form about a sixth of the population, belong partly to the Greek and partly to the Roman Catholic Church; only a few are Mohammedans. They are principally engaged in agriculture, the feeding of cattle, and the barter trade. The Morlacks, who number about 150,000, dwell mostly in the district of Herzegovina, and are courteous and clever in business. They are inveterate enemies of the Turks. Three-fourths of them are Greek Christians, and the rest Roman Catholics. The Osmanli Turks in B. are but about 2000 in number; the number of Greeks and Jews is between 20,000 and 30,000. B., in ancient times, was included in Pannonia; and previous to the 7th c., was governed by princes of its own, called Bans or Waiwodes, who became dependent on Hungary. Being conquered by the Turks, it was finally annexed to the Ottoman empire in 1522. A dangerous rebellion broke out in 1851. The insurrection which originated in Herzegovina in 1875, soon assumed the proportions of a national movement, and led to war between Turkey and Servia and Montenegro. The war of 1877–78 between Russia and Turkey followed; the treaty concluded at the close of it proposed to give B. administrative autonomy, but the Berlin Conference of 1878 resolved that B. should be occupied and administered by Austria (the sanjak of Novi-Bazar being put under special arrangements). The Bosnians sympathized with and supported the Anti-Austrian and Pan-Slavonic rising in Herzegovina and Dalmatia in 1882.

BO'SPORUS (of which *Bosphorus* is an ancient and common variation), the ancient name of the channel which separates Europe from Asia, and connects the Black Sea with the Sea of Marmora. The name, which signifies Ox-ford or Cow-ford, was given to it because here, according to the legend, Io, transformed into a cow, swam across; or, as is very generally supposed, because it is so narrow that an ox might swim across. Afterwards, as the same name was bestowed upon other straits, this was designated the *Thracian Bosporus*. Its south and north entrances have two lighthouses each. Its shores are elevated, and throughout its length the strait has 7 bays or gulfs, with corresponding promontories on the opposite side. One of these gulfs forms the harbor of Constantinople, or, as it is often called, the Golden Horn. The length of the Thracian B. is about 17 miles, with a breadth of from little more than a third of a mile to two miles. At the middle of this strait, where it is about 2800 feet in breadth, Darius made his bridge of boats when he marched against the Scythians. The B. has long been under Turkish control. Repeated European conferences, including that of Berlin in 1878, have confirmed the stipulation of the treaty made in 1841, providing that no ship of war belonging to any nation but Turkey shall pass the B. without the consent of the Ottoman authorities.

The name of CIMMERIAN BOSPORUS was given by the ancients to the Strait of Kaffa (q. v.), also called the Strait of Yenikalé or of Theodosia. The country on both sides of the Cimmerian B. formed, in ancient times, the kingdom of Bosporus, which was founded in 502 B.C. In 393 the kingdom was extended along the Asiatic coast; and Theodosia was united with it in 360. The kingdom became tributary to the Scythians in 290; and in the year 116 B.C., Mithridates, king of Pontus, vanquished the Scythians, and set his son, Machares, on the throne of Bosporus. On the death of Machares, soon followed by that of Mithridates, the Romans gave the country, in 63 B.C., to Pharnaces, the second son of Mithridates, and after his assassination, to several princes who gave themselves out for descendants of Mithridates. When at last the family became entirely extinct, in 259 A.D., the Sarmatians made themselves masters of the kingdom, from whom the inhabitants of the Chersonesus took it in 344. Along with Tauric Chersonesus, it afterwards formed a part of the Eastern Roman Empire, until the Chazars, and afterwards the Tatars, under Mongolian princes, made themselves masters of it. See TAURIDA.

BOSQUET, Pierre François Joseph, a distinguished French marshal, born 8th November 1810 at Mont de Marsan, in the department of Landes, entered, in 1829, the Polytechnic School at Paris, and in 1833 joined the artillery as sub-lieutenant. In June 1834, he proceeded with his regiment to Algeria, where he became conspicuous for his military tact, energy, and valor. In 1847, he had attained the rank of colonel, and the following year he was named general of brigade by the republican government. In the end of 1853, he returned to France, and in 1854 was appointed by the emperor general of division. He had the command of the second division of the French army in the Crimea, and at the battle of the Alma, 20th September, his successful manœuvres against the Russian left wing were mentioned in Marshal St. Arnaud's dispatch to the emperor as deciding the fate of the day. At Inkermann, 5th November, he contributed greatly to the defeat of the Russians. His conduct on this occasion was noticed with praise by Lord Raglan in his dispatch, and the British parliament voted its thanks to him in a special resolution. He also took a leading part in the capture of the Malakoff, 8th September 1855; but a wound he received from the bursting of a shell obliged him to retire to France. In 1856 he was made field-marshal. He died in 1861.

BOSS, in Architecture, a raised ornament, covering the intersections of the ribs of ceilings. They are more frequently seen in vaulted roofs, as in the aisles of a church, but occur also where the ceiling is flat. In early Norman work there are generally no bosses, and they become richer and more frequent as we advance towards the decorated and perpendicular styles. In the decorated



Boss.—From Notredame la Riche, Tours.

Boss, on Norman shield.

style the B. usually consists of foliage, sometimes combined with animals, heads, and the like. Coats-of-arms, charged with armorial bearings, came then also to be used for this purpose, though they were more frequent in the perpendicular.—The B. of a bit is the ornament with which a bridle-bit terminates at each end. It was borne in the arms of the corporation of Lorimers. See Lorimer.

BOSSI, Luigi, an Italian archæologist and historian, was born at Milan in February 1785; studied at Pavia, and became a canon of the cathedral of Milan; but when the French entered Italy, he took the side of the invaders, and was appointed by Bonaparte agent of the French government at Turin, and afterwards prefect of the archives of the kingdom of Italy. He died at Milan 10th April 1835. He was an extremely prolific author, and produced more than 80 works, great and small, including theological and religious works, dissertations on antiquarian subjects, historic works, works on subjects connected with the fine arts, tragedies, comedies, &c. That his works have afforded many opportunities for unfavorable criticism, is only what might be supposed, from their number and variety. His *Introduzione allo Studio delli Arti del Disegno*, is instructive and much esteemed. His most important historic works are a much enriched translation of *Roscoe's Life of Leo X.* (12 vols., Milan, 1816—1817); *Researches concerning Christopher Columbus* (Milan, 1818); and a *History of Italy* (19 vols., Milan, 1819—1823).

BOSSUET, Jacques Benigne, a distinguished French pulpit orator, was born, 27th September 1627, at Dijon; received his earlier education in the Jesuit college there; and then came to Paris to the College of Navarre, where he studied the Sacred Scriptures, the works of classical antiquity, and the Cartesian philosophy. In 1652, he was made a doctor of the Sorbonne, and a canon in Metz. Here he was called by the bishop to reply to the Catechism of the Protestant minister, Paul Ferri, and this he did in a way that commanded the admiration even of Protestants. He soon attained great distinction as a pulpit orator, and in 1661 he was made preacher to the court. His discourse on the occasion of Marshal Turenne's conversion to the Catholic church obtained for him the bishopric of Cordan. The king having, in 1670, intrusted to him the education of the Dauphin, he resigned his bishopric in 1671, because he believed that he would be unfaithful to his duty if he retained it during a continued absence from his diocese. He was now made a member of the Academy. The care with which he attended to the education of the Dauphin was rewarded, in 1680, by his nomination as first almoner of the Dauphin, and in 1681 by his appointment to the bishopric of Meaux. He was the author of the four articles, which secured the freedom of the Gallican Church, and the rights of the king in regard to it, against the aggressions of the pope; and his eloquence in the Assembly of the French clergy, in the year 1682, obtained their adoption of these articles. In 1697, he became a member of the Council of State, and in the following year first almoner to the Duchess of Burgundy. He spent the last year of his life in his diocese, where he died 12th April 1704. He was alike strict in morals and in religious doctrine; his strictness in the latter he showed particularly in his controversy with Fénélon (q. v.), whom he accused of heresy for his defence of the Quietists (q. v.). His style is vigorous and artistic. His orations at the funerals of the Duchess of Orleans and the great Condé are particularly noted as masterpieces of this kind of eloquence. All his writings attracted much attention. For the defence of those dogmas of the Catholic Church which are rejected by Protestants, he wrote his *Exposition de la Doctrine de l'Eglise Catholique sur les Matières de Controverse* (Par. 1671). His greatest controversial work is his celebrated *Histoire des Variations des Eglises Protestantes* (2 vols., Par. 1688), in which he founds his argument chiefly upon the doctrinal diversities of the churches of the Reformation. To the defence of the four articles of the Gallican Church he devoted his *Defensio declarationis celeberrimæ, quam de Potestate Ecclesiæ sanxit clerus Gallicus a.* 1682 (2 vols., Luxemb. 1730). With a view to the instruction of the Dauphin, he wrote his *Discours sur l'Histoire Universelle jusqu'à l'Empire de Charlemagne* (Par. 1681), a work particularly deserving of notice, as the first attempt at a philosophical treatment of history. The continuation of it to the year 1661 (Par. 1805) is entirely derived from materials which he left behind him, but to which the last touch of his own hand was wanting.

Another fruit of his political and historical studies, was the *Politique tirée de l'Ecriture Sainte* (Par.1709). The most complete edition of his works is that published under the care of the Benedictines (46 vols., Versailles, 1815—1819.)—His nephew, Jacques Bossuet, died bishop of Troyes, 12th July 1743. His very extensive correspondence, chiefly devoted to the elucidation and investigation of the views of Fénélon, is included in the abovementioned edition of the works of his uncle.

BOSSUT, Charles, a French mathematician and natural philosopher, born 11th August 1730, at Tartaras, near Lyon. So early as the year 1752 he became professor of mathematics in Paris, and in 1768 was received into the Academy of Sciences. The revolution deprived him of his situation and his income, and he lived in the greatest seclusion, and in almost misanthropical discontentment, till under the Empire he was appointed a professor in the Polytechnic School. He died 14th January 1814. His works are very numerous. The following may be mentioned as particularly valuable: *Recherches sur la Construction la plus avantageuse des Digues* (Par. 1764); *Recherches sur les Altérations que la résistance de l'éther peut produire dans le Mouvement des Planètes* (Par. 1776); *Nouvelle Expérience sur la Résistance des Fluides, par d'Alembert, Condorcet, et Bossut* (Par. 1777); *Traité élémentaire de Mécanique et de Dynamique* (Charleville 1763); *Cours Complète des Mathématiques* (7 vols., Par. 1795—1801); *Cours de Mathématique á l'Usage des écoles Militaires* (2 vols., Par. 1782); *Essai sur l'Histoire Générale des Mathématiques* (2 vols., 2d ed., Par. 1810), one of the best works on the history of mathematics; and *Traité du Calcul Différentiel et Intégral.* All his works are distinguished by methodical arrangement and great clearness. He was a great admirer of Pascal, and edited his works (15 vols., Par. 1779), to which he prefixed an introductory *Discours sur la Vie et les Ouvrages de Pascal*, in 5 vols.

BOSTA'N (El), a town of Asiatic Turkey, in the pashalic of Marash, situated in a plain on the Sihun, on the north side of Mount Taurus. Lat. 38° N., long. 36° 23′ E. B. can be surrounded with water on the approach of an enemy; it has several mosques, and a considerable trade in wheat. It occupies the site of the Cappadocian Comana, which had a celebrated temple dedicated to a deity which is 'supposed to have been called *Ma* in the language of the country, and to be the moon-goddess.' Pop. between 8000 and 9000.

BOSTANJI, a class of men in Turkey who, originally the sultan's gardeners (the name being derived from *bostan*, a garden), now perform, in addition to their garden labor, a variety of duties, such as mounting guard at the seraglio, rowing the sultan's barge, and attending on the officers of the imperial household. They are under a chief called Bostanji Bashi, who holds the rank of a pasha, and is governor of the sultan's residences, and steersman of his barge. He also holds the inspector-generalship of the woods and forests in the vicinity of the capital, has the jurisdiction of the shores of the Bosporus and Sea of Marmora, and is, altogether, so important a functionary that only personal favorites of the sultan can hope to fill the office. The financial reforms of Sultan Mahmoud, however, have greatly lessened the emoluments of the post. The B. at one time amounted to 5000, and were di-

vided into companies like the janissaries, with whom they were united in military duty. In war-time, their strength was 12,000. A scarlet bonnet, of excessive dimensions, formed the distinctive part of their costume. Their number now does not amount to more than 600.

BO'STON, an ancient English borough and seaport in Lincolnshire, on both sides of the Witham, 28 miles south-east of Lincoln. It is supposed to be identical with the Icanhoe, where St. Botolph founded an abbey in 654, destroyed in 870 by the Danes. Under the Normans, B. became a place of importance, and in 1204 it paid the largest dues (£780) of any English port except London (£836). In the reign of Edward III., many foreign traders settled, and the merchants of the Hanseatic League established a guild in Boston. After their departure, the town declined, and the suppression of the monasteries by Henry VIII. further injured it; but his grant of charter of incorporation, and Mary's subsequent grant of extensive lands, partly compensated for this. The modern town consists chiefly of two good streets, one on each side of the river. The parish church of St. Botolph (1309), 245 by 98 feet, is one of the largest without cross aisles in England, and has a fine tower 300 feet high, surmounted by a lantern visible 40 miles out at sea. The church was partially restored in 1857 at the expense of the inhabitants of Boston in America. The clearing of the river of silt and the closing of the adjacent fens have greatly promoted the trade of Boston. Vessels of 300 tons can reach the heart of the town. The chief export is corn. Pop. of muni. bor., (1871) 14,526; of parl., 18,279; (1881) 14,932 and 18,887. For bribery and corruption, it was determined in 1882 temporarily to disfranchise B., which heretofore returned two members. B. is a great market for cattle and sheep, and manufactures canvas, iron, brass, ropes, leather, bricks, whiting, and hats. In 1880, 471 vessels, of 35,651 tons, entered, and 476, of 34,968 tons, cleared the port.

BO'STON, capital of Massachusetts, United States, stands at the west end of Massachusetts Bay, on an inlet, which, whether for defence or trade, forms one of the best havens in the world. This inlet, known as Boston Harbor, the primary source of the city's growth and prosperity, has a seaward barrier of two headlands, the interval of 4 miles being so subdivided by an insular breastwork as to leave only three practicable entrances, the main one barely wide enough for two vessels to pass one another; while the enclosed space of about 75 square miles—at least half of it affording depth for the largest ships—greatly augments, with its islands and its peninsulas, both its military and its commercial capabilities. On an oblong peninsula, of about 700 acres, running to the north-east, B. was founded in 1630, its original owner, John Blackstone, selling out his right and title, five years thereafter, for £30. With so well chosen a site, and, doubtless, also through the industry and enterprise of its Puritan occupiers, the new town increased so steadily in wealth and population, that in less than a century and a half it became the foremost champion of a colonial independence. Since then it has overleaped its natural limits, swarming off, as it were, into an island towards the north-east and into the mainland on the south-east, and consists of Old, East, and South Boston; Roxbury, annexed in 1868; Dorchester, annexed in 1870; and Charleston, Brighton, and West Roxbury, annexed in 1873; which are connected together by bridges. An immense dam called the Western Avenue connects the whole with the inner side of the harbor. All the divisions of the city are of an uneven surface. Undulation, in fact, is a characteristic of the entire neighborhood—continent, islands, and peninsulas alike. From this irregularity, so different from the straight and formal lines of street in American cities, and also from being built of a very neat kind of brick, B. has much the appearance of a substantial English provincial town; the resemblance being perhaps heightened by the dress, manners, and feelings of the inhabitants, who are essentially of the old British types, as befits the descendants of the 'Pilgrim Fathers.' On a peninsula, to the north of East B., rises Bunker's Hill, so famous in the War of Independence; while the Dorchester heights, only less famous, occupy the center of South B.; and, lastly, the peninsula of Old B. seems to have originally taken the name of Tremont, from its three mounts or hillocks. Between 1840 and 1850 the population had swelled from 93,383 to 136,881; (1860) 200,000; (1870) 250,526; (1880) 362,535.

Among the public buildings, the principal are the State House, City Hall, Faneuil Hall, Faneuil-hall market, Massachusetts hospital, post-office, custom-house, county jail, houses of industry and correction, 4 theaters, an athenæum, an odeon, a library, an admirable music hall, and 200 churches, including the very handsome Roman Catholic Cathedral. Among other objects worthy of note are the Common, a beautiful park of 50 acres, on the peninsula; the wharfs and quays; and the bridges, 16 in number, which unite together the different portions of Boston. The waterworks demand special mention. To say nothing of an earlier enterprise of the kind on a smaller scale, the waters of Lake Cochituate, distant 20 miles, have since 1848 been conveyed by a brick conduit into the grand reservoir of Brookline, at the further end of the Western Avenue, and thence been carried into the subordinate reservoirs respectively of the different sections of the city. The annexation of Charlestown brought with it the waters of Mystic Lake. B., as the center—social, political, and commercial—of the best educated and most intelligent state in the Union, is pre-eminent throughout the republic in literature and science. Its trade, likewise, is marvelous: it is, in fact, more marvelous in proportion to physical facilities, than even that of New York, for while the latter city, with the lakes on the one side and the ocean on the other, and with the Hudson as a link between them, drains regions of vast extent and singular fertility, B., to say nothing of rugged soil and ungenial climate, is cut off from the interior, such as it is, by the entire want of inland waters. But what New York has so largely inherited from nature, B. has in some measure created for itself. By eight great systems of railway it reaches, besides the coasts to the north and south, the St. Lawrence and the Lakes, the Hudson and the Mississippi; while, as the Transatlantic terminus of the Cunard line, it virtually connects those channels of communication with Great Britain and its net-work of iron roads. In several departments of maritime trade, such as the coasting intercourse and the trade with Russia, India, and China, B. is understood to possess far more than its share; and as the port of the manufacturing districts of the Union, it may be said to monopolize the carrying alike of raw material and of finished goods. The chief exports are beef, pork, lard, fish, ice, woollens, cottons, paper, boots and shoes, cordage, hardware, and furniture; while the imports, wafted from all corners of the world, comprise nearly every article that has a name in commerce. While B. ranks as the second city in the Union for commerce, its charitable institutions, schools, and public libraries are in harmony with the city's importance in other respects.

The B. public library, with more than 300,000 volumes, is the largest in the United States after that of Congress. The *News Letter*, the first journal issued in North America, was published here in 1704; there were in 1880 about 150 periodical publications in B., nine of which were dailies. B. University, incorporated in 1869, has the following departments: college of liberal arts, music, agriculture, theology, laws, medicine, and sciences. In allusion to the good opinion which the natives of B. entertain of their prosperous and privileged city, it has been banteringly styled 'The Hub of the Universe.' In 1822, B. adopted a municipal organization. A great fire in the end of 1879 did damage to the amount of $1,000,000. See BOSTON in AM. SUPP.

BOSTON, THOMAS, a Scottish divine, once extensively popular, was born of poor parents at Dunse, Berwickshire, March 7, 1676. As early as his 12th year he was concerned about the state of his soul, and while only a boy at the grammar school, he formed a society of three for religious conference and social prayer. After a hard struggle, he succeeded in entering Edinburgh University in 1691. He received license as a preacher in 1697, and was greatly appreciated by the serious portion of the community; but his uncompromising character prevented him from receiving a clerical charge for two years. He was then ordained minister of Simprin, and in 1707 was translated to Ettrick, where he died on the 20th May 1732. Of his voluminous works the best known, but not the most agreeable, is the *Fourfold State*, published in 1720. It discourses of man's paradisaical integrity, his ruin by the fall, his begun regeneration on earth, and consummate bliss or woe hereafter. An excellent little treatise of B.'s is entitled *The Crook in the Lot*. As a pastor, B. was eminently laborious, and deservedly popular. In the ecclesiastical courts, he distinguished himself by his zeal in defence of the church's independence, and in the controversy regarding the *Marrow of Modern Divinity* (which was objected to as being too free in its offers of salvation), he was one of the ten ministers who declared their approval of that work. See MARROW CONTROVERSY. As a theologian, B. is perhaps the most 'Representative Man' in the whole list of Scottish divines. His language, sentiments, and peculiar modes of expressing the peculiarities of Calvinistic psychology, have colored the style of Scottish preaching more than any other writer of the same school has done. Although often displaying what we should now call narrowness and ignorance, B. exhibits also flashes of insight and beauty, quaint felicities of diction—as, for instance, when in *The Crook in the Lot*, he warns the profligate against the possibility of a 'leap out of Delilah's lap into Abraham's bosom'—and an occasional shrewdness of thought, which are even yet worth studying. B.'s autobiography used to be a great favorite with the Scottish peasantry.

BO'SWELL, JAMES, Esq., of Auchinleck, in Ayrshire, celebrated as the friend and biographer of Dr. Samuel Johnson, was born October 29, 1740, at Edinburgh, where his father was one of the judges of the Court of Session, and as such was styled Lord Auchinleck. He was intended by his father for the profession of an advocate, and studied first at Glasgow, and afterwards at the then famous university of Utrecht, to which he went in 1763.

When in London in that year he made the acquaintance of Johnson, an event of decisive importance for his whole subsequent life. The acquaintance was earnestly sought by himself, and originated in his strong literary tastes and his ardent admiration of Johnson's writings. He spent one winter at Utrecht, and then proceeded on a tour through Germany, Switzerland, and Italy, and visited Corsica with a letter of introduction from Rousseau to Paoli, with whom he contracted a warm and lasting friendship. He enthusiastically adopted the cause of Corsican independence; and after his return to Scotland, published an *Account of Corsica, with Memoirs of General Pasquale Di Paoli* (Glasg., 1768; 3d ed., Lond. 1769), which was speedily translated into several languages. B. became a member of the Faculty of Advocates in 1766, but never devoted himself with earnestness to the business of law. In 1773, he was admitted into the Literary Club instituted by Johnson, and of which Burke, Goldsmith, Reynolds, and Garrick were members. From this time he made it his principal business to note down the sayings and doings of Johnson, with whom he associated on most intimate terms, and whom he accompanied on his tour in Scotland and the Hebrides in 1773. Boswell was married in 1769 to a lady named Montgomery, by whom he had several children. Led by his taste for London society, he removed thither at a mature period of life, and entered at the English bar, but without attaining to any success in the profession. After Johnson's death in 1784, he employed himself in arranging the materials which he had collected, and preparing his long-contemplated biography. His *Journal of a Tour to the Hebrides* appeared in 1785, his *Life of Samuel Johnson*, in 2 vols., in 1791. Both have gone through many editions. Boswell has been emphatically styled by Macaulay 'the first of biographers.' His work is indeed full of details, but they are such as exhibit character, and are arranged in the most interesting manner. He neither conceals his own faults, nor those of Johnson, but presents a picture of which the truthfulness is too evident to be questioned; and Johnson is perhaps already better known by the pages of B. than by any of his own writings.

B. died in London, June 19, 1795. Besides the works already mentioned, he was the author of one or two minor productions of temporary interest. In December, 1856, there was published a posthumous volume of *Letters of James Boswell, addressed to the Rev. W. J. Temple, from the Original MSS.*, in which the gay, *insouciant* character of the man very strongly appears. His eldest son, SIR ALEXANDER BOSWELL, Baronet, of Auchinleck, born 1775, was the author of a number of Scottish songs, full of humor, which he collected into a volume entitled, *Songs, chiefly in the Scottish Dialect* (Edin. 1803), and some of which attained considerable popularity. He also wrote *Edinburgh, or the Ancient Royalty*, a picture of Scottish manners in the dialogue form, and edited many of the older productions of Scottish literature. A duel with Mr. Stuart of Dunearn, occasioned by personal allusions in a publication connected with a parliamentary election, resulted in his death on March 26, 1822.

BOSWE'LLIA, a genus of trees of the natural order *Amyridaceæ* (q. v.), having flowers with a small five-toothed calyx, five petals, and a crenulated glandular disk; a triangular capsule with three valves, three cells, and one seed in each cell; the seeds winged on one side; their cotyledons intricately folded, and cut into many segments. Two or three species only are known, of which the most interesting is *B. serrata* (or *B. thurifera*), the tree which yields OLIBANUM (q. v.), now very generally believed to have been the FRANKINCENSE (q. v.) of the ancients. It is a large timber-tree, with pinnate leaves, which have about ten pair of hairy serrated oblong leaflets, and an odd one, each leaflet about 1—1½ inch in length. The flowers are small and numerous, in axillary racemes, and of a pale pink color. When the bark is wounded, the olibanum flows out, of a delightful fragrance, and hardens by exposure to the atmosphere. The tree is found in the mountainous parts of Coromandel, and is supposed to be a native of other parts of India, and of Persia, Arabia, and perhaps Abyssinia. *B. glabra*, a very similar species, a native of India, also yields a resin, comparatively coarse, which is sometimes used for incense, and is boiled with oil as a substitute for pitch.

Boswellia serrata:
a, part of a branchlet, with leaf and raceme of flowers; *b*, a single flower; *c*, a capsule, cross section.

BO'SWORTH, or MARKET BOSWORTH, a market-town in Leicestershire, on an eminence in a very fertile district, 12 miles west of Leicester. Pop. in 1881, 6409, many of whom are employed in knitting worsted stockings. On the moor in the vicinity was fought, 1485, the battle in which Richard III. was slain, and which terminated the Wars of the Roses. On an elevation, called Crownhill, Lord Stanley placed the crown on the head of the Earl of Richmond, Henry VII. Here Simpson the mathemarician was born; Dr. Johnson was an usher in the Free Grammar School, in which Salt the Abyssinian traveler, and Richard Dawes the Greek critic, were educated.

BOSWORTH, JOSEPH, D.D., a distinguished philologist, was a native of Derbyshire, where he was born in 1789. He graduated first at Aberdeen, and afterwards at Leyden; he also took the degrees of B.D. and D.D. at Cambridge and Oxford. He obtained a curacy in the English Church in 1815, and two years afterwards the vicarage of Horwood Parva, Buckinghamshire. He now devoted such time as an active discharge of his parochial duties left at his disposal to literature, and especially to researches in Anglo-Saxon and its cognate dialects. The results of his labors appeared in 1823 in a work, entitled *Elements of Anglo-Saxon Grammar*. Fifteen years afterwards, he published the work by which his name is best known, *A Dictionary of the Anglo-Saxon Language* (Lond. 1838; of which a new edition by T. Northcote Toller was published in 1882). This was at the time a very valuable work; an abridged edition was afterwards issued by the author. B. resided in Holland eleven years, from 1829 to 1840, as British chaplain. He returned to England in 1840, and was presented to the vicarage of Waithe, in Lincolnshire. In 1858 he became rector of Water Stratford in Buckinghamshire, and also Professor of Anglo-Saxon at the University of Oxford. In 1865, he published the Gospels in Gothic of 360 A.D., and the Anglo-Saxon of 995 A.D., in parallel columns with Wycliff's version of the year 1389, and Tyndale's of 1526. He was author of various other works of a philological character. His death took place on May 27, 1876.

BOSZORME'NY, the chief of the six towns of the free district of Hajduk, in the east of Hungary, about ten miles north-northwest of Debreczin. It carries on an active trade in rye, tobacco, water-melons, soda, and saltpetre. The population in 1880 amounted to 20,000.

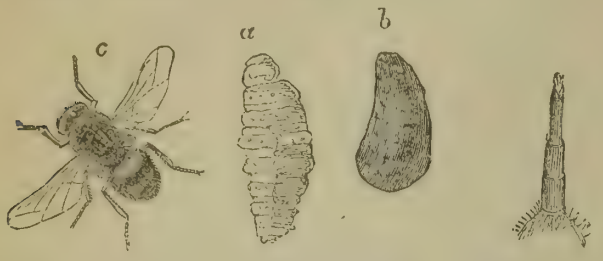
BOT, BOT-FLY, and GAD-FLY, names common to many insects of the family *Œstridæ* (q. v.) or *Œstracidæ*, the genus *Œstrus* of Linnæus. The name bot is sometimes restricted to the larvæ, which appears to have been its original use, the other names having been given to the perfect insects; the name gad-fly often to insects of the genus *Tabanus* (q. v.), to which some try to restrict it. The insects of this family are now supposed not to be those which were called *Œstrus* by the ancients, although, like them, extremely troublesome to cattle. They are Dipterous (two-winged) (q. v.) insects, nearly allied to the *Muscides* (House-fly, Flesh-fly, Blow-fly, &c.), with small 3-jointed antennæ, and mouth destitute of a proboscis.

Horse Bot-fly:
a, a horse-hair with eggs of bot-fly; *b*, one egg magnified; *c*, larva; *d*, pupa; *e*, perfect insect, a little larger than life.

—The Horse-bot, or Gad-fly of the Horse (*Gasterophilus*, or *Gastrus*, or *Œstrus Equi*), sometimes also called the *Breeze* and *Horse-bee*, is much less common in Britain than in some parts of the continent of Europe, and occurs chiefly in elevated and healthy districts. It is not quite half an inch in length, woolly, with yellowish gray head, rusty thorax, abdomen, and the wings whitish, with brownish-gray spots. The abdomen of the female terminates in a blackish horny tube. In the latter part of summer, the female hovers about horses, and deposits her eggs on their hairs, where they remain attached by a glutinous substance until they, or the larvæ just emerging from them, are licked off by the tongue of the horse, their destined place being its stomach. It is believed that the fly deposits her eggs only on those parts which are accessible to the horse's tongue, seeming to prefer the back of the knee-joint, where they may sometimes be found in hundreds. The larva is yellowish, without feet, short, thick, soft, composed of rings which have a double row of short teeth surrounding them; it is somewhat acuminated at one end—the head; and the mouth is furnished with two hooks, one on each side, for taking hold of the inner coat of the horse's stomach, to which the B. attaches itself, and from which it derives its subsistence, hanging in clusters sometimes of three or four, sometimes of more than one hundred. Here it spends the winter, and in the following summer, when it is about an inch long, it disengages itself, and being carried

through the horse's intestines, burrows in the ground; and changes into an oval black pupa with spiny rings, from which, in a few weeks, the perfect insect comes forth. Multitudes, of course, become the prey of birds, before they can accomplish their burrowing.—It has been disputed whether or not bots are very injurious to horses; and some have even maintained that, when not excessively numerous, their presence is rather beneficial, an opinion, which is certainly not recommended by its apparant probability, whilst it seems to be universally admitted, that in great numbers they are hurtful.—The Red-tailed Horse-bot (*G.* or *Œ. hæmorrhoidalis*), also a British species, deposits its eggs upon the lips of the horse, distressing it very much by the annoyance which it gives in so doing. The larvæ attach themselves chiefly to the surface of the intestine, about the anus of the horse, and sometimes cause an annoying irritation.

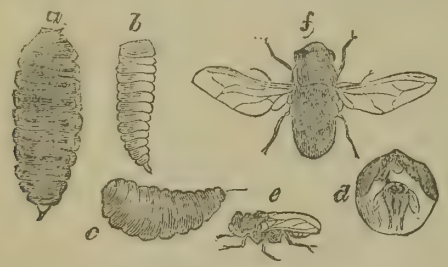
Linseed-oil is used for their removal.—The OX-BOT, or Ox Gad-fly (*Œstrus* or *Hypoderma Bovis*) is more troublesome than any other species of horse-bot. It is a beautiful insect, not quite half an inch long, and thicker in proportion than the horse-bots; it has brown unspotted wings; the face whitish, the crown of the head brown, the thorax black, the abdomen whitish, with a broad black band around the middle, and yellow hairs at the extremity, where also the female has an ovipositor—a remarkable organ, formed of a horny substance, and consisting of four tubes retractile within one another, like the pieces of a telescope; and the last



Ox Bot-fly:—*a*, larva, full-grown, natural size; *b*, pupa; *c*, perfect insect, a little larger than life.

Ovipositor of Bot-fly highly magnified.

of them terminating in five points, three of which are longer than the others, and hooked. By means of this organ, a small round hole is pierced in the hide of an ox's back, in which an egg is deposited. The fly is very quick in depositing her egg, not remaining upon the back of the animal more than a few seconds. Cattle exhibit great alarm and excitement at the presence of the gad-fly, and rush wildly about, with head stretched forward, and tail stuck out, to escape from their tormentor. The further injury done by this insect is not, however, usually great; the larva—a little pearl-white maggot (*warble* or *wormal*)—feeding upon the juices beneath the skin, causes a swelling, called a *warble*, forming a sort of sac, within which it lives and grows, amidst a kind of purulent matter suited to its appetite; and from which it finally emerges, leaving a small sore, and like the horse-bot, undergoes its further transformations in the ground. By pressure on the warbles, bots may be destroyed, and when they are numerous, assiduous oiling of



Sheep Bot-fly:—*a*, larva, full grown; *b*, larva, younger; *c*, pupa; *d*, the face of the perfect insect, magnified: *e*, perfect insect, natural size; *f*, perfect insect, magnified.

the back of the ox is resorted to for the same purpose.—The SHEEP-BOT (*Cephalemyia* or *Œstrus Ovis*) is a much more serious pest than any other British species, and is not unfrequently very destructive to flocks. The insect is smaller than either the ox-bot or horse-bot; it is of grayish color, with a large head and yellow face, and is most abundant in damp situations and woody districts. It is to be seen chiefly in the months of June and July. Sheep exhibit great alarm when it approaches them, and seem to seek, by keeping their noses close to the ground, and by incessant motion of their feet, to keep it from entering their nostrils.

It is in the nostrils of the sheep that this fly deposits its eggs, and the larvæ, when hatched, make their way into the maxillary and frontal sinuses, feeding upon the juices there, until they are ready to change into the pupa state, in April or May of the following year, when they find their way again through the nostrils to the ground. They seem to cause great irritation in their progress up the nostrils of the sheep, and the poor animals run hither and thither, snorting and in great excitement. 'The common saying, that a whimsical person is *maggoty*, or has got *maggots in his head*, perhaps arose from the freaks the sheep have been observed to exhibit when infested by their bots.' The bots cause considerable irritation in the cavities where they usually fix themselves, and sometimes get into the brain, and cause death.—These larvæ move with considerable quickness, holding on by the hooks with which their mouth is furnished, and contracting and elongating the body. It is said that flocks fed where broom is in flower are never infested with them; and when many cases arise in a flock, it is found particularly advantageous to remove it to a dry soil.—Goats, deer, and other quadrupeds are also liable to be assailed by different kinds of gad-fly. The eggs of one of the species which attacks the fallow-deer, are deposited in the nostrils, and the larvæ make their way in large numbers to a cavity near the pharynx. Rein-deer are excessively tormented by these insects, one kind depositing its eggs in their nostrils, and another in their skin; and it is no infrequent thing for a large part of a flock to be destroyed by them. When feeding where bot-flies are numerous, they keep such watch against them, that they neglect to eat, become emaciated, and often actually perish in consequence.—Even human beings have sometimes been afflicted by insects of this family. Humboldt saw Indians in South America having the abdomen covered with tumors produced by their larvæ.

BOTA'NIC GARDEN, a garden devoted to the promotion of botany, and in which plants are collected and cultivated in order to scientific study. The various economical applications of botany, however, in agriculture, manufactures, medicines, &c., are almost always kept particularly in view; and one great object of a B. G. is to bring to a country useful foreign plants, to determine the question of their suitableness to its climate, and to introduce those which may be cultivated with advantage. B. gardens are now deemed indispensable to universities; they are reckoned among the public institutions of great cities, and even of nations, and are established in new colonies, not only for the sake of science, but as one of the means of promoting their prosperity. They were utterly unknown to the ancients, although some of the secondary objects in which they are found most useful engaged the attention both of Greeks and Romans.

The first approach to a B. G. appears to have been made about 1309 A.D., in the garden of Matthaeus Sylvaticus, at Salerno; botanical science, however, being merely subservient to medicine. Of a similar character was the medical garden established at Venice, by the republic, in 1333. The example of Venice was followed by other Italian cities, and plants from different parts of the world began to be collected. At length, about contemporaneously with the revival of botanical science in modern times, the first true B. G. was formed in 1533 at Padua, by Musa Brassavola, for Gaspar de Gabrieli, a wealthy Tuscan noble; which was soon followed by those of Pisa, Florence, Bologna, and Rome. The first public B. G. was that of Pisa. A public B. G. was established at Padua in 1545, by a decree of the republic of Venice, at the request of the professors and students of medicine. The republic of Venice greatly encouraged the study of botany by sending persons to the Levant, to Egypt, and even to India, to procure plants for this garden.—The B. G. of Leyden was begun in 1577; it enjoyed in its infancy the care of Clusius, and was brought to great perfection by Boerhaave, who was professor of botany there.—The first public B. G. in Germany was established by the Elector of Saxony at Leipsic in 1580, and was soon followed by others.—France had no B. G. till Louis XIII. established the *Jardin des Plantes* at Paris, which was begun in 1610, but not completed till 1634.—Nor was there any public B. G. in England till 1632, when that of Oxford was founded by the Earl of Danby. Private B. gardens, however, had existed in England for the greater part of a century before.—The B. G. of Edinburgh, the first in Scotland, was founded about the year 1680, as a private B. G., by Dr., afterwards Sir Andrew Balfour, a zealous naturalist, who had inherited a collection of plants formed by a pupil of his own, Patrick Murray of Livingston, at his own country seat, and transferred them to Edinburgh; and the city of Edinburgh afterwards allotted to it a piece of ground, and allowed an annual sum for its support out of the revenues of the university.

The B. G. at Kew occupies a high place among British national institutions: it possesses one of the richest collections of plants in the world, and has been greatly improved under the care of Sir William Jackson Hooker and his son, who succeeded him in 1865. The *Hortus Kewensis* of Mr. Aiton, to whom the garden owed much of its prosperity in the 18th c., illustrates the greatness which it had even then attained. One of its chief glories is now its immense palm-house, finished in 1848, which is 362 feet in length, and the central part of it 100 feet wide, 66 feet high.—A palm-house has, in like manner, greatly added to the attractions and value of the B. G. of Edinburgh. It is 100 feet long by 60 feet wide, and 70½ feet high. These houses permit something of the

stateliness and magnificence of the palms of the tropics to be seen in Britain.

Of B. gardens on the continent of Europe, the *Jardin des Plantes* may be regarded as holding the first place, both with reference to the strictly scientific study of botany, and to the care bestowed upon the introduction and diffusion of useful or beautiful plants from all parts of the world. There exists in France what may be called a system of B. gardens—one at least in every department—to which plants are sent from the *Jardin des Plantes*, and from which, as they continue to be multiplied by propagation, they soon find their way into the hands of nurserymen and private cultivators. The B. G. connected with the imperial palace at Schönbrunn, in Austria, and that of Berlin, are the greatest in Germany. The former, which was begun in 1753 by the Emperor Francis I., was supplied with West Indian plants at enormous expense, the celebrated Jacquin being sent to procure them. The B. G. of New York is perhaps the most worthy of notice among the numerous botanic gardens of America; and that of Calcutta deserves to be mentioned as an important connecting-link between the B. gardens of Europe and the botany of India. It has enjoyed the care of a succession of eminent botanists, and has been very useful both in transmitting Indian plants to other parts of the world, and in introducing valuable productions of other countries into India.

In the laying out and arranging of B. gardens, different methods are adopted, mere convenience and beauty being in some cases primarily regarded, and these in other cases being sacrificed to the supposed interests of science in an attempted scientific arrangement. A perfect adherence to a botanical system is, for obvious reasons, impossible; but a scientific arrangement of the plants in natural groups, in so far as it can be conveniently accomplished, greatly increases the usefulness of a B. G., and facilitates the study of botany. Sometimes houses are devoted to particular orders of plants, as palms, heaths, or orchids; sometimes to plants of particular habit, as aquatic plants; and sometimes portions of the garden are advantageously devoted to the exhibition, at one view, of plants valuable for particular uses, as cereals or corn-plants, plants yielding fibre, &c.

BO'TANOMANCY, divination by means of plants. See DIVINATION.

BO'TANY (Gr. *botane*, an herb), the science which treats of the Vegetable Kingdom (see PLANT). Everything that relates to plants is included in this science; there are, therefore, several great branches of it, in many respects very different from each other. Of these branches of the science, some, relating to plants in general, rather than to particular kinds or species, are sometimes included under the designation of *General B.* (sometimes called *Phytonomy;* Gr. *phyton*, a plant, and *nomos*, a law); whilst those which relate to particular species, their distinctive characters, distribution, &c., are, in like manner, comprehended under the term *Special Botany*.—In the former of these departments, the first place must be assigned to *Structural B.*, also called *Organology*, or *Organography*, which has for its subject the structure of plants, the textures of which they are composed, and their various organs. Subordinate to this are the study of the elementary tissues of plants, sometimes called *Vegetable Histology* (see HISTOLOGY), and that of the anatomy of plants, sometimes called *Phytotomy* (Gr. *phyton*, a plant, and *tome*, a cutting); both of which have recently been prosecuted with great assiduity. In both, the microscope is an indispensable instrument, and by means of it all the important discoveries of modern times have been made. Intimately connected with these is *Morphology* (Gr. *morphos*, a form, and *logos*, a discourse), that branch of botanical science which relates to what has been called the *Metamorphosis of Organs*, or, in other words, the gradual transmutation of leaves by the processes of vegetable life into the various organs with which a plant is provided, and their consequent assumption of new forms and adaptation to new uses. This branch of B., entirely of recent origin, has been described as being in the vegetable what comparative anatomy is in the animal kingdom, and has now become the exposition of an admitted great general law, almost equally important in reference to structural B. and to vegetable physiology. *Vegetable Physiology* or *Physiological B.* treats of the various kinds of organic activity which are displayed in the life of plants. It is based upon *Structural B.*, an intimate acquaintance with which is indispensable to the study of it. The arguments or illustrations of natural theology, derived from B., are chiefly taken from structural B. and vegetable physiology considered together, the wisdom of the Creator appearing in his works equally in their structure and in the adaptation of all their organs to their respective wonderful functions.

In connection with vegetable physiology, another branch of science claims attention—VEGETABLE CHEMISTRY; of which there are two parts—an examination of the products of the living processes in plants, which, with all its well-known difficulty, is still comparatively easy; and an inquiry into these processes themselves, with respect to the chemical changes effected in them—an investigation of the secrets of that chemistry of nature which so far excels all that has yet been accomplished in laboratories. This is, however, a branch of the science of chemistry rather than of B.; but it so far belongs to the latter, that although only subsidiary, it is useful and indispensable. Even mathematics and natural philosophy, however, have been called to the assistance of the philosophical botanist in his attempts to explain the phenomena of his own science.

Special B. has been rendered subservient to the study of general B., and errors in the former are also guarded against by dependence, to a certain extent, on the well-ascertained principles of the latter. A comprehensive view of the vegetable kingdom is indeed impossible without an inquiry into the number and peculiarities of the different species which it contains; but the attempt to classify and arrange these can only be successful when it is founded upon a knowledge of general laws relating to all vegetable organisms. That the discoveries of a botanist may be made known, the description of species is necessary; and works devoted to this are sometimes called works of *Descriptive B.* or of *Phytography* (*phyton*, a plant and *graphe*, a writing). But in the description of plants, a multitude of terms must be employed, which almost exclusively belong to botanical science itself, whilst even those which are common to it with other departments of natural history, must be employed in senses modified by the peculiarities of the vegetable kingdom. Many of the terms used are such as belong to structural B. and vegetable physiology; but many also—for example, adjectives which designate the particular forms of leaves, &c.—become familiar only when an acquaintance with them is sought in order to descriptive B., and a knowledge of the different species of plants. Great precision is necessary in the use of these terms, and from the want of it, the descriptions of the ancients and of travelers unacquainted with B. often leave it impossible to determine the particular species intended. This gives rise to what is sometimes called in botanical works *Terminology*—an explanation of botanical terms, which, however, has no right to be regarded as a separate branch of science, or worthy of a distinct name; and the name which it has received is barbarous. When structural B. was little heeded, and little more was commonly supposed necessary for a botanist than a knowledge of species and the ability to distinguish them, 'terminology' was often separately taught, and the student was required to commit long tables of terms and their meanings to memory—a difficulty placed in his way at the outset which was both formidable and repulsive, like that which the student of the Chinese language must expect to encounter in its alphabet.

The necessity of classification and systematic arrangement in B. will be very obvious, if the multitude of different kinds of plants is considered, fully 120,000 species being already known and described, whilst great regions of the earth are still unexplored. The systematic arrangement of plants is sometimes called *Systematic B.*, sometimes *Taxological B.* (Gr. *taxis*, order, and *logos*, a discourse), sometimes, less properly, *Taxology* or *Taxonomy*. The history and progress of the science have been marked by the different systems which have been proposed, and have prevailed at different times. These have, however, been of two very distinct kinds founded upon very different principles, and are respectively designated *artificial* and *natural* or *physiological* systems. Artificial systems are based upon some single class of characters, in the external parts of plants, without reference to the importance of these characters in what concerns the life of a plant, or the purpose for which it exists, and are chiefly adapted to the convenience of the student desirous of readily distinguishing species among the multitudes with which he has to deal. A work of descriptive B. arranged according to an artificial system, has been aptly likened to a dictionary in which the words are alphabetically arranged.

An artificial system cannot, however, serve the highest purposes of the science. But in framing a natural system great difficulties are to be encountered, an imperfection of the system is necessarily to a certain extent involved in imperfection of the science. Based not upon one mere set of characters arbitrarily selected, but upon a consideration as far as possible of all characters which plants present, and not merely upon external forms viewed in themselves but upon these and internal organizations considered in their physiological relations, a natural system aims at exhibiting the real affinities which subsist in the vegetable kingdom; and evidently must be at all times liable to modification, and capable of improvement, as botanical science advances, either through the discovery of new plants or through phytotomical and physiological research; it also evidently requires the greatest scientific attainments and the highest powers of a philosophic mind. Nor is it one of the least of the practical difficulties, that the affinites of plants are not such as to constitute a simple lineal series, but that they may be viewed as a multitude of groups arranged around centers, and connected with each other upon different sides and by a great variety of ties.

Yet the rudiments of a natural system have always been sought after, and in some measure attained, when B. has been studied as a science—whenever it has become anything more than a mere acquaintance with a few plants and their names. The *genera* into which species are grouped by all botanists are natural, and are the basis upon which all classification proceeds in its further generalizations. So sensible was Linnæus of the importance of maintaining this character of the genera, that when a rigid adherence to his artificial system would have caused the division of a genus into parts, and the consequent separation of species very nearly allied, he kept the genus unbroken, and maintained the usefulness of his artificial system, to the student desirous of finding the names of plants, by referring from one of its classes or orders to another for species exceptional among those of their genus as to the number of their stamens or pistils, or their *diœcious*, *monœcious*, or *hermaphrodite* flowers.—The classification of species, however, in genera and larger natural groups, being a subject as much connected with other branches of natural history as with B., will more properly be treated in the article NATURAL HISTORY; and to that article also, and to the article SPECIES, we refer for all that our limits allow concerning some of the most interesting and difficult questions of science, the limits of species, the distribution of species, &c.

An important branch of botanical science is that which is called *Geographical B.*, or the *Geography of Plants*, and sometimes *Phytogeography*. It must be regarded as yet in its infancy, although a multitude of observations have been recorded in works of descriptive B., and by botanical travelers. It is the object of *Geographical B.* to connect with the occurrence or prevalence of plants in particular countries a great variety of facts as to climate, altitude, geology, &c., and even facts of history. It aims at the establishment of great general laws, which, however, it has not yet been able to establish. Some account of the progress which has been made in this branch of B., and of the imperfect generalizations which have been reached, will be found in the article GEOGRAPHY OF PLANTS.

Another branch of botanical science which has recently sprung up, and has acquired great magnitude and importance, is PALÆONTOLOGICAL B., or FOSSIL BOTANY. The petrified fruits and wood, the beautiful impressions of ferns and palms, and other traces and remains of former vegetation, which appear in vast numbers and great variety in different strata of the earth's crust, present a most interesting field of scientific research. The study of the different kinds of fossil plants, and the comparison of them with existing species, belong strictly to the science of B.; the study of their relations to particular strata or formations, and so to particular periods in the physical history of the globe, belongs to geology. The study of fossil plants has proved exceedingly useful in guiding to just and philosophic views of the mutual relations even of species and groups still existing. See PALÆONTOLOGY.

The subject of the DISEASES OF PLANTS must be regarded as falling within the province of Botany. It has scarcely yet been treated or studied as a distinct branch of science, although it has not been overlooked in its relation to Vegetable Physiology, with which its intimate connection is obvious, and it has received no little attention in its bearings on agriculture and other arts by which plants are made to supply the wants or minister to the comforts of man.

ECONOMIC B. includes all that relates to plants, considered with reference to these arts and to these uses. That part of it which relates to medicinal plants has been often separately and elaborately treated under the name of MEDICAL BOTANY. In the botanical articles of this work, will be found notices of the more important plants affording food to man, and therefore cultivated in fields or gardens, in warm or in cold climates, and of those valuable for their timber, their fibre, or the dye-stuffs or medicines which they yield.

Having thus endeavored to sketch an outline of the science of B., we must refer to the articles PLANT, VEGETABLE PHYSIOLOGY, instead of attempting here to fill up a part of that outline, by exhibiting the first principles of the science. It remains for us, in the present article, to give a very brief account of the history of B., and outlines of the systems of classification most deserving of attention.

We are informed that Solomon 'spoke of trees, from the cedar in Lebanon even to the hyssop that springeth out of the wall.' There is reason also to believe that Zoroaster devoted some attention to plants, and that this study early engaged some of the philosophers of Greece. The oldest botanical work which has come down to us is that of Theophrastus (q. v.), a pupil of Aristotle, who flourished in the 4th c. B.C. His descriptions of plants are very unsatisfactory, but his knowledge of their organs and of vegetable physiology may well be deemed wonderful, when we consider the low state of this branch of science throughout many centuries after his time. It was not, indeed, till after the revival of letters in Western Europe, that it was ever again studied as it had been by him. About four hundred years after Theophrastus, in the first c. of the Christian era, Dioscorides of Anazarbus, in Asia Minor—a herbalist, however, rather than a botanist—described more than 600 plants in a work which continued in great repute throughout the middle ages, a sure proof how destitute that period must have been of any botanical science of its own.

About the same time, the elder Pliny devoted a share of his attention to B., and his writings contain some account of more than 1000 species, but compiled from various sources, without much discrimination, and mingled with many errors. Centuries elapsed without producing another name worthy to be mentioned in a history of botany. It was among the Arabians that the science next began to be cultivated, about the close of the 8th century. The greatest name of this period is Avicenna. Centuries again elapsed, a longer period than before, during which it made no progress whatever. It was not till the beginning of the 16th c. that B. resumed its place as a science. The first to revive it was Otto Brunsfels, a German, who published in 1530 his *Historia Plantarum Argentorati*, or History of the Plants of Strasburg, in 2 vols., folio, illustrated with cuts. He was speedily followed by Bock or Tragus, Fuchs or Fuchsius, and other Germans; by Matthiolus and Cæsalpinus in Italy; Dodœns or Dodonæus in the Low Countries; De L'Obel or Lobelius, a Dutch physician at the court of England; Gesner in Switzerland; Dalechampa and Moulins, or Molinæus, in France, and by many others, for B. now began to be prosecuted wherever learning flourished, and with great zeal and success. Chairs of B. were founded in universities, botanic gardens (q. v.) were established in many places, and travelers began to explore even remote parts of the world. One of the greatest names of the latter part of the 16th c. is that of L'Ecluse, or Clusius, who traveled through many countries, encountering great perils and harships in pursuit of his favorite science, and was finally professor of B. at Leyden. The name of Dr. Turner, 'the Father of English B.,' belongs more to the 17th c. than to the 16th. The number of species known and described had increased, in the beginning of the 17th c., to more than 5000, but the study of them was much impeded by confusion of synonyms and by want of classification, whilst classification was rendered extremely difficult by imperfect knowledge of the structure and organs of plants. The foundations of a natural system of classification may be said to have been laid, in the latter half of the 17th c., by Dr. Robert Morison, a native of Aberdeen and professor of B. at Oxford, followed towards the close of the century by the celebrated Ray, one of the greatest naturalists that England has produced.

The application of the microscope in B. inaugurated a new epoch of the science, about the middle of the 17th century. Henshaw and Hook, both Englishmen, were among the first to employ this instrument to good purpose in the examination of the organs and structure of plants; but the greatest eminence belongs to the name of Grew, also an Englishman, a physician at Coventry, and to that of Malpighi, an Italian, perhaps still more celebrated for his anatomical than his botanical discoveries. Vegetable physiology now began to be recognized as the highest department of botanical science,

In the latter half of the century, perhaps the most eminent name after Ray is that of Joseph Pitton de Tournefort, a French gentleman, who devoted his whole life to the pursuit of botanical science, and who must be particularly noticed in a sketch of the history of B., on account of a system which he proposed, and which was more generally received and employed than any other till the time of Linnæus. Another botanist of the same period, Rivinus, professor at Leipsic, gave to the world a botanical system which was received to some extent in Germany. Tournefort's system was partly natural and partly artificial; that of Rivinus was perhaps the most perfectly artificial that was ever proposed.

The science of B. made rapid progress during the 17th and 18th centuries, both by the extension of botanical research in different parts of the world, and the careful study of particular groups or families of plants. Its progress was promoted by the publication of many valuable descriptive works. Important discoveries were also made in vegetable physiology.

About the middle of the 18th c., the wonderful genius of Linnæus effected a great change in B., as well as in zoology. His name marks an epoch in the history of the science; not chiefly, however, in consequence of the new system which he introduced, nor even because of the discoveries which he made, but rather because he was able very thoroughly to make himself master of all that had been ascertained by his predecessors, and to exhibit it in lucid order. He gave also a great impulse to botanical studies, by the enthusiasm with which he inspired his pupils. And among the benefits which he conferred on B., in common with zoology, not the least considerable was the introduction of trivial or specific names to be used along with the name of the genus as the designation of particular species.

From the time of Linnæus, the progress of B. during the remainder of the 18th c. became more rapid; and since the commencement of the 19th c., it has advanced with gigantic strides.

A large space would be occupied by a mere enumeration of the names of those who have promoted it by their labors and discoveries. Some notion of what botanical literature has become, may be formed from the fact, that Pritzel, in his *Thesaurus Litteraturæ Botanicæ* (Leip. 1847—1851), enumerates about 15,000 publications.

Von Haller, an anatomist and philosopher, as well as a botanist, was, of all the contemporaries of Linnæus, the only one who could be regarded as his rival. Of all the botanists of the latter half of the 18th c., the most deserving to be mentioned in the history of the science along with the great Swede, are Bernard de Jussieu, and his nephew, Antoine Laurent de Jussieu, who applied themselves with great earnestness to the study of the natural affinities of plants and the formation of a natural system, a work which Linnæus himself attempted, and of the importance of which he was so sensible, that whilst acknowledging the imperfect success of his endeavors, he declared his resolution to persevere in them to the end of his life. The Jussieus traced the outlines of a system which the greatest botanists since their time have not so much sought to change as to complete. Among those who have labored with greatest success in this work, must be mentioned De Candolle, Fries, Endlicher, Brongniart, Meisner, Von Martius, Lindley, and Brown. The botanist last named acquired by his work on the plants of New Holland, published in 1810, a high eminence, not on account of new plants which he described, but on account of the light which he threw upon the most difficult questions connected with the structure of plants and vegetable physiology. Many remarkable discoveries in vegetable physiology have recently been made by Link, Meyen, Schleiden, Von Mohl, Lindley, and others, some of them affecting what may be called the most fundamental principles of botanical science.

Since the days of Linnæus, great progress has been made in the examination of the B. of particular countries and districts, of which perhaps the least important result has been the discovery of very many plants unknown before. But our limits prevent us from noticing particular works in this department of botanical science, or those of botanical travelers, or of botanists who have devoted themselves to the study of particular groups of plants.

And we can merely allude to the scientific associations, continually increasing in number and resources, by which the interests of this science are promoted, and to the magazines and other periodical publications devoted to it.—However, we cannot but refer also to what may be deemed by some—but unjustly—matters of comparative insignificance, the introduction of B. into schools, and the publication of many works intended for the use of persons not very scientific. By the introduction of this or any other similar branch of science into schools, not only may important educational purposes be served, but the young may be led to form a taste for the science which will impel them to its subsequent prosecution. There are few branches of science so easily made popular as B.; but they very much mistake its nature who suppose it to consist in a mere knowledge of the names of plants, or in a familiarity with the classes of an artificial system. What B. really is, and to what the true study of it tends, is better perceived if we consider that 'there is not a flower that blows but has some beauty only unveiled to the minute inquirer, some peculiarity in structure fitting it to its destined place and purpose, and yet not patent to a casual glance.' There is perhaps no branch of science which demands more than B. the application of the highest mental powers; and like every other, to him who truly prosecutes it—whether little or much—it brings in due measure an immediate reward in his own improvement and delight.

We proceed to exhibit an outline of the Linnæan system, the only artificial system which it appears necessary further to notice, and of the natural sytem by which it has been to a great extent superseded. The Linnæan system, however, is not entirely artificial. Its foundation may be said to be laid in the perfectly natural distinction between Phanerogamous and Cryptogamous plants—the former of which Linnæus divided into 23 classes; whilst he constituted the latter, corresponding to the Acotyledonous plants of Jussieu, into his 24th and last class, *Cryptogamia*. In the other classes, he took the characters from the parts of fructification: this he defined as having no stamens or pistils distinctly visible, and gave it a name, *Cryptogamia* (Gr. *kryptos*, concealed, and *game*, marriage), in accordance with this definition, modestly refraining from a confident assertion of the absence of stamens and pistils.

Of the 23 classes of phanerogamous or phænogamous plants (Gr. *phaneros*, manifest, and *phaino*, to show), the characters of all are taken from the stamens; and those of Classes I.—XI., simply from the number of them; these classes, however, not including plants exhibiting the peculiarities with reference to which the remaining classes are constituted. Thus Class I., *Monandria* (Gr. *monos*, one, *aner*, a male), consists of plants the flowers of which have only one stamen; Class II., *Diandria* (Gr. *dis*, twice), of those with two stamens; Class III., *Triandria* (Gr. *treis*, three), of those with three stamens, and so on; Class IV., *Tetrandria* (Gr. *tetras*, four times); Class V., *Pentandria* (Gr. *pente*, five); Class VI., *Hexandria* (Gr. *hex*, six); Class VII., *Heptandria* (Gr. *hepta*, seven); Class VIII., *Octandria* (Gr. *octo*, eight); Class IX., *Enneandria* (Gr. *ennea*, nine); Class X., *Decandria* (Gr. *deka*, ten)—until, in Class XI., *Dodecandria* (Gr. *dodeka*, twelve), the number of the stamens is less definitely fixed, and plants are included in it having more than ten, and fewer than twenty stamens. Then follow two classes—Class XII., *Icosandria* (Gr. *eikosi*, twenty), and Class XIII., *Polyandria* (Gr. *polys*, many)—which have numerous stamens, but differ in their being inserted on the calyx in the former class, and on the receptacle in the latter, characters essentially natural, as are those also of most of the remaining classes. Classes XIV., *Didynamia*, and XV., *Tetradynamia* (Gr. *dynamis*, power), are distinguished by having the stamens of different lengths—the former having two long and two short stamens, the latter, four long and two short. Class XV. agrees with the great natural order *Cruciferæ*. Class XVI., *Monadelphia* (Gr. *adelphos*, a brother), has the stamens united by the filaments in one bundle; Class XVII., *Diadelphia*, has the filaments united in two bundles, or one free and the rest united; Class XVIII., *Polyadelphia*, has them united in more than two bundles. In Class XIX., *Syngenesia* (Gr. *syn*, together, and *genesis*, generation), the stamens are also united, but by the anthers instead of the filaments. This class nearly agrees with the great natural order *Compositæ*, and consists chiefly of plants having compound flowers. Class XX., *Gynandria* (Gr. *gyne*, a female), consists of plants in which the stamens grow out of, or are united with the pistil. Class XXI., *Monœcia* (Gr. *oikos*, a house), consists of plants having the stamens and pistils in different flowers on the same plant; Class XXII., *Diœcia*, of those which have the male and female flowers on different plants; Class XXIII., *Polygamia* (Gr. *polys*, many, *gamos*, marriage), of those having the stamens and pistils in the same or in different flowers on the same or on different plants.

The classes are divided into *orders*, which are constituted on various grounds. The orders of the first 13 classes are strictly artificial, their characters being found simply in the number of the pistils, according to which they are named *Monogynia* (Gr. *monos*, one, *gyne*, a female), *Digynia*, *Trigynia*, &c.; *Dodecagynia*, including all with 12—19 pistils, and *Polygynia*, all with 20 and upwards. The orders of Class XIV. are constituted on entirely different grounds, and are two in number, *Gymnospermia* (Gr. *gymnos*, naked, *sperma*, a seed), and *Angiospermia* (Gr. *angeion*, a vessel)—the former 'having naked seeds' (or rather the fruit formed of 4 *achenia*), the latter having the seeds in a capsule. The orders of Class XV. are in like manner founded upon the fruit; those of Classes XVI., XVII., and XVIII., upon the number of the stamens; as are also those of Classes XX., XXI., and XXII.; those of Class XIX., chiefly upon characters taken from the florets of compound flowers; those of Class XXIII., upon the circumstance of the hermaphrodite, male and female flowers being found on one, two, or three plants; whilst the orders of Class XXIV. are strictly natural—*Filices* (or Ferns), *Musci* (or Mosses), *Algæ*, and *Fungi*.

The student may acquire a pretty complete knowledge of the Linnæan artificial system, without knowing much in reality of B.; but, even in beginning to learn the natural system, he must learn some of the first principles of the science. Jussieu followed Ray in dividing plants into three great primary divisions—*Acotyledones* (q. v.), *Monocotyledones* (q. v.), and *Dicotyledones* (q. v.); having respectively no cotyledon or seed-lobe, one cotyledon, and two cotyledons. And, however the names may be changed, or characters assumed from other parts of the plant, these great divisions of the vegetable kingdom still subsist; the *Acotyledonous* plants being also, according to characters taken from the stem, *Acrogenous* (q. v.); the *Monocotyledonous* plants, *Endogenous* (q.v.); and the *Dicotyledonous* plants, *Exogenous* (q. v). Endlicher is the only botanist of great note who has attempted to make primary divisions of the vegetable kingdom essentially different from those indicated by Ray, and his attempt has not commended itself to general approval. De Candolle gave expression to an important truth in botanical science, when he united the two divisions of monocotyledonous and dicotyledonous plants under the common title of *Vascular plants*, in opposition to Acotyledonous or *Cellular* plants; the vascular plants being the *phanerogamous*, and the cellular the *cryptogamous*. Lindley has endeavored to modify the natural system by dividing the *asexual* or *flowerless* (cryptogamous) plants into the two classes of *Thallogens*—with the stem and leaves undistinguishable—and *Acrogens*, with the stem and leaves distinguishable, thus limiting the term acrogens to those which have a distinct stem; and in like manner dividing the *sexual* or *flowering* (phanerogamous) plants into five classes, viz., *Rhizogens*, with fructification springing from a thallus; *Endogens* and *Dictyogens*, with fructification springing from a stem, the wood of which is youngest in the center, and the seed with a single cotyledon—the former having parallel-veined permanent leaves, and the wood of the stem always confused; the latter having net-veined deciduous

leaves, and the wood of the stem when perennial arranged in a circle around a central pith; *Gymnogens* and *Exogens*, having the wood of the stem youngest at the circumference, and always concentric, the seed with two or more cotyledons; the former having the seeds quite naked, the latter having them enclosed in seed-vessels.

But others generally prefer the simpler division of phanerogamous or vascular plants into monocotyledonous or endogenous, and dicotyledonous or exogenous, the former including Lindley's endogens and dictyogens, the latter his exogens, gymnogens, and rhizogens; although the latter have only a provisional place assigned them, in the absence of well ascertained views of their structure.

One of the great advantages of the natural system is, that the plants which it brings together are very generally found to agree in their properties, as well as in their structural characters. There are, indeed, species which, in respect to their properties, are anomalous or exceptional in the genera or orders to which they belong; but these exceptions do not invalidate the general rule, according to which we expect the most deadly poisons in the order *Leguminacæ*, bland mucilage and useful fibre in *Malvaceæ*, wholesome succulent herbage along with a certain amount of acridity or pungency in *Cruciferæ*, &c., &c. The knowledge of the properties of genera and orders is of great use in guiding inquiry, and it is thus that modern science attains in rapid succession to discoveries important in their practical relations.

In the determination of the intermediate sub-divisions of the natural system, botanists have not yet been so successful as with regard to these primary divisions, and the ascertainment of the characters and limits of lowest subdivisions—orders, tribes, and genera. Great difficulty has been found in arranging the orders in natural groups, although the attempt, very necessary to a complete system and a just exhibition of nature, has been very assiduously and perseveringly made by Meisner, Endlicher, Lindley, and others of the greatest botanists of the present age.

BO'TANY BAY, a haven of New South Wales, in lat. 34° S., and long. 151° 15′ E., discovered by Cook, on his first voyage, in 1770, and named by him from the great number of new plants in its vicinity—a characteristic, however, rather of Australia in general than of this particular locality. In 1787, it received England's first penal colony in the east; and though it was supplanted the very next year by Port Jackson, a vastly superior harbor immediately to the north of it, yet it long continued to be the popular designation, not merely of this convict settlement, but of the Australian convict settlements generally. On the shore of B. B. there was erected, in 1825, a column to the memory of that eminent French navigator, the unfortunate La Perouse.

BOTH, JOHN and ANDREW, two celebrated painters, who, being united in their works like Beaumont and Fletcher, are, like them, usually spoken of together, were born at Utrecht, where their father was a painter on glass—John in 1610; the date of Andrew's birth is not known. After studying under Abraham Bloemart, the brothers went to Italy, where they soon won for themselves a high reputation. John painted landscapes, adopting Claude for his model, while Andrew filled in the figures after the style of Bamboccio, and in so careful a manner that the pictures looked like the work of one hand. John's landscapes are characterized by delicious warmth of sky, softness of distance, and general truthfulness to nature; even the different hours of the day may be distinguished in some of his best pictures, so careful are his tints. The works of the brothers are still in great repute, and bring high prices whenever they are offered for sale. One of the brothers was accidentally drowned in a canal in Venice in 1650; the other brother then settled in Utrecht, where he died six years afterwards.

BO'THIE (from the Gaelic *bothag*) signified originally a humble cottage or hut, but for a considerable number of years the term has been more popularly applied to a barely furnished, generally uncomfortable habitation for farm-servants. Though bothies are principally confined to the eastern and north-eastern counties of Scotland, a few have spread over a much wider area. The bothie, strictly speaking, of modern times is situated either under the same roof as the stable, or, oftener, at a short distance from the steading. While the cubic contents are invariably disproportionate to the number of inmates, the furnishings are of an uninviting, sometimes repulsive character. One long, roughly manufactured table, a few long stools, a chair or two, a number of victual bunks, a few wooden cups or bowls, and a pot or two, constitute the bulk of the fittings. The inhabitants are generally unmarried men, who frequently have their own food to prepare. Some of the larger farmers afford a woman for cooking and cleaning the bothie. Huddled together in this unnatural way, without the refining influence of the heads of families or the female sex, it is not surprising that the inhabitants of the bothie often acquire boorish, and sometimes immoral habits. Public moralists decry the bothie vehemently.

The men themselves do not raise their voices loudly, if at all, against it; and some influential farmers (amongst whom was the late Mr. M'Combie) seem to regard it, if an evil, as a necessary one, in present circumstances. The bands of Irish and Highland females living together in the East Lothian cottages, may be ranked as bothicites, and do not strengthen the argument for the general system. Though the bothie system is only one of several foul blots on the agricultural escutcheon affecting the laborers, it is diminishing, as farm cottages increase, and must soon, under the pressure of public opinion and the growing desire for social elevation, be reduced to a minimum, if not entirely abolished.

BO'THNIA, the name formerly given to a country of Northern Europe, extending along the east and west shores of the Gulf of Bothnia (q. v.), the eastern portion now being comprised in Finland (q. v.), and the western forming the Swedish governments of Pitea and Umea.

BOTHNIA, GULF OF, the part of the Baltic Sea which lies to the north of the isle of Aland, having on its eastern shore Finland, on the western, Sweden and Lapland, with Tornea for its northern limit. It extends from lat. 60° to 66° N., and long. 17° to 25° 35′ E., its greatest length being about 400 miles, and its average breadth 100 miles. Its depth varies from 20 to 50 fathoms, but both along its shores, and in the middle, are many small islands, sand-banks, rocks, and cliffs, called *skaers*, which render the navigation difficult; though on the whole it is less dangerous than other parts of the Baltic, and has many good harbors. The rivers which fall into this gulf, both from Sweden and Finland, are numerous; and the waters of the gulf itself are but slightly salt. In winter, it is usually so hard frozen that it can be crossed by sledges.

BOTHRIOCE'PHALUS (Gr. *bothrion*, a little pit, and *cephale*, a head), a genus of intestinal worms, belonging to the order of *Cestoid Worms* (q. v.), and included, until recently, in the genus *Tænia* (tapeworm, q. v.). The head in this genus is not furnished with four sucking disks, as in the true tapeworms, but with two lateral longitudinal hollows, which seem to serve only for adhesion by means of a partial vacuum, and to have nothing to do with nutrition. Nourishment is indeed supposed to be obtained entirely by the imbibing of fluids through the entire length of the worm; and whilst this process of imbibing takes place, there is also an exudation—as *exosmose* accompanies *endosmose* (q. v.) in the roots of plants—of peculiar oleaginous drops, which may probably be in part the cause of the injurious effects produced by these worms upon the health of the animals infested by them. The species of B. are very abundant in predaceous fishes, and occur more sparingly in fish-eating birds; the immature and sexless young being found in fishes and inferior aquatic animals, either in peculiar cysts, or in the intestinal canal. Sticklebacks are often seen distended to an unusual size by a species of B. which lies free in the cavity of the abdomen; but in the stickleback its joints and sexual organs always remain undeveloped; it is only when the stickleback has been digested in a bird's stomach, that the B. released, and finding itself at last in suitable circumstances, acquires its mature form, becoming an inhabitant of the bird's intestines. Only one species of B. occurs in man, *B. latus*, which is at once distinguished from the common tape-worm by the different form of its segments, but has been often confounded with another species of tape-worm, under the name of Broad Tape-worm. The segments are much broader than they are long, and each contains organs of reproduction. The worm is strictly androgynous. It is scarcely known in Britain, but is of frequent occurrence in some parts of Europe, and sometimes attains a length of fifteen feet or upwards; and a coil of these worms is not unfrequently expelled at once from a patient. The B. is, however, much more easily expelled than the true tape-worms. The same means are employed. The geographical distribution of this worm, which is most frequent in low marshy countries, has led to the conjecture, that its youngest brood may inhabit some of the smallest aquatic animals, and that it may find its way into human beings by their eating salads, fruit which grows near the ground, or the like.

A few Segments of Bothriocephalus latus.

BO'THWELL, a small village in Bothwell parish, in Lanarkshire, on the right bank of the Clyde, 8 miles east-south-east of Glasgow. The river is here crossed by the celebrated bridge, the place of the bloody encounter between the Covenanters and Monmouth in 1679, when the former were defeated. Near the village are the magnificent Norman ruins of Bothwell Castle, at the foot of which the Clyde washes the fine scenery of 'Bothwell Bank,' celebrated in Scottish song. Pop. (1881) 1520.

BOTHWELL, JAMES HEPBURN, fourth EARL OF, was born about 1526. On his father's death in 1556, he succeeded to the great inheritance which made the Earl of Bothwell the most powerful noble in the south of Scotland. At first, he opposed the

Reformation party, but on their accession to power he easily changed his politics; and, in 1561, formed one of the deputation of lords sent to convey the youthful Queen of Scotland to her kingdom. He was shortly after made a privy-councillor; but his violence and misconduct soon became intolerable, and he was ordered to quit Edinburgh. In March 1562, he and the Earl of Arran were committed to the castle for conspiring to seize the queen's person. B. made his escape, was recaptured at Holy Island, again got free, and sailed to France. He speedily returned, but finding Moray close on his trail, embarked for the continent. Not appearing at his trial he was outlawed. In 1565, after the queen's marriage with Darnley, he reappeared, and having strongly espoused her cause against Moray and his party, was suddenly restored to favor, and even high influence. In October 1566, while performing a judicial tour in Liddesdale, he was attacked and wounded, and the queen manifested her interest in his danger by riding twenty miles and back to see him, a journey which brought on a dangerous fever. At Craigmillar, some time after, B. attempted, unsuccessfully, to overrule her objections to a divorce from Darnley. A more thoroughgoing method was open to him, and on the night of 9th February 1567, Darnley was blown up at the Kirk of Field. The public voice loudly charged B. with the murder, but he was not formally indicted till the 28th of March. He came to the trial attended by 4000 followers, and received an easy acquittal. Two days after, he carried the sword of state before the queen at the opening of parliament, and at its close, all his lands and offices were confirmed to him, in consideration of his 'gret and manifold gude service done and performit not only to her hienes' honour, weil, and estimatioun, but alsua to the comone weil of the realme and leiges thairof.' At a supper on the following night, the leading nobles signed a bond approving of Bothwell's acquittal, and commending him as a fit husband to the queen, pledging themselves to stand by him.

On the 26th of April, B., accompanied by a strong force, carried off the queen to Dunbar Castle; on the 6th May he was divorced from his wife; and on the 15th his marriage with Mary was solemnized at Holyrood. He had previously been created Duke of Orkney. His guilty triumph was very short; the wrath of the nation was roused; at the end of one month, Mary was a prisoner in Edinburgh, and B., pursued, fled to Denmark. Imprisoned there, he died in 1576, leaving no heirs. His titles and estates were forfeited to the crown. See *Life* by Schiern, translated from the Danish by Berry (1880).

BOTONÉ, or BOTONNY. In Heraldry, a cross botoné is a cross of which the ends are in the form of buds or buttons.

BOTRY'CHIUM, a genus of Ferns, of the division *Ophioglosseæ*, having the *spore-cases* (or seed-vessels) distinct sub-globose, clustered at the margin, and on one side of a pinnated *rachis* (an altered frond), 2-valved, without any trace of an elastic ring, and opening transversely. The only British species is *B. Lunaria*, MOONWORT, a little plant, pretty frequent in dry mountain pastures, but not applied to any particular use. A species more worthy of notice is *B. Virginicum*, of which the geographical distribution is very remarkable. It abounds in many parts of the southern states of America, the mountains of Mexico, &c.; in Australia, in some parts of Asia, as the Himalaya Mountains; and is found also in Norway, although in no other part of Europe. It is large and succulent, and is boiled and eaten in the Himalaya, in New Zealand, &c. It is called RATTLESNAKE FERN in some parts of America, from its growing in places where rattlesnakes are found.

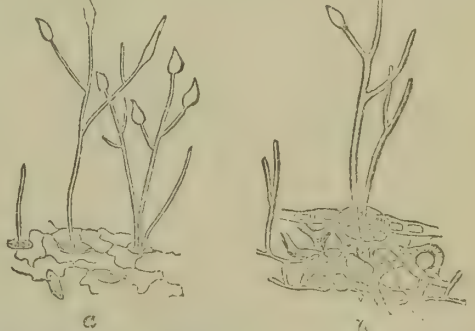
BOTRY'TIS, a genus of Fungi, of the division *Hyphomycetes*, containing many of the plants commonly called MOULD (q. v.) and MILDEW (q. v.). The plants consist of a *mycelium* (see FUNGI) of more or less entangled threads, which are composed of rows of cells with shoots of the same nature rising up from them, and bearing the fructification at their extremity. Some of them attack the fibres of vegetable fabrics, such as linen and cotton, in damp places, the decayed stems of plants, decaying fruit, &c. Some are found on living animal tissues, whether always previously diseased or not, is a question still unsettled, although the probability appears to be that they make their appearance only where there is already disease, which, however, they modify or entirely change. A remarkable species of this section of the genus is the MUSCARDINE (q. v.), or SILKWORM ROT.—A section of the genus, in many respects of particular interest, and which some botanists have endeavored to separate into a distinct genus, consists of species which grow among living vegetable tissues. The threads of the *mycelium* creep among the loose cells of the under side of the leaves, and end up their fertile shoots through the stomata (see LEAVES, and STOMATA).

Many of the species are extremely destructive to particular plants, as *B. parasitica* to turnips. But *B. infestans* is, of all the species, the subject of greatest interest, the potato disease being confidently ascribed to it by some observers, among whom is sometimes named Mr. Berkeley, and the opinion of no living botanist is entitled to greater respect upon a point connected with this branch of the science; but Mr. Berkeley himself states his opinion very guardedly. "The decay of the leaves and haulm in the potato murrain," he says, 'is certainly due to *Botrytis infestans;* and its appearance in the diseased tissues of the tubers, when exposed to the air, makes it at least probable that it has a close con-

Moonwort Fern (*Botrychium Lunaria.*).

Botrytis parasitica:—*a*, plant, with mycelium, magnified; *b*, extremity of branch, with fructification; *c*, fructification, more highly magnified.

nection with that destructive murrain, which, in many instances, does not appear alone, but accompanied by other diseases. The mould may be traced spreading round the edges of the brown spots on the leaves, and soon destroying the tissue on which it was developed.' (Art. *Botrytis* in Morton's *Cyclopædia of Agriculture.*) This destruction results not only from the fungus feeding upon the juices of the plant, but from its obstructing the elabora-



Botrytis infestans: *a*, Young plants proceeding from stomata. *b*, Section of potato-leaf, showing the mode in which the mycelium creeps among the loose tissue of the leaf.

tion of the sap and all the processes which in a healthy state take place at the surface of the leaf.—The whole subject of the propagation of fungi of this kind is involved in great obscurity. They are indeed seen to produce seeds (or spores) in great abundance, but the doubtful question is, how these reach the place where they are to grow, whether from the surface of the leaf, to which it is objected that the stomata are too small to admit them, or, as Mr. Berkeley thinks, from within the plant. See POTATO DISEASE.

BOTTA, CARLO GIUSEPPE GUGLIELMO, an Italian poet and historian, born 1766 at S. Giorgio del Canavese, in Piedmont. He studied medicine in Turin. In 1794, he became a physician to the French army, and in 1799, he, Carlo Aurelio de Bossi, and Carlo Giulio, were appointed the provisional government of Piedmont. They were known as *Il triumvirato de tre' Carli.* After the battle of Marengo, he became a member of the Piedmontese Consulta. In the *Corps Legislatif*, he gave offence to Napoleon, by designating his government as despotic. In 1830, he was allowed to return to his native town, and was pensioned by Charles Albert. He died in Paris 10th August 1837. Of his works of earlier date, the following may be mentioned, in which his admirable historic style is gradually developed: *Description de l' Ile de Corfu* (2 vols., Par. 1799); *Souvenirs d'un Voyage en Dalmatie* (Tur. 1802); *Précis Historique de la Maison de Savoie* (Par. 1803); *Histoire de l'Amérique* (Par. 1809). His epic poem in twelve books, *Il Camillo o Vejo Conquistata* (Par. 1816), was also favorably received. But his most

important works are his *Storia d' Italia dal* 1789 *al* 1814 (Par. 1824), which has gone through many editions, and for which he received the quinquennial prize of 1000 Tuscan dollars, founded by the Grand Duke Ferdinand II. in 1814, in the *Accademia della Crusca* at Florence; his *Histoire des Peuples d' Italie* (3 vols., Par. 1825), in which he denies to the Christian religion and to philosophy the credit of having civilized Europe, and ascribes it to the restoration of learning; and the *Storia d' Italia dal* 1490 *al* 1814 (20 vols., Par. 1832), which consists of Guicciardini's work (1490—1534), Botta's continuation of it (1535—1789), and the above-mentioned *Storia d' Italia*.

BOTTA, PAUL EMILE, a distinguished French archæologist and traveler, the son of the preceding, was born in 1805. While yet young, he undertook a voyage round the world, and remained long about the western coasts of America, where he zealously collected treasures of natural history. In the year 1830 he went to Egypt, where he entered into the service of Mehemet Ali as a physician, and in this capacity accompanied the Egyptian expedition to Sennaar. Here he formed a very considerable zoological collection, with which he returned to Cairo in 1833. The French government now appointed him consul in Alexandria, from which he undertook a journey to Arabia, the results of which he gave to the world in a work, entitled *Relation d'un Voyage dans l'Yémen, entrepris* 1837, *pour le Muséum d'Histoire Naturelle de Paris* (Par. 1844).

From Alexandria the government sent him as consular agent to Mosul, and at this place, at the instigation of the German orientalist Julius Mohl, he commenced a series of discoveries which form an epoch in archæological science. Early in the spring of 1843, B. began his diggings in the heaps of ruins near the Tigris, for monuments of Assyrian antiquity, and the *Journal Asiatique* soon contained accounts of the success with which his enterprise and perseverance were rewarded, and also disquisitions on the extremely difficult subject of the cuneiform writing of the Assyrians, which afterwards appeared as a separate publication under the title *Mémoires de l'Ecriture Cunéiforme Assyrienne* (Par. 1848). The French government took up the matter warmly; a practised draughtsman was sent out for the purpose of making sketches upon the spot of the sculptures on alabaster, so apt to fall to pieces; and a commission of learned men was appointed for the purpose of conducting the publication of a magnificent archæological work, which shortly afterwards appeared under the special superintendence of B. himself, with the title, *Monument de Ninive, découvert et decrit par Botta, mesuré et déssiné par Flandin* (Par. 1849—1850). In 1848, he published the *Inscriptions découvertes à Khorsabad*. In 1846, B. was appointed consul at Jerusalem, and in 1857 at Tripoli. He returned to France in 1868, and died at Achères, near Poissy, in 1870. Although in abundance of results B. was far exceeded by Layard (q. v.), yet he certainly deserves the praise of having laid the foundation of Assyrian archæology. See ASSYRIA.

BOTTARI, GIOVANNI, a learned Italian prelate, was born at Florence, January 15, 1689. He studied ancient literature and eloquence under Biscioni, and subsequently applied himself to mathematics, philosophy, and theology. He soon gained a great reputation for the delicacy and purity of his style. The Della Crusca Academy intrusted him with the care of a new impression of its famous dictionary. This extensive work occupied B. and his collaborateurs several years, and proved of extreme service to the Italian language. In 1730, he went to Rome, where he was made professor in the college of La Sapienza. He died in 1775.

BOTTGER, or BOTTCHER, or BOTTIGER, JOH. FRIEDR., improver of the porcelain manufacture, was born in 1682 in Reuss-Schleiz. He was apprenticed to an apothecary in Berlin, but became an enthusiast in the search for the philosopher's stone, for which he involved himself in many difficulties. He found patrons at the court of Saxony, and received large sums. Disappointment ensuing, as he did not succeed in making gold, he was called upon to reveal his secret in writing. The king, dissatisfied with this production, sought to avail himself of the skill which B. really possessed, with a view to the manufacture of porcelain. B. was compelled, accordingly, to enter upon these experiments, of which the celebrated Meissen Porcelain was the result. See POTTERY. To prevent the revelation of the art, he and his assistants were treated as prisoners; and when Saxony was invaded by Charles XII. of Sweden in 1706, they were removed from Dresden to Königstein. He died 13th March 1719.

BOTTICELLI, SANDRO, originally Alessandro Filipepi, an eminent painter of the Tuscan school of the 15th c., was born at Florence in 1447. He was at first apprenticed to Botticelli, a goldsmith, whose name he assumed; but as he showed evidence of his genius for painting, he was transferred to the school of Fra Lippo Lippi. In his youth and early manhood, B. felt the spell of classical mythology, and produced many works on classical subjects—the finest his Birth of Venus, now at the Uffizi, and his Venus with the Graces, now at the Florence Academy. Numerous devotional pictures from his hand exist also, most of them marked by much imaginative refinement. His coloring is rich and fanciful, the light often enriched by gold, and the minutest care is shown in all the details of the composition. His flowers, especially his roses, are painted with marvelous delicacy. In the countenances, whether of Madonnas and angels, or of Venuses and Graces, there is a fascinating expression of wistful melancholy. Perhaps B.'s greatest works are his three frescoes, representing the Life of Moses, the Destruction of Korah, Dathan, and Abiram, and the Temptation of Christ, in the Sistine Chapel at the Vatican. He was powerfully impressed by the teaching of Savonarola; and, according to Vasari, his later years were devoted to the study of mystical theology. He seems also to be in part the author of a series of engravings executed in a primitive style. B. died in 1515.

BOTTIGER, KARL AUGUST, one of the most erudite and thoughtful archæologists of Germany, was born 8th June 1760, at Reichenbach, in Saxony. He studied at Leipsic. In 1791, chiefly through the influence of Herder, he was appointed director of the Gymnasium, and consistorial councillor at Weimar. Here he enjoyed the stimulating society of Schiller, Herder, Wieland, Goethe, and others. His literary activity at this period was prodigious. He edited several journals, and wrote multitudes of reviews, biographical notices, &c., for the *Allgemeine Zeitung*. In 1804, B. was called to Dresden, where he began to deliver lectures on special branches of classical antiquites and art. The result of these was: *Discourses on Archæology* (Dresden, 1807); *On Museums and Collections of Antiques* (Leip. 1808); *Aldobrandinian Morriage Festival* (a mythico-allegorical interpretation of a picture discovered by a member of the Florentine family of Aldobrandini, representing a Roman marriage, Dresden, 1810); *Thoughts on the Archæology of Painting* (Dresden, 1811); and the *Mythology of Art* (Dresden, 1811). In 1814, appeared his *Lectures on the Dresden Gallery of Antiques* (Dresden); in 1821—1825, his *Amalthea*, or *Museum of Mythological Art*, &c. (Leip.); and in 1826, his *Thoughts on Mythological Art* (Dresden and Leipsic). In 1832, B. was elected a member of the French Institute. He died 17th November 1835. His works, both in Latin and German, have been collected and edited by Sillig.

BOTTLE (Fr. *bouteille*, which is the dim. of *botte* or *boute* [allied to Eng. *butt*], a vessel), a vessel, generally of a round shape, with a narrow neck, for holding liquids. Bottles are now usually made of glass or earthenware; but the first bottles were made of the skins of animals, mostly goats—of this kind were the bottles spoken of in Scripture. Skin bottles are still used in Southern Europe for the transport of wine, and by tribes of Africa and Asia for carrying water. The ancient Egyptians made bottles of most elegant form and exquisite workmanship of alabaster, stone, gold, ivory, and other substances. The Italian peasants carry, slung round their necks, bottles made of the rind of the gourd, which, when dry, is as hard as wood. Bottles made of glass will be treated of under GLASS.

BO'TTLE CHART, BOTTLE PAPERS. A bottle chart purports to show the track of sealed bottles thrown from ships into the sea. It is a well-known practice to throw sealed bottles containing some intelligence into the sea during long voyages, in the hope that these fragile messengers may be picked up, and their intelligence reach its proper destination. The frequency of these instances at length led to the inference, that by such means the determination of currents might be illustrated. Lieutenant Becher an English naval officer, has the merit of having constructed, in 1843, a chart of bottle-voyages in the Atlantic, his facts being drawn from the numerous cases that had occurred. The time which elapses between the launching of the bottle from the ship and the finding it on shore, or picking it up by some other ship has varied from a few days to sixteen years; while the straight-line distance between the two points has varied from a few miles to 5000 miles. Of the actual length of the curved line followed by the bottle, little or nothing is known; but some are believed to have exceeded 8000 miles. The Bottle Chart has been re-edited and re-engraved from time to time, and published in the *Nautical Magazine;* it is marked by several hundred straight lines, each drawn from the lat. and long. of immersion, to the lat. and long. of the finding.

BO'TTLE-GLASS. See GLASS.

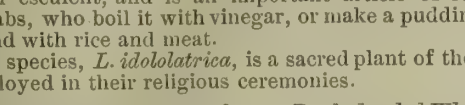
BO'TTLE-GOURD (*Lagenaria*, from Lat. *lagena*, a bottle), a genus of plants of the natural order *Cucurbitaceæ* (q. v.), nearly allied to the Gourd (q. v.) genus (*Cucurbita*), in which it was until recently included. One of the most marked distinctions between them is the very tumid border of the seeds of the Bottle-gourds, which have also all the anthers separate, and have white flowers, whilst those of the Gourds proper are yellow. The Common B., or False Calabash (*Lagenaria vulgaris*), is a native of India, but is now common almost everwhere in warm climates. It is a climbing musky-scented annual, clothed with soft down, having its flowers in clusters, and a large fruit, from 1 to 6 feet in length,

which is usually shaped like a bottle, an urn, or a club. The fruit has a hard rind, and when the pulp is removed, and the rind dried, it is used in many countries for holding water, and is generally called a *calabash* (q. v.). The B. in its wild state, is very bitter and poisonous, and even in cultivation, some of its varieties exhibit not a little of the bitterness and purgative properties of colocynth (q. v.). Other varieties, however, have a cooling edible pulp. This is most perfectly the case, in general, with those which attain the greatest luxuriance.

The B. appears to have been introduced into Europe about the close of the 16th c., but it requires for its advantageous cultivation a warmer climate than that of any part of Britain, where, although it succeeds well enough on a hotbed, it is chiefly known as an object of curiosity. It is, however, much cultivated in warmer countries as an esculent, and is an important article of food to the poorer Arabs, who boil it with vinegar, or make a pudding of it in its own rind with rice and meat.

Another species, *L. idololatrica*, is a sacred plant of the Hindus, much employed in their religious ceremonies.

BO'TTLEHEAD (synon. *Bottlenose*, *Bottle-headed Whale*, *Bottle-nosed Whale*, or *Beaked Whale*). a cetaceous animal occasionally but rarely met with on the British coasts, and on those of the continent of Europe. It was until recently placed in the genus *Delphinus* by naturalists, and is still ranked among the *Delphinidæ* or Dolphin (q. v.) family; but some of its characters appear to make it a connecting-link between them and the *Balænidæ*, or true whales. A new genus, *Hyperoödon* (the name of which is derived from the Greek, and refers to the peculiarities of the dentition), has been erected for it; but unfortunately several specific names have been adopted by different authors—as *H. Butzkopf*, *H. bidens*, and *H. Honfloriensis*—to the increase of difficulty and obscurity; whilst it appears that there is only one species to which they equally belong. The B. has the snout produced into a beak, as in the dolphins; the beak is short and strong; the forehead rises suddenly from the beak, and is remarkably elevated, a peculiarity which is owing to large bony crests rising over the bones of the upper jaw. The teeth are only two in number, and are situated in the fore-part of the lower jaw, pointed, but much enveloped by the soft parts, and sometimes completely hidden among them: the palate and upper jaw are furnished with little hard points or tubercles, not $\frac{1}{10}$th of an inch in height, which, however, have been doubtfully regarded as a kind of false teeth, and by Cuvier as rudimentary vestiges of whalebone. There is a dorsal fin, rather small in proportion to the size of the animal, and placed further back than in the common dolphin. The blowhole is crescent-shaped, the points of the crescent directed backwards. The skin is smooth and glossy, of a blackish lead color on the back, gradually becoming lighter on the sides, and whitish on the belly. The animal attains a length of about 25 feet.



Bottlehead

Skull of Bottlehead.

The B. has occasionally been caught in consequence of its having entered harbors or the mouths or rivers. One was caught above London Bridge, and figured and described by Hunter in the *Philosophical Transactions* for 1787. It is impossible that too great attention can be paid to specimens of the rarer cetacea caught or driven ashore on any part of the coast, and it is to be hoped that the obscurity and confusion still so much prevailing in this branch of natural history may soon be removed. Photography seems to afford new facilities for an exact comparison of specimens, of which advantage ought to be taken; and everything capable of being preserved should be so carefully, for the study of naturalists. There is a splendid skeleton of the B. in the Museum of the Royal College of Surgeons, London.

The name BOTTLE-NOSED WHALE has been also given to a species of dolphin (q. v.), *Delphinus Tursio*, which is occasionally met with on the British coasts.

BO'TTOM, in naval language, is either the whole ship itself, or that part of it which is under water when laden. Commodities are often said to be imported 'in foreign bottoms,' or in 'British bottoms:' in which cases, the phrase is applied to the whole ship. A 'full ship,' or a 'full B.,' denotes such a form given to the lower half of the hull as to allow the stowage of a large amount of merchandise. A 'sharp ship,' or a 'sharp B.,' implies a capacity for speed.

The word B. is also applied in an obvious way to the bed of the sea, which is characterized as rocky, stony, sandy, coral, muddy, oozy, &c., bottomed.

BO'TTOMRY, BOND OR CONTRACT OF, is a security by which a ship itself is expressly mortgaged and pledged by the owner or master, or *hypothecated* for repairs to the ship, or for money advanced for its outfit or otherwise with relation to it. It is called a security by *B.*, because the bottom or keel of the ship is figuratively used to express the whole of it. The loan or debt is repayable only in the event of the ship's safe arrival at the port or destination; and in consideration of this risk, the lender or creditor exacts a premium, the amount of which depends on the nature of the adventure. If the ship be totally lost, the lender loses his money; but if she returns safely, he recovers his principal, together with interest at the rate agreed upon. These contracts are not treated as ordinary mortgages, and preferred according to the order of date; but inversely, the latest is preferred to the preceding, because it is presumed that the last loan saved the ship, and in all cases necessity alone is the condition of the contract.

Such, generally, is the law of Great Britain; but the French law appears to be different. By that system, a ship, as movable property, cannot be hypothecated, but remains subject to the debts of the seller until it has made a voyage at sea, under the name and at the risk of the new purchaser, unless it has been sold under a decree; and it is a rule that the sale of a ship at sea shall never prejudice the creditors of the seller. See RESPONDENTIA, and MERCHANT SHIPPING ACT.

BO'TZEN, or BOZEN (Ital. BOLZANO), an important trading town of the Austrian Tyrol, about 32 m. N.N.E. of Trent. B. is a well-built town, with good streets and arcades; and streams of pure water are conducted through the principal thoroughfares, in little canals. It is protected from the inundations of a mountain-torrent in the vicinity by a strong wall about two miles in length. Its situation on the Brenner Railway and at the junction of the roads from Germany, Italy, and Switzerland, makes B. an important entrepôt. It has manufactures of silk, linen, hosiery, leather, &c.; and four extensive annual fairs. Wine and fruits in abundance are produced in the environs. Pop. (1880) 10,641.

BOUCHAIN, a fortified town of France, in the department of Nord, 12 miles south-east of Douai, intersected by the Scheldt, and possessing the means of laying the adjacent country under water, in the event of an attack. It was taken by the Duke of Marlborough in 1711, and recaptured by the French in the following year, to whom it was finally ceded by the treaty of Utrecht. Pop. (1872) 1039, who are chiefly engaged in extracting sugar from beet-root, and in refining salt.

BOUCHER, FRANCIS, a French painter of great note in his day, was born at Paris in 1704, and after studying there under Francis le Moine, he went to Rome to prosecute his art. After a short residence there, he returned to Paris, and on the death of Vanloo, was appointed principal painter to Louis XV. B. was an artist of much ability, and equally facile in the production of figure or landscape pictures—a facility, however, which was very fatal to the claims his genius might otherwise have had on posterity. In many of his paintings, picturesque effect is the only thing sought, no matter at what cost to truth. He has been called the Anacreon of painting, on account of the amorous character of many of his works: mythological and pastoral subjects were also great favorites with him. At his death in 1770, he was director of the French Academy.

BOUCHES-DU-RHONE, a department in the south-east of France, formerly a part of Provence, is situated at the mouths of the Rhone, in lat. 43° 10′—43° 56′ N., and long. 4° 13′—5° 40′ E. It has an area of 1970 square miles, and a population, in 1881, of 584,731. It is divided into three arrondissements—Marseille, Aix, and Arles—which are subdivided into 27 cantons and 108 communes. Through the northern and eastern districts, the Maritime Alps, which send out some calcareous ridges southward, slope gently down to the basin of the Rhone. Towards the sea-shore, there are several plains of considerable extent. About one-half of the department is under cultivation: heaths, wood, wastes, and water occupy the other half. The Rhone—which between Arles and the sea separates into several branches, forming a delta, called *Ile de la Camargue*—and its affluent, the Durance, are the principal rivers. The department is intersected by several canals of importance, and the aqueduct to convey the water from the Durance to Marseille, is one of the most extensive works of the kind in existence, being no less than 51 miles long, including 15 miles of tunnelling. The *Ile de la Camargue* produces corn and rice, and affords pasture for large numbers of sheep and cattle. The vine, olive, and mulberry also thrive here, and timber is plentiful. The soil in some parts, however, is strongly impregnated with salt. The great plain of Crau, which extends along the eastern branch of the Rhone, is stony and arid, except in a few spots, where the vine and olive are successfully cultivated. Besides the Etang de Berre (q. v.), there are numerous salt-lakes, communicating with

the sea by natural or artificial channels. Marble, limestone, and gypsum are found in the Bouches-du-Rhone. Leather, hats, perfumes, soap, olive-oil, vinegar, and chemical products are manufactured; there are extensive brandy-distilleries, sugar-refineries, and salt-works, and the produce of wine is large. B. has an active commerce with the Levant, Africa, Spain, and the W. Indies.

BOUCICAULT, Dion, dramatic author and actor, was born at Dublin on the 26th of December 1822. He was brought up under the guardianship of Dr. Dionysius Lardner, the well-known popular writer on science, and was educated at University College, London. He produced his first dramatic work very early—before he was 19 years old. It was signally successful, and its success determined his career. This was *London Assurance*. It was first performed at Covent Garden Theater in March 1841; and it has ever since remained a favorite with playgoers, both throughout Great Britain and in America. Much of the success it had in London must be ascribed to the admirable acting of Mr. Charles Matthews; but it had merits of its own sufficient to secure to it the favorable verdict of the public. The plot was slight, but ingenious; it abounded in comic situations; the dialogue was brisk and sprightly; there was no lack of wit, and there was perhaps somewhat too much of those flippancies and pleasant impertinences which average theater-goers prefer to wit. Once embarked in the career of a play-writer, B. produced piece after piece in rapid succession, and greatly increased the reputation which his first attempt had brought him. *Old Heads and Young Hearts*, *Love in a Maze*, *Used Up*, *Louis XI.*, and *The Corsican Brothers* were among the most popular of his early works.

Several of these are still stock pieces at our theaters; and to playgoers, the mere enumeration of their names will show that B. distinguished himself equally in comedy, farce, and melodrama. When he went upon the stage, as he soon did, he added a high reputation as an actor to the reputation he had previously gained as an author. From 1853 till 1860, he was in America, where his popularity was scarcely less than it had been in England. On his return to England in 1860, he produced at the Adelphi Theater, a play, *The Colleen Bawn*, which proved among the most successful of modern times, and which, if not the first of a new school, has at least supplied a new descriptive name to our dramatic literature. *The Colleen Bawn* was, happily enough, described as a 'sensation drama;' its interest depended largely upon scenery, mainly upon startling incidents and astounding stage-effects. It was not a high kind of work, or fit to stand the tests of a good dramatic piece, as nobody knew better than the author; but it suited the public taste, and the author made a fortune by it. It has been performed at almost every theater in the United Kingdom; it had a great run in America too; it was even translated into French, and brought out at Ambigu Theater at Paris. Mr. B. subsequently produced at the Adelphi—of which he was for some time joint-manager with Mr. B. Webster—another 'sensation' drama, *The Octoroon*, the popularity of which was only inferior to that of *The Colleen Bawn*. Having quarreled with Mr. Webster, he, in 1862, opened a new theater in London, the Westminster, erected on the site of what had been for generations known as Astley's Amphitheater; but this speculation turned out unfortunate, and B. was ruined by it. He afterwards re-established his fortunes by new plays, brought out at the Princess's, the Holborn, and other theaters, in some of which he and his wife—formerly Miss Robertson, a very popular actress—took the leading parts. *The Streets of London*, *Flying Scud*, *After Dark*, and the *Shaughraun* have been the most popular of his recent works, all of which are of the 'sensation' school, with which, it may be said, he first familiarized the public. He has written upwards of 150 dramatic pieces; and in illustration of the facility with which he has composed works which—all deductions made—are of considerable merit, it may be said that he lately stated to a royal commission that he would undertake to write plays for all the theaters in London. He is undoubtedly capable of writing better works than any he has yet written; but he found the public taste bad, and instead of making thankless attempts at improving it, he has been content to gratify it; and in fact has helped to debauch it. As an actor, B. has always been popular, without attaining to high excellence in his vocation. He wants some natural gifts, without which a man cannot be a great actor; he has an immobile countenance, an indifferent voice, and a too artificial manner. Any success he has had has been gained by the soundness of his judgment and his great cleverness. In 1876 he went to live in New York.

BOUDOIR (Fr. *bouder*, to pout—hence a retired corner), a lady's small private appartment, in which she receives only her most intimate friends. Boudoirs became particularly fashionable in France during the reign of Louis XIV., and so continued during the following reign. The example having been set by Madame Pompadour, Madame Dubarri, and other royal mistresses, it became indispensable for every lady of fashion to have her B., which was adorned with the most fantastic luxuriousness.

BOU'FARIK, a village of Algeria, in the province of Algiers, and 16 miles south of Algiers. It is an important military station on the road from Algiers to Blidah and Oran. It has well-frequented markets, and a considerable trade in corn, cotton, olives, oranges, tobacco, raisins, and cattle. Pop. 7650.

BOUVA'RDIA, a genus of plants of the natural order *Cinchonaceæ* (q. v.), and of the same tribe with the *Cinchona* (q. v.), or Peruvian Bark. The calyx is 4-partite, with teeth between the segments; the corolla tubular and 4-fid; the stamens 4, included within the corolla; the capsule 2-celled. The species are natives of Mexico. One of them, *B. triphylla*, with oblong ternate leaves and trigonous branches, has obtained a place among the favorite ornaments of flower-borders in Britain, but requires careful protection from frost. To preserve it, the roots are generally taken up, and are sometimes placed in a greenhouse or frame for the winter, sometimes in a dry cellar. Its beautiful corymbs of scarlet flowers are produced from June till November.

BOUFLERS, Louis Français, Duke of, peer and marshal of France, one of the most distinguished generals of his time, was born in 1644, and was descended from one of the most ancient and noble families of Picardy. He began his military career as a lieutenant, and rose very rapidly from one rank to another. Under the great Condé, Turenne, Crequi, Luxembourg, and Catinet, he fought with distinction in Germany and the Netherlands. His defences of Namur in 1695 and of Lille in 1708, are famous. The siege of the former place, conducted by King William III. of England, cost the allies more than 20,000 men; and although Louis XIV. sent to B. an order written by his own hand for the surrender of the place, yet he did not surrender it until all the means of defence were exhausted. After the defeat of Malplaquet, he led the French army so admirably, that the retreat seemed rather a triumph than the consequence of a lost battle. He was a man of highly honorable and upright character. He died at Fontainebleau in 1711.—His son, Joseph Marie, Duke of Bouflers, and also a marshal of France, born in 1706, died at Genoa in 1747.

BOUFLERS, Stanislas, Marquis de, commonly styled the Chevalier de Bouflers, was born at Luneville in 1737. He was the son of the Marquis Bouflers-Remiencourt, who was captain of the guard to Stanislas, king of Poland, and his mother was long one of the brightest ornaments of the Polish court. He himself was esteemed one of the most clever and agreeable men of his time. He entered the French military service, and was very soon made governor of Senegal, in which capacity he had the merit of introducing many regulations very useful to the colony. After his return, he devoted himself to the light literature for which the time of Louis XV. was distinguished. He was chosen a member of the National Assembly in 1789, in which he displayd great moderation, and made some most judicious proposals; but after the 10th of August 1792, he forsook France. He was hospitably received at the court of Prussia, and received the gift of a large estate in Poland, in order to establish upon it a colony of French exiles. Having returned to France, he again devoted himself, after the year 1800, entirely to literature. In 1804, he entered as an old academician into the Institute reorganized by Napoleon. He died 18th January 1815. The monument on his grave bears the following inscription, dictated by himself: *Mes amis, croyez que je dors* (My friends, believe that I sleep). A collection of his works was published after his death (8 vols. Par. 1815). His letters from Switzerland deserve to be particularly mentioned; and from this work an idea may be formed of the amiable character and intellectual liveliness of its author.

BOUGAINVI'LLE, a bay, island, and strait, so called from th. French navigator of the name (q. v.), a contemporary of Cook.—1. *Bay*, in Patagonia, on the north side of the Strait of Magellan, being in lat. 53° 25′ S., and long. 70° 13′ W.—2. *Island*, one of the Solomons, in the west section of Polynesia, sometimes distinguished from the east section as Melanesia. It is between lat. 5° 30′ and 7° 2′ S., and in long. 155° E., being mountainous, well wooded, and populous.—3. *Strait*, in the New Hebrides, between Mallicollo and Espiritu Santo.—Bougainvillea is the name given to a plant of the order *Nyctaginaceæ*, largely cultivated in green-houses for the beauty of its purple bracts: the name is also used of a genus of hydroid zoophytes.

BOUGAINVILLE, Louis Antoine de, one of the most famous navigators of France, was the son of a notary, and was born at Paris, 11th November 1729, studied there, and attained great proficiency both in languages and science. In 1754, he went as secretary of the French embassy to London. In 1756, he acted as aide-de-camp to the Marquis of Montcalm, to whom the defence of Canada was intrusted. At the head of a select detachment, he burned an English flotilla; and through his advice and example, a corps of 5000 French, in June 1758, successfully withstood an English army of 24,000 men. In the campaign of 1761 in Germany, he served with distinction. After the peace, he entered the

naval service, in which he soon signalized himself. After having been obliged to give up a project which he had formed of founding a settlement on the Falkland Islands, he undertook a voyage round the world (15th Dec. 1766, to 16th March 1769) with a frigate and a St. Malo transport, the first voyage round the world which the French ever accomplished. He gave an account of it in his *Description d'un Voyage autour du Monde* (2 vols., Par. 1771—1772). Geography and other branches of science were enriched by it with many discoveries. In the North America war, B. commanded several ships of the line, and in 1779, was made *chef d'escadre;* in the following year, he was made a field-marshal in the army. After the outbreak of the Revolution, he retired from public service, devoted himself entirely to scientific pursuits, and died 31st August 1811.

BOUGHT AND SOLD NOTES are notes of sale signed by a broker employed to sell goods, and by which the bargain through him is completed. The following is the form of the bought and sold note:

'Sold for A. B., to C. D., 250 firkins butter, at 100*s*. Shipped in the month of July, and payable by bill at two months.'

These notes are, in fact, transcripts from books, in which it is the practice of brokers to enter or register their transactions. The bought notes and the sold notes are respectively delivered to the principal parties; and as they contain the essential parts of the bargain, they will suffice, in the absence of a corresponding entry in the broker's books; but if they describe the particulars differently or incorrectly, as one species of goods for another, or erroneously state the terms, no contract arises, and a variation of this nature cannot be corrected by a reference to the broker's book.

In Scotland, there is no necessity for any such signed note, but the contract may be proved by any kind of evidence, verbal (see PAROLE EVIDENCE) as well as written, the only exceptions to this general rule being those contained in acts of parliament relative to ships, literary property, patents, and goods bonded in the Queen's warehouses. See BROKER, SALE OF GOODS.

BOU'GIES are rods of metal or other substances, used for distending contracted mucous canals, as the gullet, bowels, or urethra. See STRICTURE. For the urethra, they are frequently of German silver, or pewter, and vary from ·125 to ·25 inch in diameter. Still larger sizes are used by many surgeons. The following directions for making common non-metallic B. are taken from South's translation of Chelin's *Surgery:* 'A piece of fine linen, which has been already used, nine inches long, and half an inch in width, according to the thickness of the bougie to be made, is to be dipped into melting plaster, and, when a little cooled, spread flat and even with a spatula; it is then to be rolled together between the fingers, and afterwards between two plates of marble, till it is quite firm and smooth. The bougie must be equally thick throughout its whole length to about one inch from its point. Bougies are also made by dipping cotton threads into melted wax till they have acquired sufficient size, after which they are rolled between marble plates. Bougies are also made of a material termed "gum elastic;" and for very narrow strictures, catgut is often used.'

BOUGUER, PIERRE, one of the most eminent French mathematicians and natural philosophers of his time, was born at Croisic, in Bretagne, 16th February 1698, and studied in the Jesuit College at Vannes. In 1713, he succeeded his father as Professor of Hydrography in Croisic, from which he was removed to a similar office at Havre in 1730. In 1729 he published his *Essai d'Optique sur la Gradation de la Lumière*. His researches on other subjects of natural philosophy and astronomy continued to add to his fame; and in 1731, he was made Associate Geometer of the Academy of Sciences, and promoted to the office of pensioned astronomer in 1735. In that year, also, he was chosen to proceed, along with Godin and De la Condamine, to South America, in order to the measurement of a degree of the meridian at the equator. B. and his companions had to contend with many difficulties, and were more than seven years away from home, during which time B. made valuable observations on the length of the seconds' pendulum at great elevations, the deviation of the plumb-line from a vertical position through the attraction of a neighboring mountain, the limit of perpetual snow, the obliquity of the ecliptic, &c. He published an account of his labors and those of his colleagues in a magnificent work, entitled *La Figure de la Terre determinée par MM. Bouguer et de la Condamine* (Par. 1749), which, however, involved him in an unpleasant controversy with De la Condamine concerning their respective shares of merit in the researches in which they had been jointly engaged. B.'s investigations concerning the intensity of light laid the foundation of Photometry; and their results, which had been partly exhibited in the optical work already noticed, were more fully embodied in his *Traité d'Optique sur la Gradation de la Lumière*, which was edited after his death by Lacaille (Par. 1760). He invented the heliometer in 1748, which has of late been brought to greater perfection by Fraunhofer. He also published an excellent work on navigation (Par. 1753). He died in 1758.

BOUILLÉ, FRANÇOIS CLAUDE AMOUR, MARQUIS DE, a distinguished French general, was born in 1739 at the castle of Cluzel, in Auvergne, entered the army at the age of 14, and served with distinction in Germany during the Seven Years' War. In 1768 he was appointed governor of the island of Guadaloupe, and on the seeming approach of war with Britain, he was made governor-general of Martinique and St. Lucia, and commander-in-chief of all the French forces in the West Indies.

When the war really broke out in 1778, he took the island of Dominica from the British, the whole garrison falling into his hands. In conjunction with Admiral De Grasse, he took Tobago in 1781; and after De Grasse's departure, the British islands of St. Eustatius, Saba, and St. Martin. The humanity and generosity which he displayed were equal to his valor and skill. In 1782, B. captured the islands of St. Christopher's and Nevis. For this he was rewarded with the rank of lieutenant-general. In 1784, he visited England, and was received with extraordinary respect. Louis XVI. nominated him a member of the Assembly of Notables in 1787—1788; in 1790, he was made commander-in-chief of the army of the Meuse, the Saar, and the Moselle. His decision of character prevented the dissolution of the army and the outbreak of civil war; he also quelled the insurrection of the garrison of Metz and of the three regiments at Nancy. For this he received the thanks of the National Assembly and of the king. For his share in the attempted escape of Louis XVI. he had to flee from France. He repaired to Coblenz to the king's brothers, and in 1791 attended the conference at Pilnitz. In the same year he entered into the service of Gustavus III. of Sweden, and after the assassination of that monarch, he served in the corps of the Prince of Condé. He rejected a proposal which the French princes made to him in 1793, that he should take the chief command in La Vendée; and went to England, where his advice in West Indian affairs were useful to the government, and where he wrote his *Mémoires sur la Révolution Française*—a truthful and useful work, throwing much light on the transactions of that time. He died in London in 1800.

BOUILLON, a duchy, originally German, in the Belgian part of the grand duchy of Luxemburg, consisting of a woody and hilly district in the Ardennes, about 157 square miles in extent, and with a population of 21,000. This duchy was the possession of the famous crusader, Godfrey (q. v.) of Bouillon, who, in order to raise money for his crusade, pledged it, in 1095, to the Bishop of Liege. It was conquered by France in the war of 1672, and bestowed by Louis XIV., in 1678, upon his grand chamberlain, Latour d'Auvergne. By the peace of 1814, the greater part of it was included in the grand duchy of Luxemburg; and the sovereignty of it passed to the king of the Netherlands, who, in 1821, purchased the proprietary rights from the heir. By the revolution of 1830 B., along with Luxemburg, was separated from the Netherlands, and in 1837 united to Belgium.—The principal town is Bouillon, situated between steep hills on the Semoy, with a strong castle on a rock, formerly the residence of the Dukes of Bouillon. Pop. 4000.

BOUILLON, GODFREY. See GODFREY OF BOUILLON.

BOUILLY, JEAN NICOLAS, one of the most prolific of French dramatic authors, was born at Boudray, near Tours, in 1763, and at first studied law, but afterwards devoted himself to belles-lettres. At the commencement of the Revolution, he attached himself to Mirabeau and Barnave, and in 1790 produced a drama called *Pierre le Grand* (Peter the Great), in which he displayed very revolutionary sentiments. He afterwards filled important public offices in Tours during times of the most dangerous excitement, and conducted himself with great prudence and moderation. He took an active part in the introduction of the system of elementary schools in France. The greater number of his dramatic works were produced in the first decade of the 19th century. Many of them have been translated into other languages. He wrote also tales and other works for young persons, some of which acquired great popularity. He died at Paris, 24th April 1842.

BOULAC, or BOOLAK, the name of the port of Cairo, is situated on the Nile, about one mile distant from that city, and is supposed to be the site of the ancient Litopolis. It is a crowded town, extremely dirty, with very narrow and irregular unpaved streets. It contains the custom-house and warehouses of Cairo, cotton, paper, and sugar factories, a printing press, and the famous museum of antiquities. Pop. 10,000.

BOULAINVILLIERS, HENRY, COUNT, an eminent French author, descended from an ancient family in Picardy, was born 11th October 1658 at St. Saire, in Normandy. After studying at the College of Juilly, he embraced the military profession, but afterwards resigned it, and devoted himself to the investigation of the genealogy of the ancient families of France. He regarded the feudal system as the most perfect creation of human genius and

wisdom, and his writings are pervaded by the most extreme aristocratic sentiments. They were only circulated in manuscript during his life, and first published after his death, which took place on 23d January 1722. The most valuable of them are his *Histoire de l'Ancien Gouvernement de France* (3 vols. Hague, 1727), his *Histoire de la Pairie de France et du Parlement de Paris* (2 vols. Lond. 1753), and his *Abrégé Chronologique de l'Histoire de France* (3 vols. Hague, 1733). His philosophical writings have long ceased to have any interest, and the prejudices which appear in his historic works may afford amusement to his readers; but he deserves to be remembered as one of the first laborious investigators of the facts of history.

BOULAY DE LA MEURTHE, ANTOINE JACQUES CLAUDE JOSEPH, COUNT, a statesman of the French Empire, was born in 1761 at Chaumousey, a village in the Vosges. He espoused the cause of the Revolution, but held moderate principles. In 1797, he was elected to the Council of Five Hundred, in which he became the declared opponent both of Jacobinism and of the despotism of the Directory. He supported the *coup d'état* of the 18th Brumaire. Under the Empire, he accepted the post of president of the legislative section of the Council of State, in which capacity he had an important part in the preparation of the *Code Civil*. He afterwards labored with extraordinary zeal and energy in the administration of the national domains, which he regarded as affording the basis for a regeneration of France. He adhered to the cause of Napoleon with remarkable fidelity. After the second Restoration, he was conveyed by the Russians into Germany. He received permission to return to France in 1819, and lived in complete retirement till his death, which took place at Paris, 2d February, 1840. Napoleon had elevated him to the rank of a count of the Empire. In 1799, he published an *Essay on the Causes which led to the Establishment of the Commonwealth in England in* 1649, a work which had an extraordinary circulation, and did much to prepare men's minds for the revolution of the 18th Brumaire. He prosecuted the same general subject in his Political Picture of the Reigns of Charles II. and James II. (*Tableau Politique*, &c., 2 vols., Brussels, 1818). He wrote also Bourrienne and his Errors, Voluntary and Involuntary (*Bourrienne et ses Erreurs*, &c., 2 vols. Par. 1830), a work not without value in reference to the history of Napoleon.

His son, HENRY BOULAY DE LA MEURTHE, was born at Paris in 1797. He took an active part in the revolution of 1830, but became an opponent also of the government of Louis Philippe. He devoted great attention to questions of social economy, contributing much to promote the establishment of houses of refuge (*salles d'asile*), the extension of elementary education, and many improvements in the condition of the laboring classes. In the National Assembly of 1848, he associated himself with the modern republicans, and in January 1849 was elected vice-president of the republic. Nevertheless, he tacitly acquiesced in the *coup d'état* of December 1851, and became a member of the imperial senate. He died at Paris, 24th November 1858.

BOU'LDER-CLAY, DILU'VIUM, DRIFT, or TILL, is a post-pliocene bed of a remarkable character, and as yet somewhat mysterious history. It usually occurs as the lowest or first of that group of beds which geologists recognize as the post-tertiary, post-pliocene, or pleistocene, superficial formation. The only exception is when a bed of sand intervenes—as is rarely the case—over the surface of the subjacent rocks. It consists of a compact clay, blue or red, according to the prevalent character of the subjacent rocks, having boulders diffused throughout its mass, and with here and there thin lenticular beds of gravel and sand interspersed. In some places in Scotland it is not less than 70 feet thick. In America, it extends to about the 38th parallel; in Britain, it terminates a little to the north of London. The boulders, which are the most striking feature of this bed, differ in size from a small pebble to masses many tons in weight. They are portions of rocks of all ages, more or less worn. The older rocks, when from a distance are rounded, while those that have been broken from rocks in the district are more angular. These masses are scattered without order in the clay, the heaviest blocks occurring frequently in the upper portion of the bed. Nor is there any indication of their having sunk in the clay from gravity—the clay seems to have been so viscid when the materials assumed their present position, as to have successfully resisted the immense pressure of those enormous blocks. The boulders have not that rounded appearance produced by the action of water in a river-course or on the shore between high and low water marks. They have a greater or less number of *rubbed faces*, produced evidently by being forced, while held in one position, over the solid rocks beneath. The rubbed and scratched surfaces exhibited on these rocks, when the superincumbent clay is removed, plainly testify to their origin. Several interesting examples of such rubbed surfaces exist in the neighborhood of Edinburgh. They have been carefully examined and described by Fleming, Chambers, Milne-Home, and other local geologists. A careful observer can determine from the scratchings the direction of the current which bore with it the rubbing boulders. In the district to which we have alluded, these indicate a current from the west. The general direction, however, in America, in Britain, and in Scandinavia, seems to have been from the poles towards the warmer regions of the earth.

The B. contains no fossils strictly its own. Organisms exist in the boulders obtained from the older fossiliferous rocks, but no indications have hitherto been observed of a fauna or flora belonging to the period of the deposition of this bed. In the brick clays and gravels overlying it in Scotland, there are shells of arctic character.

The origin and structure of this remarkable bed have been a puzzle to geologists. That it was produced by the Noachian deluge, as was universally believed not many years ago, finds now no supporters. The present approved explanation assigns it as the product of a glacial ocean, in which the materials were borne violently along, pressing hard upon the sea-bottom, so as to wear and scratch it. But, while there is little room to doubt that such was the general fact, it remains to be shown how a merely ice-charged ocean could carry along such vast masses of clay and blocks, allowing them all the time to press so hard upon the sea-bottom as to mould its whole figure—for such appears to have been its work.

BOU'LDERS, ERRATIC, are large masses of rock found at a distance from the formations to which they belong. The term is generally applied when they are found lying detached on the surface; in which case they may either have been washed out

Erratic Bouider.

of the boulder-clay (q. v.), or have been carried separately by icebergs, and dropped in their present situations. Large blocks of Scandinavian rocks are scattered over the plains of Denmark, Prussia, and Northern Germany. From their magnitude and number, they frequently form a striking feature in the landscape. They abound on the shores of the Frith of Forth—a large one, locally known as the 'Penny Bap,' is the most prominent object on the beach a little to the east of Leith. The pedestal of the statue of Peter the Great, in St. Petersburg, was hewn out of a large erratic boulder, 1500 tons in weight, that lay on a marshy plain near that city. We give a drawing of a large one that forms a rocking-stone at Fall River, Massachusetts.

BOULEVARD, or BOULEVART (Ital. *Boluardo*), identical with Eng. *bulwark* (q. v.), the name given in France to the old fortifications, ramparts, &c., with which towns, or portions of them, were or still are surrounded. In France and Germany, these ancient works have generally been levelled, the ditches filled up, and the space thus obtained employed for the formation of parks, promenades, and streets lined with trees. These, however, in France, still bear the name of Boulevard. The boulevards of Paris are celebrated, and are of great service as open spaces promoting the circulation of air amidst the dense mass of habitations. Some parts of them present a very dazzling spectacle; and as a whole, they afford a striking exhibition of the life and character of the French capital in all the different classes of society. The *Boulevard des Italiens* is particularly known as the rendezvous of the fashionable, and the *Boulevard du Temple* as the place where the small theaters are to be found which are frequented by the common people and the inhabitants of the suburbs, for which reason the expression *Théâter de Boulevard* is often employed to denote a theater for the common people, or one of an inferior kind. The Thames Embankment is esentially a B.

BOULOGNE, a town of France, in the department of the Seine, on the right bank of the river of that name, about 5 miles west of Paris, from which it is separated by the Bois de Boulogne. A fine stone bridge of twelve arches crosses the Seine from B. to St. Cloud. Pop, in 1876, 21,556. The Bois de Boulogne is traversed by many walks, through the broadest of which the fashionable

world of Paris travels in Easter-week to the Abbey of Longchamp. At the entrance of the wood lies Auteuil (q. v.). During the Revolution, the trees of the older walks were mostly cut down. But when Napoleon chose St. Cloud, in the immediate neighborhood, for his summer residence, new walks were planted and laid off, and the enclosing walls were restored. This wood which from ancient times to the present day has been a place of enjoyment and recreation to the Parisians, was again much injured during the siege of 1870—1871.

BOULOGNE-SUR-MER, a fortified seaport in the department of Pas-de-Calais, France, situated at the mouth of the Lianne, in the English Channel, about 19 miles south-west of Calais, and 139 north-north-west of Paris. Lat. 50° 45′ N., long. 1° 36′ E. The town consists of two parts—Upper and Lower Boulogne. The upper town was, in former times, strongly fortified ; but its citadel was demolished in 1690, and its ramparts have been converted into beautiful promenades, with fine views, and from which, in clear weather, the spire of Dover can be seen. The upper town contains the Hôtel-de-Ville, and the Cathedral, a modern edifice with a conspicuous dome. The lower town, which is more properly the seaport, is newer, finer, more populous, and more lively, inhabited chiefly by merchants, mariners, and fishermen. It contains the barracks, the great hospital, the theater, the museum, and gallery of art. The streets have been much improved by side-pavement, and many new and elegant buildings have been erected. A large wet-dock was completed in 1872. B. has numerous churches and educational institutions ; is the seat of various associations ; has extensive and excellent salt-water baths ; and on account of its fine sands, is much resorted to for sea-bathing. Pop. (1881) 44,085, actively engaged in the boiling of sugar, in the manufacture of linen and sail-cloth, cordage, &c., and in fishing, the coast being productive in oysters, herring, cod, and mackerel.

B. has an active coasting trade, and ranks with Calais as one of the nearest and most frequented places of passage between France and England, steamers plying daily to London, which theyr each in from 9 to 10 hours, and twice a day to Folkstone, which they reach in about 2 hours. B. is much resorted to by the English, who form a large section of the population, and for whose accommodation there are numerous hotels and boarding-houses. Paris is reached by railway from B in 4½ hours. The harbor of B. is too shallow for large ships of war, which can only reach the wide and safe roads of St. Jean; it was, however, repeatedly enlarged and improved, so as to admit large merchant vessels at high water. A new and extensive deep-sea harbor was begun in 1879. The long pier forms a fine promenade. B. was anciently called *Gesoriacum*, in the country of the Morini; after the time of Constantine the Great, it was called *Bononia*, and after that of the Carlovingians, *Bolonia*. In 1435, B. came into the possession of the Duke of Burgundy, and was united with the crown of France by Louis XI. in 1477. B. was besieged by Henry VII. of England in 1492, taken by Henry VIII. in 1544, and restored to the French by Edward VI. in 1550. From this point Napoleon contemplated the invasion of England; and here he encamped 180,000 men and collected 2400 transports, ready at any favorable moment to swoop down on the shores of Britain; but after months' watching, the war with Austria created other employment for them. As a memorial of this great camp, a tall marble column was commenced on the higher grounds; but being incomplete at the restoration of the Bourbons, it was finished and inaugurated in honor of Louis XVIII. It has since been restored to its original object, and surmounted by a colossal statue of Napoleon. The poets Campbell and Churchill died at B.; and the house, or rather, the house occupying the site of that in which Le Sage, the author of *Gil Blas*, is said to have died, is shown to the visitor. Altogether, B. is to be described as a thriving and agreeable place of residence; and from its accessibility to English tourists, and rapid railway transit to Paris, it has greatly superseded Calais as a place of debarkation.

BOULTON, MATTHEW, a celebrated English mechanician, was born in 1728 at Birmingham, where his father, who had a steel manufactory, had acquired a considerable fortune. When still very young, he undertook, at his father's death, the business of the manufactory, which he carried on with great energy, and extended, in 1762, by the purchase of a piece of land, then a barren heath, at Soho, near his native town. One of his first inventions was a new mode of inlaying steel. He entered into partnership with James Watt (q. v.), who had obtained a patent for great improvements in the steam-engine which have immortalized his name, and they established a manufactory of steam-engines in 1769. They jointly contributed also to the improving of coining machinery, and so to the perfection of the coinage itself. B. died at Soho, 17th August 1809. His long life was devoted to the promotion of the useful arts and of the commercial interests of his native country. He was a man of extremely pleasing conversation, and of a most generous disposition.

BOUND, or BOUNDARY, the utmost limits of land by which the same is known and can be described; being in this sense synonymous with *abuttals*, which means the buttings and boundings of lands, east, west, north, and south, with respect to the places by which they are limited and bounded. The *sides* of the land are properly said to be *adjoining*, and the ends *abutting*, to the thing contiguous. For other applications of this term, see the articles that follow.

BOUNDARIES OF BOROUGHS, CITIES AND TOWNS in England are settled by the 5 and 6 Will. IV. c. 76, ss. 7 and 8, which refers to and adopts, for the purpose of such boundary, the regulations of the 2 and 3 Will. IV. c. 64—amended, however, by the 5 and 6 Will. IV. c. 103. These boundaries are generally the same as the parliamentary limits. The corresponding Scotch law on this subject is contained in the 3 and 4 Will. IV. c. 76, which adopts the limits prescribed in the 2 and 3 Will. IV. c. 65.

By the 7 Geo. IV. c. 64, is enacted that where, in England, any felony or misdemeanor shall be committed on the boundary or boundaries of two or more counties, or within the distance of 500 yards of any such boundary or boundaries, or shall be begun in one county, and completed in another—every such felony and misdemeanor shall be dealt with and tried in any of the counties.

BOUNDARIES OF PARISHES are determined by ancient and immemorial usage, as to which, see PARISH, and see BEATING THE BOUNDS. It may also be observed that by numerous acts of parliament lately passed, for extending church accommodation, and making more effectual provisions for the cure of souls, it is generally provided that any part or parts of any parish may be constituted a separate district for spiritual purposes, or parish *quoad sacra*, as it is called in Scotland; and that any parish may also be divided into two or more distinct and separate parishes for all ecclesiastical purposes, though for other purposes the old limits remain. The Church Building and Inclosure Acts contain many provisions as to boundaries.

BOUNDARY SURVEY OF IRELAND. This important subject is povided for and regulated by these acts of parliament—the 6 Geo. IV. c. 99, 17 Vict. c. 17, 20 and 21 Vict. c. 45, and the 22 and 23 Vict. c. 8, which are all to be read as one act. The boundary surveyor may alter the names of lands erroneously named in the ordinance map of any county, on the application of the owners of such land, who are to state the ground on which such application is made. And the same surveyor may define the boundaries of parishes divided under certain acts of parliament. The publication in the *Dublin Gazette* of the surveyor's report, referred to in the order of the lord-lieutenant in council, is to be discontinued, on the ground of its being unnecessary and expensive; and in lieu thereof, any person desirous of seeing the report and ordnance plans, may see them at the council office, in Dublin, at all reasonable hours, without fee or reward. See ORDNANCE SURVEY and SURVEY; and see IRELAND.

BOUND-BAILIFF, in England, is an officer of the sheriff whose duty is to discover and arrest debtors. As the sheriff is responsible for the misconduct of these bailiffs, they are annually bound in an obligation, with sureties for the due execution of their office, and are, in consequence, called *bound*-bailiffs, a name which Blackstone is at pains to inform us ' the common people have corrupted into a much more homely appellation '—*bum-bailiff*. See BAILIFF.

BOUNDING CHARTER, in the Scotch law, is an instrument of title which describes the lands thereby conveyed by their boundaries or limits. It gives right to everything within the bounds, and, on the other hand, it excludes what lies beyond these. If the boundary be the sea or the sea-shore, the right is extended or limited as the sea recedes or advances. If, again, it be a stream or river, the property may be subject to alteration, either extended by *alluvion* (q. v.), or by the gradual and imperceptible variation of the channel; or the stream may cease to be the boundary, in consequence of some violent change. But if the property described in the charter is bounded by walls, the walls, as a general rule, will not be held as included in the grant; and where it is intended that a wall is to be mutual, this must be expressed. When the grant is described both by boundaries and by measurement, the boundaries determine its extent, although containing a larger quantity of ground than the measurement. The lands, however, may be described simply by reference to a plan, and this is a conveyance which makes a valid bounding charter. By statute also a reference to a leading name in a prior deed is a sufficient description. The following articles should be consulted in connection with this subject—CHARTER ; CONVEYANCE; TITLE ; and GRANT.

BOUNTY is a sum of money given to encourage men to enter the army or navy. In time of peace, when there is little or no need to augment the forces, the B. sinks to a minimum; but in cases of exigency, it is raised according to the difficulty and urgency of the circumstances. In the British army, no B. was paid to recruits until about half a century ago; the temptations offered to them, if any, were of some other character. The high-

est B. ever paid during the great wars against Napoleon was in 1812, when it amounted to £18, 12*s.* 6*d.* for limited service, and £23, 17*s.* 6*d.* for life; but these sums were in great part nominal, being subject to many unfair and absurd deductions. Even so late as 1849, when the B. to an infantry recruit was nominally £4, he received little more than one-eighth of this amount, all the rest being swallowed up in fees and drawbacks of various kinds. The only B. which now exists is a free kit—no other being allowed.

The young men who used to enter the British army were supposed, for the most part, to have been tempted by immediate B. rather than by prospective pays and pensions; and thus it arose that the rate of B. varied frequently, while those of pay and pensions underwent very little change. In 1855, it was £7 per head (for line infantry); in 1856, only £2; in 1858, £3; and it afterwards underwent further changes. It was always higher to the cavalry and artillery than to the infantry; and in the latter it was higher to the Highland than to the other regiments, on account of matters connected with dress and personal ornaments. The relation which the B. bore to the other emoluments of the soldier are explained under ENLISTMENT, RECRUITING. In reference to seamen, the subject will receive elucidation under MANNING THE NAVY.—The term B. is also used in the navy to signify the payment and distribution of money to which the officers and crews of her Majesty's ships and vessels of war may, on particular occasions of active service, be entitled. See PRIZE, SALVAGE, BOOTY.

BOUNTY, a term applied to any sum granted by the legislature towards creating or encouraging some kind of undertaking believed to be of national importance. At one time there was no end to the giving of bounties in this way from the public purse—there were bounties on exporting corn, with a view to encouraging agriculture; there were bounties on the tonnage of vessels employed in the herring and whale fisheries; on the importation of materials of manufactures; on the importation of indigo from the colonies; on the exportation of Irish linen, &c. The fallacy of this costly and factitious process for fostering commerce, manufactures, and agriculture was amply demonstrated by Adam Smith in his *Wealth of Nations*; one of his more striking facts being, that every barrel of herrings which sold for 20*s.*, cost the government about 25*s.* The notion that bounties may properly be given as an encouragement in the infancy of undertakings, has been happily exploded. It is ascertained that, besides taxing the general community in order to reward or encourage individuals, bounties do no real good to the parties so favored; for by such inducements they engage in business for which they have no special vocation, or which, in existing circumstances, it would be preferable to let alone. Misdirection of capital, talent, and industry are, in short, the inevitable result of bounties, as of all measures alleged to be for the special protection of trade. The subsidies in the form of extra rates paid to certain steamboat companies for carrying the mails may be said to be the last remnant of British bounties. The carrying of the mails, as involving greater responsibilities than ordinary goods, is paid at much higher rates, even where the ordinary traffic is remunerative, as on the Atlantic route, which is crossed by the greatest number of steamboat lines. Here the Post-office, after a trial of open competition for the conveyance of the mails, in 1878 returned to the system of special contracts with certain of the most reliable companies at increased rates. These contracts have been objected to in the House of Commons as monopolies.

BOUNTY OF QUEEN ANNE. See QUEEN ANNE'S BOUNTY.

BOUQUE'T OF WINE is the peculiar flavor yielded by the better class of wines, and which is due principally to the presence of œnanthic ether. See WINE.

BOUQUETIN, or IBEX of the Alps (*Capra Ibex*), a species of goat, which inhabits the highest regions of the Alps, even higher and wilder than those inhabited by the chamois, up to the limits of perpetual snow. It is the *Ibex* of te ancients. See IBEX. In German Switzerland, its name is *Steinbock*. It was at one time found on all the higher Alps, but has disappeared from most of them, and exists chiefly on those between the Valais and Piedmont, where it is carefully protected by the Sardinian government. It is larger and more powerful than the common goat, and has a small head and great horns (those of the male 1½—2 feet long), which curve backwards, are directed a little outwards, and have prominent transverse knots or bands on the front. The horns of the females are only about 6 inches long. The hoofs are large, rough on the sole, and capable of being spread widely apart, to give greater security of footing. The general color is brown. The body is covered with two kinds of hair, the longer hair being mixed, at least in winter, with thick soft wool. There is no beard, except a few hairs in winter, although the animal has been often incorrectly figured as having one.

The B. feeds on the herbage and small shrubs which are found on the last confines of vegetation, and descends by night to browse in the highest forests, the lichens and branches of which supply much of its winter food. It is capable of enduring great cold, and will remain, with seeming indifference, for hours on the summit of a rock, motionless, during the most severe storm. It possesses an extraordinary power of bounding from crag to crag, and of ascending or descending almost perpendicular precipices. Even the projections of a wall of rough masonry have been seen to suf-

Bouquetin.

fice for the feet of a tame one to take hold of. One has also been known frequently to spring from the ground, without a race, and plant itself on a man's head. Tschudi rejects as a fable the statement which has been repeated by one naturalist after another, from the days of Gesner, that the B. throws itself down precipices, so as to fall upon its horns, their elasticity preserving it from injury.

When taken young, the B. is easily tamed. It readily associates with common goats, and breeds with them, and the hybrids produce young, of which, however, it does not appear that in any case both parents have been ascertained to be hybrids.

Whether this animal might not be made useful to the inhabitants of such countries as Iceland and Greenland, no one seems to have thought of trying.

BOURBON, ILE DE, or, as it is called at present, RÉUNION, an island in the Indian Ocean, the southernmost of the Mascarene Isles, lying about 100 miles south-west from Mauritius, and 360 miles east from Madagascar. It is one of the most important of the insular colonies of France. It has an area of about 950 square miles, being about 38 miles in length, and 28 in its greatest breadth. Pop. (1873) 193,362, including some hundreds of Chinese, 6000 negroes, 34,500 Indians, and a garrison, and other officials, to the number of about 2000. It may be described as one great mountain mass, of which the highest peaks are the Piton de Neiges—in the center of the island, rising more than 10,000 feet above the sea—the Grand Bernard, and the Cimandef, in the north, with respective heights of 9500 and 7300 feet, and in the south-east the Piton de Fournaise, 7200 feet high, one of the greatest volcanoes in the world, and one of the most active, its eruptions taking place at least twice every year, and its lava-streams sometimes reaching to the sea. This volcano occupies perhaps one-sixth of the island, often changes its crater, and is surrounded by a district of more than 10,000 acres, which is a dreary desert, and is called the *Pays Brûlé* (Burned Land). Except in this part, however, the soil is in general extremely fruitful. About a fourth part of the island is cultivated, chiefly along the coast, although much of the interior is of great natural fertility. The scenery is very beautiful. Streams, although not large, are very numerous and rush in cascades to the sea. The climate, which was once mild and salubrious, is now very unhealthy to Europeans, who cannot reside four or five years on the island without an attack of typhoid fever or dysentery. The south-east monsoon and hurricanes often make fearful devastation. The plants of Arabia, of the Asiatic Archipelago, and of the south of Europe, succeed equally well here; coffee and cloves are produced, along with the fruits of Italy and Spain. The trade is estimated at about two millions sterling.

By far the most important article of export is sugar; coffee, vanilla, cloves, saltpetre, wood for cabinet-making, and dye-woods, are the other exports. The value of the exports, which up to 1867 had been steadily increasing, has since then greatly declined, as the crops have repeatedly suffered from cyclones, persistent drought, and blight. The cereals grown in the island are not sufficient for its own wants. Cattle are imported from Madagascar. The capital of the island, and seat of government, is St. Denis, on the north-west coast, with 9000 inhabitants, a college, a botanic garden, &c. Lat. 20° 52′ S., long. 55° 30′ E. The mean

temperature here is 77° F. There is an almost total want of harbors, the whole coast of the island possessing only two tolerable anchoring-places—one at St. Denis, and another at St. Paul, 18 miles farther south. But France is now constructing at fabulous cost a new and great harbor, meant to be an eastern Cherbourg. B. and Mauritius were discovered by the Portuguese navigator, Mascarenhas, and named after him, the Mascarene Isles. After the French had begun their attempt to found a colony in Madagascar, they took possession of B. in 1649, giving it that name, which was changed to Réunion at the Revolution, and to Isle Bonaparte in 1809. The name has been varied according to the political changes in France. The French having in 1720 taken possession of Mauritius, which they named Isle of France, the Mascarene Isles were placed under one governor. In 1810 they were taken by the British, but B. was restored to France in 1814.

BOURBON, a French family of the highest note in history, and which came to possess several European thrones, derives its name from the castle and seignory of Bourbon, in the former province of Bourbonnais, in the center of France. The first lord or *sire* of this family, of whom history makes mention, was Adhémar, at the beginning of the 10th century. The fourth in succession from him, Archambauld I., added the name of the family castle to his own. Under his successors, who also bore the name of Archambauld, the family possessions were soon very much increased. At length the seignory of Bourbon having devolved upon an heiress, who, in 1272, married Robert, the sixth son of Louis IX. of France, thus passed to a branch of the royal family of the Capets, under whom it was converted into a duchy. The principal branch of this family was, in 1523, deprived of all its dignities and possessions, because the duke, Charles de B. (q. v.), the famous Constable, allied himself with Charles V. against Francis I. of France.

Of the collateral branches, that of Vendôme acquired great importance, first attaining by marriage, in the person of Antoine de B., Duke of Vendôme, to the throne of Navarre; afterwards by inheritance to the throne of France, in the person of Henry IV., on the extinction of the male line of the House of Valois; and by the fortune of war to the thrones of Spain and Naples. Among the numerous other collateral branches may be mentioned those of Montpensier, De la Marche, Condé, Conti, Soissons, and Orleans. Only a few members of the collateral lines, however, have borne the name of B.; for example, the Cardinal Charles de B., Duke of Vendôme, who, under the name of Charles X., was set up by the Catholic League as a rival king to Henry IV. The ducal dignity was revived by Louis XIV. in the House of Condé, so that the eldest son of that House should bear the title of Duke of Bourbon.

The dynasty of the Bourbons in France begins with Henry IV. (q. v.), who, after the assassination of Henry III., became, in virtue of the Salic Law (q. v.), the next heir to the French throne. Through his father, Antoine de B., king of Navarre and Duke of Vendôme, he was descended from Robert, son of Louis IX., and husband of Beatrix, heiress of Bourbon. On his assassination in 1610, he left, by his second wife, Mary de' Medici, five legitimate children: 1. Louis XIII. (q. v.), his successor on the throne; 2. J. B. Gaston, Duke of Orleans (q. v.), who died in 1660, and left no male heirs; 3. Elizabeth, married to Philip IV. of Spain; 4. Christina, married to Victor Amadeus, afterwards Duke of Savoy; 5. Henrietta, married to Charles I. of England.—Louis XIII., on his death in 1643, left two sons by his queen, Anne of Austria: 1. Louis XIV. (q. v.), his successor; and 2. Philip, who received from his elder brother the title of Duke of Orleans, and was the founder of the family which has become the younger B. dynasty.—The Dauphin Louis, styled Monsieur, the son of Louis XIV. by his marriage with Maria Theresa of Austria, died on 14th April 1711, and left three sons by his marriage with Maria Anna of Bavaria: 1. Louis, Duke of Burgundy (q. v.); 2. Philip, Duke of Anjou, who afterwards became king of Spain, as Philip V.; 3. Charles, Duke of Berri, who died in 1714.—Louis, Duke of Burgundy, died in 1712.

By his wife, Maria Adelaide of Savoy, he had three sons, of whom two died in early youth, the only one who survived being Louis XV., who succeeded his great-grandfather, Louis XIV. in 1715.—Louis XV. having married Maria Leszcynska, daughter of the dethroned king Stanislaus of Poland, had by her a son, the Dauphin Louis, who married Maria Josepha of Saxony, and died in 1765, leaving three sons: 1. Louis XVI. (q. v.), who succeeded his grandfather, Louis XV., in 1774; 2. Louis Stanislaus Xavier, Count of Provence, afterwards Louis XVIII.; 3. Charles Philippe, Count of Artois, afterwards Charles X.—Louis XVI. had three children by his queen, Marie Antoinette of Austria: 1. the Dauphin Louis, who died in 1789; 2. Louis, called Louis XVII. (q. v.), who died in 1795; 3. Marie Therese Charlotte, styled Madame Royale, afterwards Duchesse d'Angoulême (q. v.).—Louis XVIII. had no children; but Charles X. had two sons: 1. Louis Antoine de B., Duke of Angoulême (q. v.), who was dauphin prior to the Revolution of 1830, and died without issue in 1844; 2. Charles Ferdinand, Duke of Berri (q. v.), who was murdered in 1820. The Duke of Berri left two children: 1. Marie Louise Therese, styled Mademoiselle d'Artois, married to the Duke of Parma; 2. Henry Charles Ferdinand Marie Dieudonné, Duke of Bordeaux, now styled Count de Chambord, the representative of the elder branch of the Bourbons, till June 1871, exiled from France, and whom the French Legitimists sometime designate Henry V.

It has already been stated that the founder of Orleans or younger branch of the B. royal family of France, was Philip, Duke of Orleans (q. v.), the younger brother of Louis XIV. He died in 1701, leaving, by his second marriage with Elizabeth Charlotte of the Palatinate, a son of his own name as his heir, who was Regent of France during the minority of Louis XV. His son, Louis Philippe, Duke of Orleans (born 1703), married a princess of Baden, and died in 1752, leaving an only son of his own name (b. 1725, d. 1785), whose son and heir was that Louis Joseph Philippe, Duke of Orleans (q. v.), so notable in the French Revolution, who in 1792 renounced his rank, taking the name of Citizen Egalité, and died by the guillotine in 1793.

He left four children: 1. Louis Philippe (q. v.), who, before the Revolution, was styled Duke of Chartres—that being the ordinary title of the eldest son of the Orleans family—became afterwards Duke of Orleans, was King of the French from 1830 to 1848, and died in England on the 26th of August 1850; 2. the Duke de Montpensier, who died in England in 1807; 3. the Count de Beaujolais, who died at Malta in 1808; 4. Adelaide, styled Mademoiselle d'Orleans, b. 1777, d. 1847.—Louis Philippe left a numerous family by his queen, Amelia of Naples; but his eldest son, Ferdinand, Duke of Orleans, lost his life by an accident on the 13th of July 1842, leaving by his wife, the Princess Helen of Mecklenburg-Schwerin, two sons, the eldest of whom, Louis Philippe Albert, now styled Count of Paris, is the representative of the younger or Orleans B. family.—Concerning the other members of Louis Philippe's family, see the article LOUIS PHILIPPE.

Louis XIV. having succeeded in placing his grandson, Philip, Duke of Anjou, on the throne of Spain in 1700 as Philip V., this prince became the founder of the Spanish B. dynasty, as well as of the B. dynasties of Naples, Parma, and Piacenza. These dynasties endured only a temporary overthrow from the policy and arms of Napoleon Bonaparte. Philip V. was succeeded on the Spanish throne by his son, Ferdinand VI., who died without issue in 1759, and the crown fell to his brother, Charles III., whose son and successor, Charles IV., was compelled to resign it in 1808, in favor of a successor nominated by Napoleon, and died at Rome in 1811. The two eldest sons of Charles IV. by his marriage with Maria Louisa of Parma were—1. Don Fernando, Prince of Asturias, who, after the overthrow of Napoleon, reigned as Ferdinand VII. (q. v.), whose eldest daughter was Isabella II., the mother of Alfonso XII.; 2. Don Carlos (q. v.), who, on the death of his elder brother in 1833, became pretender to the Spanish throne until 1845, when he resigned his pretensions in favor of his son, Count de Montemolin. He died at Trieste, 1855. The Count de Montemolin died in 1861, and his claims to the Spanish throne are now represented by his nephew, Don Carlos, son of his brother Juan.

Philip V. did not succeed in keeping possesson of the crown of the Two Sicilies (see NAPLES) as of that of Spain; the House of Hapsburg being restored there in the person of a son of Leopold I., who in 1720 ascended the throne as Charles III.

But in consequence of the peace of Vienna, the son of Philip V. became king of the Two Sicilies, likewise by the name of Charles III. Upon his accession to the throne of Spain in 1759, he gave up that of Sicily to his third son, Don Fernando, called Ferdinand IV., with the express stipulation that it should never again be occupied by a king of Spain. Ferdinand IV. was compelled to yield to the French arms in 1806; but after the overthrow of Napoleon, he became king of the Two Sicilies as Ferdinand I. (q. v.). His son, Francis I., left the throne in 1830 to his son Ferdinand II. (q. v.), whose son, Francis II., was expelled in 1860, when Naples was incorporated with the new kingdom of Italy.

By the peace of Aix-la-Chapelle in 1748, Austria made over the duchies of Parma and Piacenza to Don Philip, the youngest son of Philip V. of Spain, but with stipulation of their reversion to Austria on the failure of his male descendants, or on his succeeding to the throne of Spain. He was succeeded in 1765 by his son, Ferdinand I., whose son, the hereditary Prince Charles Louis Ferdinand, was made king of Etruria in 1801, under the guardianship of his mother, Maria Louisa of Spain; but Etruria being soon incorporated with France, they were compietely dispossessed. The Congress of Vienna assigned Parma and Piacenza for life to Maria Louisa of Austria, the spouse of Napoleon, but meanwhile indemnified Maria Louisa of Spain with the duchy of Lucca. In 1847, Parma and Piacenza reverted to the B. family, in the person of the former king of Etruria, Charles Louis de B., who had suc-

ceeded his mother in Lucca in 1824. He abdicated on March 14, 1849, and was succeeded as Duke of Parma and Piacenza by his son, Charles III., and he in 1854 by his son Robert—born 1848—whose mother, Maria Louisa Theresa de B., daughter of the Duke of Berri, then became regent of the duchies. The B. family lost these duchies in 1859. See ITALY and PARMA; and see Coiffier-Demoret, *Histoire du Bourbonnais* (1828); Achaintre, *Histoire Chronologique et Généalogique de la Maison Royale de Bourbon* (1825); also histories by Mure (Par. 1860–68) and Dussieux (1869).

BOURBON, CHARLES, DUKE DU BOURBONNAIS, styled CONSTABLE DE BOURBON, born 1489, was the son of the Count of Montpensier; and in consequence of the death of his elder brother, and his marriage with the only daughter of the Duke of Bourbon, he united in his own possession the vast estates of both these branches of the Bourbon family.

Holding a very high position in virtue of his birth and wealth, he soon showed himself to be no ordinary character, by the brilliancy of his exploits in arms, and by his rigid morals and severe taciturn disposition. At the age of 26, he received from Francis I. the Constable's sword, and was sent to Italy at the head of an army, which he disciplined on the march; and crossing the Alps by passes previously deemed impracticable, he surprised the hostile generals, won the battle of Marignan (1515) and within a few days placed the keys of the citadel of Milan in the king's hand, acquiring for himself by these exploits the reputation of the greatest general of his time. But Maria Louisa, the king's mother, became enamored of the brave Constable; and he, although a widower, declined her hand, openly declaring that he deemed her a woman devoid of modesty, and not to be thought of for a wife. Her revenge led to the seizure, on behalf of the crown, of the estates which he had acquired through his wife, and the withholding of his pay as Constable. Thus deeply injured, he renounced the interest of France, and concluded a private alliance with the Emperor Charles V., and with Henry VIII. of England. The former agreed to give him in marriage his sister, Eleonora, who had Portugal as her jointure, and to make an independent kingdom for him of Provence and Dauphiné, with his own possessions of the Bourbonnais and Auvergne. The rest of France was to be apportioned between the two confederates. The king, who was engaged in an expedition to Italy, received intelligence of this conspiracy. Forthwith he proceeded in person to the Constable, and offered him restoration to favor and also of his estates. The Constable, however, did not trust him, but fled in disguise, and reached Franche Comté in 1523. In order not to appear as a fugitive to the Spanish army, which awaited him in Lombardy, he drew around him 6000 German lancers, and soon contrived to gain their entire attachment. He attacked, in 1524, the French army on its march over the Alps, and thought to have advanced to the heart of France with the Spaniards, whose general he had been appointed by the emperor. But Charles V. did not entirely trust him, and appointed the Marquis of Pescara to assist and watch him. He was compelled to relinquish the siege of Marseille, on the approach of Francis I. with a great army.

He repassed the Alps, and took his revenge in the battle of Pavia, 24th February 1525, where the king was made a prisoner. He now went to Madrid, but soon found himself entirely disappointed in his hopes, and was sent back to Lombardy by Charles V. Without money or support, surrounded by daring and mutinous bands, he conceived a plan to found for himself an independent dominion of his own, and to unite himself with France against Spain. Hastily gathering together the wild bands around Milan, he led them against Rome; and on 6th May 1527, unprovided with things necessary for a siege, appeared before the walls of that city. Resolved to conquer or die, he led up his troops in the most impetuous manner, and eagerly seized with his own hands a scaling-ladder, in order to make his way over a weak place of the walls, when he was mortally wounded by a bullet, which Benvenuto Cellini afterwards asserted that he had shot. His death was kept secret for a time from the storming army under his command. When it departed from Rome two months after, his corpse, which the soldiers would not part with, was taken with them, and buried at Gaeta, under a magnificent monument, which, however, was afterwards destroyed.

BOURBONNAIS, a gently undulating, terrace-formed district in the center of France, northward of the high lands of Auvergne, abounding in grain, fruits, wine, iron, marble and mineral springs. From 1327 to 1523, it formed the duchy of Bourbon, and afterwards, becoming a domain for the crown, it formed a separate province of France. It now constitutes the department of Allier, and part of the department of Cher. The capital was Moulins.

BOURBONNE-LES-BAINS, a town of France, in the department of Haute-Marne, about 20 miles east-north-east of Langres. It is pleasantly situated at the confluence of the Borne and the Aspance, and has some fine promenades and manufactures of cotton, hosiery and cutlery. Its chief feature, however, is its saline springs, which range in temperature from 121°—136° F., and are much resorted to by people suffering from chronic complaints or old wounds. Pop. (1876) 3705.

BOURDALOUE, LOUIS, one of the greatest pulpit orators of France, was born at Bourges, 20th August 1632, and having, at the age of 16, entered into the order of the Jesuits, obtained in succession the chairs of Humanity, Rhetoric, Philosophy, and Theological Ethics in the academy of his native place. He showed a great capacity for science, but his remarkable powers of eloquence led his superiors finally to determine upon employing him as a preacher. Disdaining the inflated style prevalent among the tasteless pulpit orators of his time, he assailed with manly vigor and truly religious earnestness the passions, weaknesses, and errors of men. The dignity of his manner and the fire of his eloquence made him famous even when the public mind was occupied with the festivities of Versailles, the victories of Turenne, and the literary masterpieces of Corneille and Racine. At the court of Louis XIV. he was remarkably well received. After the revocation of the Edict of Nantes, he was sent to Montpellier in 1686, to labor among the Protestants on behalf of the Roman Catholic Church. B. particularly understood how to accommodate his eloquence to the minds of those whom he addressed. Simple among the simple, a dialectician among ecclesiastics, he was equally a favorite with the common people and with the learned and the great. He was also much esteemed and beloved as a man; and in all circumstances, maintained unimpeached a high reputation for candor and honesty. In the later years of his life, he relinquished the pulpit, and devoted his time to hospitals, prisons, and pious institutions. He died at Paris 13th May 1704. How thoroughly his religious sentiments were governed by the theological tenets of his church, may be perceived from these remarkable words which he uttered on his death-bed: 'It is highly reasonable that God be fully satisfied; and at least in pugatory I will suffer with patience and with love.' Several editions have appeared of the collected works of B. (as 16 vols., Versailles, 1812, and most recently in the *Panthéon Littéraire*, 3 vols., Par. 1838). The best edition of his sermons is that published under the care of Bretonneau (16 vols., and 18 vols., Par. 1707—1734. His life was written by Madame de Pringy.

BOURDON DE L'OISE, FRANÇOIS LOUIS, a notorious character of the French Revolution, was born in the middle of last century at Saint Remy, near Compiègne, and became a procurator in the parliament of Paris. He helped to storm the Tuileries on 10th August 1792. He shortly afterwards obtained a seat in the Convention by a trick, presenting himself as the regularly elected deputy for the department of Oise, in which he had actually been defeated by a namesake who was elected also for that of Loiret. The trick was subsequently discovered, but he was not ejected. B. contributed much to bring about the execution of Louis XVI., the insurrection of 31st May, and the destruction of the Girondists. He was sent to La Vendée, where, however, he loudly condemned the revolutionary cruelties, and appeared in the character of a moderate. Obnoxious on this account to Robespierre and Hébert, and fearing for his head, he urged on with the greatest eagerness the overthrow of the Terrorists on the 9th Thermidor (27th July 1794). From this time forth, B. showed himself an enemy of the clubs, and a protector of the nobles and the priests. In consequence of the insurrection of 13th Vendémiaire (5 October 1795), he was sent as commissioner to Chartres, where he behaved harshly and brutally. He passed from the Convention into the Council of Five Hundred, became a prosecutor of the republicans, and joined a royalist club. The Directory placed him upon the proscription list after the 18th Fructidor (4th September 1797). He was transported to Cayenne, where, in a short time, he died in great misery, tortured with remorse.

BOURGELAT, CLAUDE, founder of the first veterinary school, and consequently the first to institute a distinct profession of veterinary surgeons. Born in Lyon in 1712, he died there in 1799. He was a learned lawyer, an able writer, and the bosom friend of the great D'Alembert, enjoying also the esteem of Pembroke, Voltaire, Buffon, and Haller. He was instigated to further the cause of veterinary science from a natural liking for horses, and conceived the idea of educating men to alleviate their infirmities and those of other domestic animals. In the execution of this project he found a friend and collaborator in a minister of Lyon, Bertin; and in 1761, the first veterinary school was opened in the suburbs of the city. It was patronized by royalty, and students flocked to it from all parts of France, Italy, Switzerland, Germany, Sweden, and Denmark.

Probably the only dark spot in B.'s veterinary career is his treatment of Vial de St. Bel, who, persecuted by his colleagues in France, came to England, and founded the St. Pancras College, Camden Town, London, in 1792. B. had, however, endowed the Lyon school with so much vital energy that it has maintained itself in the foremost ranks. From it all other colleges in Europe sprang, and with them it has kept pace, being superior to the majority, and rivaling the very best, even those of Paris and Berlin.

B. wrote much—his works on Farriery, Materia, Medica, External Form, Contagious Diseases, and on the various apparatus and bandages used for quadrupeds, being still highly esteemed.

BOURG-EN-BRESSE, a town of France, capital of the department of Ain, pleasantly situated on the left bank of the Reyssousse, about 20 miles east-south-east of Macon. It is well built, has several public fountains, a statue to Bichat, the celebrated anatomist, who was a student at the hospital here, a museum, a fine corn-market, and a public library of 19,000 volumes. The distinguished astronomer, Lalande, was a native of B. It has manufactures of linen, cotton, hosiery, and leather, and a trade in agricultural produce. The town was captured by the allies in 1814. Pop. (1876) 14,289.

BOURGEOISIE, a French term, but now not unfrequently employed in English, German, and other languages. It denotes the citizens of towns as a rank or class of society, including persons from the condition of heads of manufacturing or mercantile establishments, down to master-tradesmen. The French B. have long been extremely hostile to the aristocracy, but have themselves latterly become the object of attack on the part of the operatives and of the extreme radical or red republican party. The term *bourgeois*, from which B. is formed, is quite distinct in meaning from *citoyen*, the latter term designating a citizen of the state.

BOURGES, the capital of the department of Cher, in France, situated in a fertile plain at the confluence of the Auron and the Eure, 123 miles south of Paris. B. is divided into an old and new town, the latter being built around the former. Its houses are of antique architecture, and its streets crooked and dirty. It was formerly surrounded by ramparts flanked with high towers, some of which still remain; but the ramparts have been converted into promenades. B. has one of the noblest Gothic cathedrals in Europe, lighted by 59 splendid painted windows. Its university was suppressed at the Revolution. B. has greatly prospered since the railway has reached it. In 1861 it was chosen to be one of the militaay arsenals of France, and its strategical importance has become greater since the loss of Metz. Pop. (1881) 39,988. B. is of great antiquity, being the *Avaricum* of the Gauls, in the country of the *Bituriges Cubi*. Taken by Cæsar in 52 B.C., it was afterwards named *Bitu'rica*, and became the capital of the Roman province of *Aquitania Prima*.

In the middle ages, it was the capital of the province of Berri. Charles VII. had his residence at B., when almost all France had been taken from him by the English; and its Hôtel de Ville was originally the abode of his unfortunate minister, Jacques Cœur. Louis XI. was born at B. Of the seven ecclesiastical synods held at B., that of 1438—in which the Pragmatic Sanction of the Gallican Church was established with approbation of Charles VII., and the resolutions of the Council of Basel, relative to the papal power and the king's prerogatives, were confirmed—was the most important.

BOURIGNON, ANTOINETTE, a celebrated religious visionary, born at Lille 13th January 1616. Her father was a merchant, and she inherited from him a considerable patrimony. She was so ugly an infant, that there was some thought of killing her as a monstrous birth. Her intellect, however, was very acute, and its powers were early developed, along with a tendency to religious mysticism, which was much encouraged by the reading of mystic books, till her imagination became inflamed, and she began to fancy that she saw visions, conversed with God, received special revelations, and was called to restore the pure spirit of the gospel. By the good offices of the Archbishop of Cambray, she obtained admission into a convent, where she won over some of the nuns to her opinions, and soon found herself at the head of a considerable party. She afterwards had charge of a hospital at Lille, but from this position she was driven in consequence of her extravagant fancies. She now traveled through various countries, her enthusiasm gaining proselytes, whose conversion, she said, caused the pains of childbirth in her person. At last she was appointed head of a hospital in East Friesland. She died at Franeker, 30th October 1680. According to Madame B., religion consists in internal emotion, and not in either knowledge or practice. Her own character exhibited a strange combination of pride and avarice, with a sort of mystic piety. She never gave anything to the poor, alleging as a reason that she had consecrated all to God. Some of her pretended revelations were of the most indecent nature; many of them were extremely ridiculous; yet many persons of intelligence and learning believed in them, and adopted the peculiar form of mysticism which soon began to receive the name of Bourignianism. Among the chief expounders of it was Peter Poiret, a Calvanistic minister. It spread to a remarkable extent both among Roman Catholics and Protestants; and about the end of the 17th c., and beginning of the 18th, prevailed so much in Scotland, that a solemn renunciation of it was demanded from every entrant on the ministry at his ordination. A minister of Aberdeen was deposed for it in 1701. The formal renunciation of Bourignianism is still continued in the Established Church of Scotland, but has been given up as needless by other Presbyterian churches. The works of Madame B. were edited by Poiret (25 vols., Amst. 1676—1684; 2d edit. 1717). They exhibit not a little fiery eloquence.

BOURMONT, LOUIS AUGUSTE VICTOR DE GAISNE, COUNDE, a French marshal, and the conqueror of Algiers, was born in 1773 at his paternal castle of Bourmont, in Anjou, went into exile at the Revolution, served as an officer in the army of the Prince of Condé, and from 1793 to 1796 was actively engaged in the anti-revolutionary struggle in La Vendée. Subsequently, he obtained the favor of the First Consul. Under the Empire, he was appointed to a colonelcy in the army of Naples, and was soon raised to the rank of brigadier-general. In the campaigns of 1813 and 1814, he distinguished himself upon a number of occasions, particularly in the battle of Dresden, and by the defence of Nogent, upon account of which Napoleon promoted him to the rank of a general of division. On 31st March 1814, he declared for the Bourbons, and received the command of a military division during the first Restoration; yet, on Napoleon's return, he went over to him, and was intrusted with the command of a division of the army of the Moselle. On the evening before the battle of Ligny, he deserted, and betook himself to Louis XVIII., at Ghent. There can be no doubt that B. was singularly ungenerous in choosing such a moment to resign, nor is there anything in his career to make us suppose he was actuated by any high principle in what he did. His evidence went a considerable way in bringing about the condemnation and execution of Marshal Ney. He received high military employment under Louis XVIII. Distinguishing himself in the Chamber of Peers as a zealous supporter of the king, he was appointed minister of war in 1829, and in this office displayed great activity. When the expedition against Algiers was undertaken in 1830, he received the chief command of the troops, and the rapid success of the expedition was ascribed to his prudence and energy. For this he received the marshal's baton on 22d July, but on the revolution taking place in that month, he was superseded in his command, and went to England to share the exile of Charles X. Refusing to take the legal oath, he was struck off the lists of the French army and peerage in 1832. In 1833, Don Miguel of Portugal placed him at the head of his troops, but the campaign was brief and unsuccessful. B. finally settled on his estate in Anjou, and died there in October 1846.

BOURNE, HUGH, the founder of the sect of Primitive Methodists, was born 3d April 1772 at Fordhays, in Staffordshire. Originally a preacher among the Wesleyan Methodists, he distinguished himself by the fervor of his religious sentiments, and by the zeal which he displayed for the conversion of the ungodly. His enthusiasm for 'revivals' and open-air meetings, however, received no countenance from the leading clergymen of the denomination to which he belonged. In 1808, B. was cut off from the Wesleyan connection, strange to say, for following much the same course of earnest evangelization as Wesley himself had done. He was not, however, alarmed. His preaching was wonderfully acceptable, and he quickly gathered around him many devoted adherents. In March 1810, a committee of ten members was formed. This may be regarded as the first official organization of the body. In 1818, B. published in the *Primitive Methodist Magazine*, a narrative of his labors and of those of his coadjutors. In the course of his life he visited Scotland, Ireland, Canada, and the United States, where his ministrations were attended with great success. He died at Bemersley, in Staffordshire, 11th October 1852.

BOURNE, VINCENT, one of the most elegant Latin versifiers that England ever produced, was born about the close of the 17th century. In 1714, he entered Trinity College, Cambridge; in 1721 he took his degree of A.M., and subsequently he was appointed usher of Westminster School. He died December 2, 1747. It would be difficult to praise too highly B.'s exquisite contributions to Latin poetry. They will stand comparison, not only in point of Latinity, but also in point of originality, with the choicest productions of the ancient Roman poets. A gracefulness which pervades thought, sentiment, and expression, is their essential characteristic. The subject is indeed often insignificant, but the treatment is always perfect. His translations of English ballads and other lyrics into Latin are wonderfully felicitous, every beauty being retained with the most delicate skill, and every defect being most carefully remedied. Cowper, Beattie, Charles Lamb, and others have expressed their admiration of B.'s singularly fine *genius*, for assuredly a gift so rare as that which enables a man to find a complete utterance for his ideas in a dead tongue, deserves the name. The first edition of B.'s poems appeared in 1734. Their number was enlarged in a subsequent edition.

BOU'RNOUSE is the Arabic name of a garment worn in Algeria, Marocco, and other parts of North Africa. It is a large woollen mantle, worn above the other attire of the natives, and having a hood, which is thrown over the head in rainy weather. The B. is generally white, though distinguished individuals wear it of vari-

ous colors—blue, green, red, &c. It has been long in use among the Spaniards under the name of *albornoz*. Through the conquest of Algeria by the French, the B. was imported into France and England, although its original form has been considerably altered.

BOURRIENNE, Louis Antoine Fauvelet de, the secretary and early friend of Napoleon I., was born at Sens, 9th July 1769, and received his education in the military school at Brienne, where he formed the closest intimacy with the future emperor. He became, in 1792, secretary to the embassy at Stuttgart. Deprived of this office by the breaking out of war, he lived for some time a rather retired life, until, in 1797, his former school-fellow appointed him his secretary. He accompanied him to Egypt and to Italy, and in 1801 was nominated a councillor of state. In 1802 he was dismissed from his office, for being implicated in the dishonorable bankruptcy of the house of Coulon, army contractors; but in 1805 he was appointed ambassador to the States of the Circle of Lower Saxony, and in this capacity resided long at Hamburg. His tendency to peculation, however, necessitated his return to France, where he had to refund 1,000,000 francs into the public treasury. He now decidedly joined the party which sought the overthrow of the emperor and the restoration of the Bourbons. He was treated with little consideration by them during the first Restoration, yet he followed Louis XVIII. in his flight to the Netherlands upon Napoleon's return, and upon the second Restoration was honored with the title of a minister of state. As deputy from the department of Yonne in 1815 and 1821, he showed his weakness of character by opposing all liberal measures, and even institutions for the promotion of science and popular education.

The revolution of 1830, and the loss of his fortune (occasioned by extravagance), caused his reason to give way, and he died in a lunatic asylum at Caen, 7th February 1834. His Memoirs concerning Napoleon, the Directory, the Consulate, the Empire, and the Restoration (*Mémoires sur Napoleon*, &c., 10 vols., Par. 1829), gave many new explanations of the events of his time, but were declared by contemporaries to be in many respects untrustworthy. See the article Boulay de la Meurthe. The work, however, is one which must always constitute an important part of the materials of history. A work entitled *Histoire de Bonaparte par un Homme qui ne l'a pas quitté depuis* 15 *Ans*, has been erroneously ascribed to him.

BOU'SSA, a town of Soudan, Central Africa, capital of a district of the same name, is situated on an island in the Niger, in lat. 10° 14′ N., and long. 5° 20′ E. It is hemmed in by rocks, and being also surrounded by walls, is a place of very considerable strength. Population estimated at from 10,000 to 18,000. A melancholy interest attaches to B. as being the death-scene of Mungo Park (q. v.).

BOUSSINGAULT, Jean Baptiste Joseph Dieudonne, a French chemist, particularly distinguished for investigation relative to agriculture, was born at Paris, 2d February 1802, attended the mining school at St. Etienne, and went in the employment of an English mining company to South America; where, besides his professional and scientific labors, he served as a colonel under Bolivar in the South American war of liberty. Returning to France, he was appointed professor of chemistry at Lyon, and in 1839 was admitted into the Institute, and appointed to the chair of agriculture in the Conservatory of Arts and Measures, Paris. In 1848, he was elected a member of the Constituent Assembly, and voted with the moderate Republicans. After the *coup d'état*, he retired from political life. In 1857, he was made commander of the Legion of Honor. His *Economie Rurale* (2 vols., Par. 1844; 2d ed., Par. 1849) embodies the result of experiments and investigations which have won for him a European reputation. It contributed much to the promotion of the infant science of agricultural chemistry, and has been translated into English (Lond. 1845) and German. B. is the author of numerous valuable papers in scientific periodicals, which were collected and published in 1854, and he is also the author of *La Fosse à Fumier* (1858), and *Agronomie, Chimie agricole, et Physiologie* (1864),

BOUSSO'LE STRAIT passes through the Kurile Islands, uniting the Sea of Okhotsk and the Pacific Ocean. Lat. 46° 30′ N. It takes its name from one of the vessels of La Perouse, who, soon after Cook's death, nobly emulated, on the north-east coasts of Asia, that navigator's explorations on the north-west shores of America.

BOUSTROPHE'DON (Gr. *bous*, an ox, and *strepho*, I turn), a word used to describe a mode of writing practised by the Greeks in the earlier period of their history—viz., in which the lines did not proceed uninterruptedly from left to right, but alternately, the first line being written from right to left, the second from left to right, &c. Examples are frequently found in coins and inscriptions. The method received its name from its resemblance to the path made by oxen in ploughing a field.

BOUTERWEK, Friedrich, a German philosophical and æsthetical author of merit, was born on 15th April 1766 at Oker, near Goslar, in the Harz district. He at first devoted himself to the study of law; but in the second year of his academic course at Göttingen he relinquished it, imagining that his proper vocation was to be a poet. Besides poems, he wrote the romance of *Count Donamar* (*Graf Donamar*, 3 vols., Gött. 1791—1793; 2d ed., 1798—1800). Not finding, however, that success which he expected in this career, he renounced it, and devoted his whole energies henceforth to the study of philosophy and of the history of literature. In philosophy, he was at first a zealous follower of Kant, but afterwards adopted the system of Jacobi. He began to give lectures in Göttingen in 1791, and became extraordinary professor of philosophy in 1797, and ordinary professor in 1802. He produced several works on philosophy; but his great work, on which his reputation really depends, is his *History of Modern Poetry and Eloquence* (*Geschichte der neuern Poesie und Beredsamkeit*, 12 vols., Gött. 1801—1819), one of the best works of its kind which Germany has produced. The part relating to Spanish literature is especially valuable, and has been translated into Spanish and much enlarged by Jos. Gomez de la Cortina and Nic. Hugelde de Molinedo (3 vols., Madrid, 1828). B. died at Göttingen in 1828.

BOUTS-RIMÉS (Fr. 'rhymed endings') are a kind of verses the making of which forms a social amusement. Some one of the party gives out the rhymes or endings of a stanza, and the others have to fill up the lines as they best may. Suppose the rhymes prescribed are *wave, lie; brave, die;* the following are two of the ways in which the lines might be completed.

Dark are the secrets of the gulfing wave,
Where, wrapped in death, so many heroes lie:
Yet glorious death's the guerdon of the brave,
And those who bravely live can bravely die.

Whenever I sail on the wave,
O'ercome with sea-sickness I lie;
I can *sing* of 'the sea,' and look brave;
When I *feel* it, I *feel* like to die.

BOUVA'RDIA, a genus of plants of the natural order *Cinchonaceæ* (q. v.), and of the same tribe with the *Cinchona* (q. v.), or Peruvian Bark. The calyx is 4-partite, with teeth between the segments; the corolla tubular and 4-fid; the stamens 4, included within the corolla; the capsule 2-celled. The species are natives of Mexico. One of them, *B. triphylla*, with oblong ternate leaves and trigonous branches, has obtained a place among the favorite ornaments of flower-borders in Britain, but requires careful protection from frost. To preserve it, the roots are generally taken

up, and are sometimes placed in a greenhouse or frame for the winter, sometimes in a dry cellar. Its beautiful corymbs of scarlet flowers are produced from June till November.

BOUVET, JOACH., a learned French Jesuit, who was sent by Louis XIV. to China, to acquire information concerning that country, which he reached, along with five other missionaries, in July 1686. Being invited to Pekin, the missionaries received permission to disperse themselves over the whole Chinese empire, except B. and Gerbillon, who were required to remain in attendance upon the emperor, the famous Kanghi, whose respect and confidence they soon acquired in a high degree. He committed to them the erection of great buildings, and was so pleased with their performances, that he not only caused a church and a residence for them to be built within the bounds of his palace, but commissioned B. to return to his native country, and to engage as many missionaries as he could find. B. arrived in France in 1697, and brought with him, for the king, about fifty Chinese works.

He returned again to China in 1699 with ten new missionaries, amongst whom was the learned Parrenin. He died at Pekin, June 28, 1732, after having labored indefatigably in the cause of science, in that distant scene, for 50 years. He has left four different accounts of his various travels, and a work entitled *Etat Présent de la Chine, en Figures Gravées, par Griffart* (Par. 1697).

BOVEY COAL is a form of wood-coal or lignite, which derives its name from being found in Bovey, in Devonshire.

BO'VIDÆ (Lat. *bos*, an ox), a family of ruminating mammalia (see RUMINANTIA), to which different limits have been assigned by different naturalists, but which is generally regarded as equal in extent to the Linnæan genus *Bos*, or to what is popularly called the ox tribe. The B. are all large animals, with stout limbs and broad muzzle. The facial outline is nearly straight. Their dentition agrees with that of some of the other ruminants, as sheep, goats, and antelopes: they have eight cutting-teeth in the lower jaw, and none in the upper, but instead of them a fibrous and elastic pad, which covers the convex extremity of the anterior maxillary-bone; they have no canine teeth, but a large interval between the cutting-teeth and grinders, which are six on each side in each jaw. In eating, they collect and roll the grass together 'by means of the long and movable tongue; it is firmly held between the lower-cutting-teeth and the pad, the cartilaginous upper lip assisting in this; and then, by a sudden nodding motion of the head, the little roll of herbage is either torn or cut off, or partly both torn and cut.' Both sexes are furnished with unbranched tapering horns, which are directed more or less laterally, and generally upwards and forwards, and are usually curved throughout their whole length. There are, however, breeds of the common ox, in which both sexes are destitute of horns. The tail is rather long, and terminated by a tuft of long hair. The females have four teats. All the B. are gregarious. Native species are found in Europe, Asia, Africa, and North America. Fossil remains of species which no longer exist, have been found in pliocene and pleistocene deposits. The number of existing species is by no means certain; as, besides the difficulty of deciding in some cases what are to be deemed species and what merely varieties, there is still a great deficiency of accurate information concerning the B. of different parts of the world.

The very magnitude of the animals has probably prevented so frequent a comparison of the specimens as would otherwise have taken place. It has recently been ascertained that the number of species is more considerable than had been supposed. Attempts have been made to divide the genus *Bos* into several genera, but they are not very clearly nor strongly distinguished. All the B. are valuable to man, for their flesh, tallow, skin, &c.; but some of them, having long been reduced to domestication, are among the most valuable of all domestic animals, particularly the common ox, different kinds of buffalo, and the yak of Tatary.—See ARNEE, BANTENG, BISON, BUFFALO, GAUR, GAYAL, GALLA OX, MUSK OX, OX, PEGASSE, URUS, YAK, ZAMOUSE, ZEBU, &c.

BOVI'NO, a fortified town in the province of Foggia, South Italy, about 20 miles south-south-west of Foggia. It is the see of a bishop, has a cathedral, churches, and convents. The valley of B. was formerly notorious as the haunt of the brigands of Capitanata, and the town still enjoys the unenviable reputation of being the nursery of all the highway robbers of this portion of the Apennines. Pop. 7900. B. occupies the site of the ancient *Vebinum*. The Imperialists defeated the Spaniards here in 1734.

BOW, of a ship, is a general name for the fore-part, or that which breasts the waves. Very often the word is used in the plural, the ship being considered to have starboard and larboard, or right and left bows, meeting at the prow or figure-head. A narrow or *lean* bow, and a broad or *bluff* bow, are seamen's phrases for different shapes of bow, each of which has its own peculiar advantages at sea: a narrow bow will cut more smoothly through the water, but a broad bow bears up more firmly in a high sea.

'On the bow,' in sea-language, is the position of a distant object when seen over the bow; it implies a sweep of one-quarter of the horizon, embracing about 45° on each side of the prow or head.

BOW AND ARROW. In ARCHERS AND ARCHERY will be found a brief account of the military arrangements under which bowmen formed a component element in the armies of the middle ages; and under ARBALEST is a description of the cross-bow, which was once so favorite a weapon. We here describe the more effective, though simpler implement. The long-bow first gained ascendancy in England in the 14th century. It was found that a dozen arrows could be discharged from this weapon while the arbalester was winding-up his cumbrous cross-bow, and discharging one arrow or quarrel from it. Moreover, the long-bow being held vertically, the bowmen were able to stand in closer array than the arbalesters; they were enabled also to take a greater supply of the munitions of war into the field, seeing that the bow and arrows were much lighter in weight. In the time of Edward III., a bow was priced 1*s.* to 1*s.* 6*d.*, and a sheaf of arrows, 1*s.* to 1*s.* 2*d.*; in the time of Henry VIII., the price (fixed by law) of the bow varied from 6*d.* to 3*s.* 4*d.* The last-named monarch adopted extraordinary means for encouraging the use of the long-bow. Many ordinances were issued for insuring a good supply of bow-staves. The bowyers, string-makers, fletchers, and arrow-head makers were all placed under stringent regulations. Merchants were compelled to import good bow-staves with cargo, in certain proportions. Very long bow-staves were admitted duty-free. Yew was considered the best wood; but in order that the supply should not be too speedily used up, bowyers were ordered to use elm, ash, and wych-hazel in certain proportions to yew. The heads of families were bidden to provide bows for their sons and servants; and town-councils or officers were required to provide shooting-butts just outside each town. Some of the bows had two arches, connected by a middle straight piece. The best length was regarded as about 5 feet 8 inches from nock to nock; but in earlier times, some of the bows were much longer. The first arrows were made of reeds; these materials were afterwards superseded by cornel-wood; but the wood finally adopted as the best was ash. The arrows had heads pointed with steel, sometimes barbed to render their action more terrible. They were feathered with portions of goose-wing. The best length for a bow of the above-named size was set down at 2 feet 3 inches. Sometimes the arrows were tipped with combustibles. The best makers of arrow-heads, as well as bows, were compelled by law to go from town to town, to exercise their craft wherever it was most needed. The bowman usually carried 24 arrows, called a sheaf, or a quiver, at his right side or at his back; besides others in his girdle.

He kept his bow in a case; hence Falstaff's comparison of Prince Hal to a bow-case, in allusion to his slenderness. Bowmen in their hours of sport, used arrow-heads called *rigged*, *crossed*, *swallow-tailed*, and *spoon-handed*, according to the shape.

The circumstances attending the decline of the use of the long-bow are narrated in the articles above cited.

BOW ISLAND, an island of coral formation in the South Pacific, the largest in the Low Archipelago, being about 30 miles long and 5 miles broad. It can only be approached by a small opening in the reef at the north end. Within the lagoon, the anchorage is safe. The east side is well wooded, but the west is low and barren. Pearl-oysters and other shell-fish abound in the lagoon. The inhabitants are few, ill-looking, and indolent, with a partiality for raw food. The island was first discovered in 1768 by Bougainville, who gave it the name of La Harpe, which Cook, who visited it in the following year, changed to the name it now bears.

BOWDICH, THOMAS EDWARD, an enterprising African traveler, born at Bristol in June, 1790, was first engaged in trade in his native city, but afterwards appointed a writer in the service of the African Company. Selected, in 1816, to conduct a mission to the king of Ashantee, he published an account of it in 1819, 4to. On his return to Europe he resided for some years in Paris. To obtain funds for a new expedition into the interior of Africa, he published a translation of Mollien's *Travels to the Sources of the Senegal and Gambia*, and other works, and in August, 1822, sailed from Havre. He died of fever on the river Gambia, January 10, 1824. A profound scholar and accomplished linguist, B. was a member of several literary societies both in England and on the continent.

BOWDITCH, NATHANIEL, an American astronomer of some note, born 26th November, 1773, at Salem, in Massachusetts. He showed at a very early age a great inclination for mathematics, in which he afterwards made great proficiency, without ever attending a university. He was at first bred to his father's trade of a cooper, and afterwards apprenticed to a ship-chandler. He acquired Latin that he might study Newton's *Principia*. He particularly devoted himself to the study of the practical applications of science. He went as supercargo of a merchant-ship in several long voyages, and added a thorough practical acquaintance with navigation to a theoretical knowledge of it.

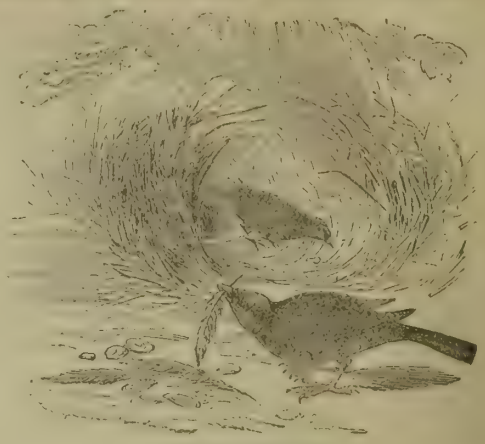
His work, *The American Practical Navigator*, was received with great favor. He published also an admirable translation of La Place's *Mécanique Céleste* (2 vols. Boston, 1829), to which he added valuable annotations. These works obtained for him marks of honor from scientific societies in Britain, and led to his being called to the professorship of mathematics and astronomy in Harvard College, in his native state, which situation, however, he declined, in order to enter the executive council of the state. He afterwards became manager of the Massachusetts Life Insurance Association, president of the Mechanics' Institute, and president of the Academy of Arts and Sciences in Boston. He died 16th March 1838.

BOWER (Ang. Sax. *bur*, a chamber). The 'ladies' bower,' a private apartment in ancient castles and mansions, used by ladies both as a parlor and sleeping-chamber.

> Up, then, rose fair Annet's father,
> Twa hours of it were day,
> And he is gane into the bower
> Wherein fair Annet lay.
> Ballad of *Lord Thomas.—Percy's Reliques.*

BOWER-BIRD, a name given to certain Australian birds of the Starling (q. v.) family, or *Sturnidæ*, remarkable for their habit of making bower-like erections, called *runs* by the colonists of New South Wales, and for adorning them with gay feathers, rags, bones, shells, and such other white or brightly colored objects as they can pick up. These bowers are not used as nests, but they appear to be places of much resort at the breeding-season in particular. The use made of them by the birds is very imperfectly understood; but their structure has been carefully examined, and fine specimens of them, transported with no little difficulty, have been deposited in the British Museum by Mr. Gould, in whose work on the *Birds of Australia* an account of them was first given to the world. The bowers of the Satin B. (*Ptilonorhynchus holosericeus*) are built among the branches of some tree, and appear to be repaired and frequented from year to year. The base consists of an extensive and rather convex platform of sticks, firmly interwoven, on the center of which the bower itself is built of more flexible twigs. It is chiefly at and near the entrance that the shells, feathers, &c., employed for decoration are placed. The bowers of the Spotted B. (*Chlamydera maculata*) are longer and more avenue-like than those of the Satin B.; they are placed upon the ground, and are outwardly built of twigs, and beautifully lined with tall grasses so disposed that their heads nearly meet. The decorative propensity appears in the highest degree in this species. 'In some of the larger bowers, which had evidently been resorted to for many years,' Mr. Gould says, 'I have seen nearly half a bushel of bones, shells, &c., at each of the entrances.' These are arranged in much the same at both entrances. Small pebbles are often transported by the birds from considerable distances.

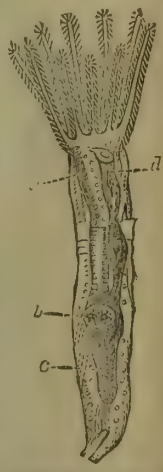
The Satin B. is particularly abundant in the mountainous districts of the west of New South Wales, and is found in all the



Spotted Bower bird.

'brushes' from the mountains to the coast. The adult male has the whole plumage of a deep, shining black. The colors of the female are grayish green and brown, curiously mingled.—The Spotted B., which is rather smaller than the Satin B., or about the size of a starling, has a general color of rich brown, beautifully marked with black and buff; a band of elongated feathers of light rose-pink crossing the back of the neck, and forming a broad, fan-like, occipital crest. It is exclusively an inhabitant of the interior of Australia.—Another species, the Great B. (*Chlamydera nuchalis*), considerably larger than either of the others, and very similar in form and plumage to the Spotted B., has been found in the north-west coast of Australia. Its bowers are always adorned with sea-shells, even when at a distance from the sea.

BOWERBA'NKIA, a genus of Zoophytes (q. v.), of the class *Polyzoa* or *Bryozoa*, order *Infundibulata*, the structure of which has been very carefully studied in the common British species, *B. imbricata*, one of the most abundant zoophytes on the coasts both of England and Scotland. It grows on sea-weeds, corallines, stones, &c., between high and low water mark, or in no great depth of water, and forms branching turfs sometimes 1½ inch in height. The branches are smooth and transparent, tubular, filled apparently with a granular fluid, and crowded with irregularly scattered clusters of delicate horny ovate or ovato-cylindrical cells, which are so transparent as to permit the most easy observation of their whole internal structure. The polypes which inhabit these cells are all connected with the tube of the branch, and so with the common life of the *polypidom*. Each, when fully expanded, is about one-twelfth of an inch in length, and has 10 finely ciliated tentacula. When alarmed, it contracts rapidly, the tentacula being first drawn in, and then the body of the polype retracted into its cell. The organization is higher than in many zoophytes. The mouth does not lead at once into the stomach, but into a funnel-shaped tube, which contracts into a gullet or *œsophagus*, *a*, in fig., and ends in a globular gizzard, *b*, apparently provided with radiating muscular fibres, and intended for trituration of the food. The gizzard opens below into a bag, which is regarded as the true stomach, *c*, and is supplied with a fluid, regarded as bile, from minute follicles or sacs in its sides, which follicles are therefore regarded as representing the liver. From the the upper part of the stomach, near the entrance from the gizzard, arises the intestine *d*, a straight tube which passes up by the side of the gullet, and terminates in an orifice outside the circle of tentacula; the structure thus exhibiting a strong resemblance to that of the Ascidian Mollusca.



Bowerbankia imbricata, greatly magnified.

When the polype is retracted, the gullet is bent upon itself, and the tentacula are enclosed in a tube or sheath formed by the inverted integument. When the polype is vigorous and lively, the cilia of the tentacula are kept in active motion, apparently quite under control of the will of the animal, forming a kind of whirlpool to bring animalcules or organic particles into the mouth.

BOWIE KNIFE, an American knife, so called from its inventor, Colonel Jim Bowie, a famous fighter with the rifle and other weapons, and altogether one of the most daring characters in the southern states of the Union. The B. K. is a sharp-pointed weapon, and is usually carried concealed in a sheath in the breast, or some other part of the person, ready for any encounter.

BOWING TOWARDS THE ALTAR is an ancient practice in the church, derived from a belief in the superior sanctity of the east. There are scriptural allusions to the east, from which notions of this kind may have been drawn. 'And, behold, the glory of the God of Israel came from the east.'—*Ezek.* xliii. 2. 'For we have seen his star in the east.'—*Mat.* ii. 2. There was also an early legendary belief that Christ would come to judgment in the east. For these, not to mention other reasons, it became customary to place the altar, with the crucifix and other symbols, at the eastern extremity of the church, to which all bowed. In the Romish Church, the practice is still kept up of bowing towards the altar, or more correctly towards the Host, on entering and departing from the church. Brand's *Popular Antiquities*, edited by Sir Henry Ellis, contains much curious antiquarian lore on this subject. It was further a custom in the early Christian Church to bow at the name of Jesus. This is still done in the Church of Rome, at whatever part of the service the name occurs. In the Church of England, it is customary to bow at the name of Jesus only in repeating the *creeds*. This ancient usage is traced to *Phil.* ii. 10, 'That at the name of Jesus every knee should bow.' Punctilious bowings and turning towards the east in repeating the *creeds*, have in late times given rise to dissensions in the Church of England.

BOWLES, WILLIAM LISLE, D.D., an English poet, was born 24th September 1762 at King's Sutton, in Northamptonshire, where his father was then vicar. He received his education at Winchester School, and at Trinity College, Oxford, and became at last a prebendary of Salisbury Cathedral in 1803, and Rector of Bremhill, in Wiltshire, in 1805. Here he spent, in comparatively affluent circumstances, the remainder of his long life. His poetical career began with the publication, in 1789, of *Fourteen Sonnets, written chiefly on Picturesque Spots during a Journey*. This unpretending little volume was received with extraordinary favor; the sonnets were fresh and natural, and to many minds, all the more charming because of the contrast which they presented to the style of poetry which had long been prevalent. Coleridge, Wordsworth, and Southey, were among their enthusiastic admirers; and through the influence which he exercised over them, B. may be regarded as the founder of a school of English poetry, in which their names soon became greater than his own. The subsequent poetical works of B. are very numerous, of which *The Spirit of Discovery* and *The Missionary* are generally regarded as the best of his longer blank verse poems. As a poet, B. shows a fine appreciation of the beauties of nature, and pleases by the expression of pure and generous sentiment, as well as by playfulness of fancy and perfect scholarly correctness, but he is greatly deficient in vigor and depth. He published an edition of Pope's works in 1807; and an opinion which he expressed on the poetical merits of Pope, led at a subsequent period to a rather memorable controversy, in which Campbell and Byron were his antagonists, and which turned chiefly upon the comparative value in poetry of images derived from nature and those derived from art. B. was generally admitted to have discomfited his opponents, B. frequently employed his pen in defence of the church of England, and endeavored to vindicate all the peculiarities of the older English educational institutions. Of his prose writings may be mentioned a volume of sermons (Lond. 1826), and a rather dry *Life of Thomas Ken, deprived Bishop of Bath and Wells* (2 vols. Lond. 1830—1831). B. died at Salsbury on 7th April 1850, in the 88th year of his age.

BOW-LINE, in a ship, is a rope fastened near the middle of the perpendicular edge of the square sails by three or four subordinate ropes called *bridles*. It is employed to tighten the edge of the sail in a particular direction during an unfavorable wind.

BOWLS, GAME OF. This is a favorite pastime throughout the British Isles. It is played upon a smooth, flat piece of turf, from 40 to 60 feet square, surrounded by a trench or ditch about half a foot deep. The players arrange themselves in sides, usually of four each, and each man is usually provided with two bowls. The bowls are made of lignum-vitæ wood, of 6 or 8 inches in diameter, nearly round, and with a bias to one side. A smaller ball, perfectly spherical, and white, is placed at one end of the bowling-green; this is termed the *jack*, and the aim of the players, who stand at the other end of the green, is to send their B. that they may lie as near as possible to the jack. The side whose B. are nearest the jack reckon one point for each bowl so placed. 7, 14, 21, or 31, make game, according to mutual arrangement beforehand. B. are biassed or weighted on one side, that the player may reach the jack by a curved instead of a straight course, an expedient which the nature of the game renders particularly desirable. Indeed, were it not for this, the game would lack half its charms. A bowl is played *forehand*, when it is so placed in the hand and delivered as to cause it to approach the jack with a curve from the right; and in order to attain this curve, the bowl must be held so that its bias is on the left or in-side. Backhand is the reverse. If a bowl goes into the ditch without touching the jack, it cannot count in the scoring of that end; but if it strikes the jack, and then rolls into the ditch, it reckons as if on the green. When the jack is carried by a bowl into the ditch, it is usually lifted, and placed on the green as near as possible to its position in the ditch. When the B. have so accumulated round the jack, that it is impossible to approach it from either *side*, without running the risk of touching an adversary's bowl, the last player frequently endeavors to *run* the jack, by playing straight at it with such force as to neutralize the bias, and, if fortunate, carry away the jack from the neighborhood of his opponent's bowls. A *skip* is appointed on each side, whose duty it is to direct each of his men.—For BOWLING at cricket, see CRICKET.

The game of B. was anciently unlawful, and was the subject of prohibitive legislation in England in the reign of Henry VIII.; but the law when enacted was repealed in 1845 by the 8 and 9 Vict. c. 109, s. 1, so that B. or other similar games of mere skill may be legally indulged in by the people.

BOWRING, SIR JOHN, an English politician, linguist, and author, was born at Exeter, 17th October 1792. He early devoted himself to the study of languages, in the acquisition of which he displayed an unusual degree of talent. The national poetry of different peoples had particular attractions for him, and he rendered great service to literature by collecting and translating both the more ancient and the modern popular poems of almost all the countries of Europe. His translations preserve remarkably well both the meaning and the spirit of the original ,and exhibit no mean powers of versification. B. was very intimately associated with Jeremy Bentham, who appointed him one of his executors, and intrusted him with the editing of his collected works. A descendant of the old Puritans, he early came forward in writing and speaking against the political disadvantages experienced by dissenters. He took part from the first in the *Westminster Review*, which was established in 1824, and edited it for about five years from 1825. In 1828, he visited Holland; and his letters—which appeared in the *Morning Herald*, and were shortly afterwards translated into Dutch—procured for him the degree of Doctor of Laws from the university of Groningen. Subsequent travels were undertaken by him, on a commission from the British government, to inquire into the commercial relations of certain states. He visited Switzerland, Italy, Egypt, Syria, and finally the countries of the German Zollverein, and everywhere found materials for valuable reports. He was a member of the House of Commons from 1835 to 1837, and again from 1841 to 1849, and actively promoted the adoption of free trade. In 1849, B. was appointed British Consul at Hong-kong, and superintendent of trade in China.

He returned in 1853, and in the following year was made knight, and governor of Hong-kong. In 1856, an insult having been offered to a Chinese vessel, said to have been under the protection of the British flag, B., without consulting the home government, ordered an attack on certain Chinese forts, a proceeding which excited considerable dissatisfaction in the country, and produced a ministerial crisis. B. afterwards returned to England. In 1855, he concluded a commercial treaty with Siam, and has given an interesting account of his visit in a work entitled *The Kingdom and People of Siam*. He retired on a pension in 1859, and afterwards published an account of the Philippine Islands. In 1861, B. was sent on an official mission to Italy. He died in 1872. His *Autobiographical Reminiscences* were published in 1877.

BOW'SPRIT is a large boom, spar, or mast, which projects over the stem or head of a ship. Its use is to carry sail forward, as a means of counteracting the effect of the after-sails, and keeping the ship well balanced. It is also the chief support of the fore-mast, which is fastened to it by large stays or ropes. In ordinary ships of war, the B. rises at an angle of about 45° from the horizon, and is generally about two-thirds as long as the main-mast; but in many kinds of vessels the position is more nearly horizontal.

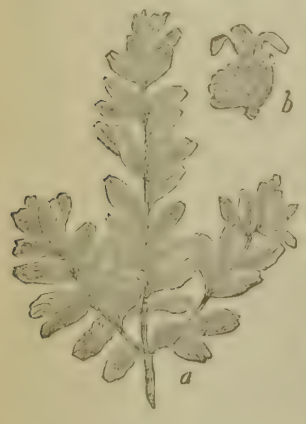
BOW'STRING HEMP, an English name, proposed by Dr. Roxburgh, and partially adopted, for the fibre produced by *Sansevie'ra Zeylanica*, a plant of the natural order *Liliaceæ* (q. v.), tribe *Hemerocalleæ*, a native of the East Indies. The employment of the fibre for making bowstrings led to this name. Dr. Royle prefers to use the Sanscrit name MOORVA, on account of the confusion apt to be caused by applying the term hemp to a variety of fibres. —The genus *Sanseviera* is distinguished by a colored funnel-shaped perianth, with a long tube, into the throat of which the stamens are inserted, and a 3-celled and 3-seeded, or abortively 1-celled and 1-seeded, berry. The plants have a general appearance much like that of many species of *Iris*, but their leaves are more fleshy; they have a thick creeping rhizome or root-stock; the rad-

ical leaves are long and narrow, and the flowering-stems have only scale-like leaves.—Very similar to *S. Zeylanica* are *S. Roxburghiana* and *S. lanuginosa*, also natives of India.—These plants grow under bushels in jungles near the sea, where the soil is salt, but may be easily propagated on almost any soil by the shoots which issue in great abundance from the root-stock. They are perennial.

The leaves are about 2 feet, or in cultivation 3 or 4 feet long; the fibres extend their whole length; and to separate the fibres from the pulpy part of the leaves, 'the natives place them on a smooth board, then press one end of the leaf down with one of their great toes, and with a thin bit of hard stick held between the two hands, they scrape the leaf from them, and very quickly remove every part of the pulp.' Steeping in water is also practised, but it discolors the fibre, which is beautifully white. One pound of clean fibre is obtained from about 40 lbs. of fresh leaves. Dr. Roxburgh calculated that 1 acre would yield 1613 lbs. of clean fibre at a gathering, of which two might be reckoned upon annually in good soil and favorable seasons, after the plants have reached a proper age. Moorva, or B. H., may well be supposed likely to acquire commercial importance. The fibre is hair-like and silky, elastic, and in strength apparently about equal to hemp. It does not rot in water so soon as hemp.—A species of *Sanseviera* very similar to the Indian ones, *S. Guineensis*, is found in abundance along a great extent of the west coast of Africa, specimens of the fibre of which, also fine and strong, have been brought to England under the name of AFRICAN BOWSTRING HEMP.

BOWYER, WILLIAM, an eminent English printer and classical scholar, born in London in 1699, was educated at Cambridge, and in 1722, joined his father in trade. Appointed, in 1729, printer of the votes of the House of Commons, he subsequently became printer to the Society of Antiquaries, and to the Royal Society. In 1767, he was nominated printer of the Rolls of the House of Lords, and the Journals of the House of Commons. He died in 1777. B. published several philological tracts, but his chief production was an edition of the New Testament in Greek, with critical and emendatory notes. He left a considerable sum in trust to the Stationers' Company, for relief of decayed printers. A small volume of anecdotes of B. and his learned contemporaries, published soon after his death by Mr. John Nichols, his apprentice and partner, was afterwards enlarged, under the title of *Literary Anecdotes of the Eighteenth Century* (9 vols., 8vo).

BOX (*Buxus*), a genus of plants of the natural order *Euphorbiaceæ;* evergreen shrubs or small trees, with opposite leaves, entire at the margins, and easily split into two plates. The greenish inconspicuous flowers grow in little axillary clusters, the male and female flowers distinct, but on the same plant. The male flowers consist of a perianth of four leaves, and of four stamens; the female flowers have a perianth of three or four leaves, and in addition, three small bracts at the base, an ovary surmounted by three styles, and two honey-secreting glands. The capsule has three beaks and three cells, and two or three black seeds in each cell.—The most important species is the COMMON BOX (*B. sempervirens*), which grows wild in the south of Europe, and in some parts of Asia. It is generally regarded as a true native of the south of England, where it grows on dry chalky hills; and is remarkable as the only arborescent species of *Euphorbiaceæ* found in such cold latitudes. In Britain, it seldom attains a height of more than 12 or 14 feet, but in warmer countries, it is often twice that height. Its leaves are oval, generally from half an inch to three-quarters of an inch in length, smooth and shining, of a deep green color. The box is remarkable for its compact habit of growth and densely crowded branches and leaves, presenting a very solid mass of foliage. There are several cultivated varieties, distinguished by differently variegated leaves—gold-edged, silver-edged, &c. The most interesting variety, however, is a very humble one, called DWARF BOX, which grows only to a height of two or three feet, and is very commonly used to form edgings for garden-plots, being kept down by clipping to the height of a few inches. These edgings—than which none are neater, or better serve the purpose of keeping gravel-walks free from earth—are generally formed by planting cuttings, which readily strike root. The box bears clipping remarkably well; and in a style of gardening once fashionable, but condemned by the taste of the present day, it occupied an important place, being cut into architectural and fantastic figures. The leaves of the box have a smell which is disagreeable to many people, and a very disagreeable bitter taste. When taken inwardly, they cause purging; an external application of them promotes the growth of the hair. In France, they are sometimes used instead of hops in making beer, but are extremely improper for the purpose. The wood of the box is heavier than that of any other European tree, and is the only European wood that sinks in the water. It is of a beautiful pale-yellow color, remarkably hard and strong, of a fine regular and compact texture, capable of a beautiful polish, and not liable to be worm-eaten.



Common Box:
b, *a*, female flower.

It is much valued for the purposes of the turner and the wood-carver; is preferred to every other kind of wood for the manufacture of flutes, flageolets, and other wind-instruments, as well as of mathematical-instruments; and is unrivalled for wood-engraving, admitting of a finish as sharp and fine as metal, whilst it *takes the ink* much better. See ENGRAVING. When scraped down and boiled, it can be used as a sudorific in many complaints, and as a substitute for guiacum. An empyreumatic oil, obtained from box-wood chips, is used for relief of toothache, and for other medicinal purposes.—Spain and Portugal send into the market large quantities of box-wood; also Circassia and Georgia, from which countries it finds its way to Odessa, and is again exported thence. In 1815, as many box-trees were cut down at Box Hill, in Surrey, as brought upwards of £10,000; but the tree is of so very slow growth, that it is seldom planted in Britain except for ornament.—The MINORCA BOX, or BALEARIC BOX (*B. Balearica*), a native of Minorca, Sardinia, Corsica, Turkey, &c., is a larger tree than the common box, and has leaves three times as large. It is much less patient of frost, but is occasionally seen in shrubberies in the south of England. The wood is of a bright yellow, and inferior to the true box-wood, but is brought in large quantities from Constantinople under that name, for wood-engraving.

BOX-DAYS. These are two days appointed by the judges of the Court of Session in Scotland, in the spring and autumn vacations, and one day in the Christmas recess, on which pleadings or other law-papers appointed by the court, or by one of the judges, towards the close of the preceding session, may be lodged or filed; the object being to expedite the procedure, notwithstanding the vacation or recess. These days are called B., in consequence of an act of sederunt or order of the Court of Session, dated the 29th November 1690, in which the evil custom of private solicitation of the judges is complained of: 'For preventing whereof,' says the order, 'and for easeing the leidges, themselves, and the lawyers, they, according to the example of the most famous judicatories abroad, have appointed *boxes* for every one of the lords, to stand on a bank in the Session-house from three o'clock till seven o'clock at night, each box having a slitt, in which the informations or bills may be lett in, and cannot be drawn out, untill the box be opened; the key whereof is to be keept by every judge himself, and to be committed to no other; and each lord is to send for his box at seven o'clock at night, that he may have competent time to peruse all the informations therein, and to consider the same, and the citationes alleged in the same, whereby none of the leidges can be put to trouble to attend any of the lords for giveing their informationes, bills, or answers.'

Further facilities for legal business in vacation-time are afforded in Scotland by the regulations of the *Bill-Chamber* (q. v.); and in England the equity and common law judges attend at chambers during vacation; but to English lawyers the use of B., or of any similar expedient, is unknown. See COURT OF SESSION and other COURTS.

BOX-HAULING is a particular mode of turning a ship, when the swell of the sea renders tacking impossible, or when the ship is too near the shore to allow room for veering. The operation is effected by a peculiar management of the helm and the sails. *Boxing-off* is an operation very similar to box-hauling. See further under TACK, VEER.

BOXING, or PUGILISM (Lat. *pugilatus*), fighting with the fists. It was practised as a manly exercise by the ancients, among whom it was an art so highly esteemed, that Pollux, Hercules, and some of the other gods were represented as having excelled in it. The pugilists of the ancient games had leather thongs on their hands, sometimes loaded with lead or iron; this armature of the hand was called the *cæstus*. Of course, their combats were not unfrequently attended with fatal consequences, which have resulted also in many instances of modern pugilistic encounters, although no armature of the fists is allowed. Among the Greeks, the practice of B. was at first permitted only to freemen, no slave, or person attainted with crime, being considered worthy to possess the high privilege of being beaten to the consistency of a jelly. Gradually, however, B. was taken up as a profession, and its character deteriorated. B. was a favorite amusement of Englishmen for centuries; it is even said to have had such distinguished patrons as King Alfred and Richard III. But the golden age of pugilism as a pro-

fession in England commenced with the accession of the House of Hanover; then men calling themselves professors publicly announced their intention of giving lessons in 'the noble art of self-defence.' One professor challenged another to combat in the most bombastic language.

In 1726, one Ned Sutton, who announces himself as 'pipemaker from Gravesend, and professor of the noble science of defence,' sneers at another professor, whom he calls 'the extolled Mr. Figg,' for having by 'sleeveless pretence' shirked a combat with him, 'which I take,' says the pipemaker and professor, 'to be occasioned through fear of his having that glory eclipsed by me, wherewith the eyes of all spectators have been so much dazzled.' He further assures the said Figg, that if he can muster enough courage to fight with him, he (Figg) 'will have the advantage of being overcome by a hero indeed!' Figg had an 'amphitheatre' in Oxford Road, wherein fights were held; and a larger one was erected in the same locality in 1742 for one Broughton, the funds being subscribed by some eighty noblemen and gentlemen. The pugilistic encounters that took place here were patronized by many of the nobility. Some faint protests against the brutality of the pastime now began to be made by the press, but these had little effect. Towards the end of the last century fights were patronized by princes of the blood-royal; and the Prince of Wales, afterwards George IV., was present at one at Brighton, in which one of the combatants was killed. When the allied sovereigns and their generals came over to England in 1814, Lord Lowther treated them to a series of B.-matches in his drawing-room, which were so highly relished that they were repeated a few days afterwards. One of the pugilists, called Jackson, became quite a hero, and made enormous sums by giving lessons to young noblemen, among whom was Lord Byron. In 1817, the Czar Nicholas of Russia witnessed a prize-fight at Coombe Warren. At the close, the victor was presented to him, with whom he shook hands. This was the last time that royalty was present at one of these disgusting spectacles.

The character of the prize-ring, or as it is called in the slang of its supporters, 'the P. R.,' had been for many years declining. People of influence and respectability seemed to have withdrawn their countenance from it. The lowest and least reputable class of the population furnished the fighters, and money was the only object of their backers. 'Fair-play' was no longer a 'jewel' in the P. R.; fights were sold, and the meanest and most disgraceful tricks resorted to, in order to win or to avoid the payment of bets. Prize-fights were under the ban of the law; in many counties of England, the police actively interfered to prevent them; and some railway companies refused to convey those taking part in them along their lines. The year 1860, however, witnessed a strange revival of the pugilistic spirit, on occasion of a fight between Tom Sayers, the 'champion prize-fighter of England,' and John Heenan, the 'Benicia Boy,' an American, for £200 a side, and the belt, a badge of honor won by the champion. The battle, which was elevated to the dignity of 'a great international contest' by sporting papers, took place at Farnborough, April 17, 1860. It lasted for more than two hours, in which time the American was beaten almost blind, and the Englishman dreadfully bruised. The continuance of the battle was prevented by the breaking in of the ring, caused by the interference of the police. After the fight the English champion was ranked by many newspapers—not sporting ones—with the heroes of the Crimea and of Lucknow; hundreds, if indeed not thousands, of pounds were subscribed for him, in admiration of his bravery, by persons of all conditions of life, and residing in all parts of the country; and he was fêted by merchants on the London and Liverpool 'Changes. His opponent received equally flattering and substantial testimonials from Americans. The fight formed the subject of discussion in the House of Commons, in which the home secretary announced that not only the principals, but all present at the spectacle were amenable to the law. Though no steps were taken to bring the offenders to justice, it was intimated to those chiefly concerned, that if a renewal of the fight were attempted, the law should be put in force against those aiding or abetting it.

The training which prize-fighters undergo for some months before a battle is of the most healthful kind; it rids them of every superfluous grain of flesh, braces their nerves, and makes their muscles like iron; yet, owing to the rude way in which the result of all this training is demolished in an hour's fight, professional boxers are usually very short-lived. With the exception of one, Gulley, who became M.P. for Pontefract, and the Jackson already alluded to, who made a fortune, few of them have ever risen to anything above the ownership of a low public-house, where they lay down the law on pugilism to their admirers, and take the chair at so-called 'harmonic meetings,' where B. is the entertainment. Prior to the decline of B. the doings of the prize-ring were duly chronicled by sporting papers. The following specimens of the slang will afford a sufficient idea of the character of this kind of literature. The mouth is called the 'potato-trap,' the 'kisser,' the 'whistler,' the 'grubber,' and the 'oration-trap;' the nose is variously described as the 'claret-jug,' the 'smeller,' the 'sneezer,' the 'snorer,' the 'sniffer,' the 'proboscis,' the 'nozzle,' the 'snout,' the 'scent-bottle,' and the 'snuff-box;' the ear as the 'conk,' and the eyes as the 'daylights,' the 'peepers,' the 'squinters,' the 'goggles,' &c. Instead of saying that the eyes did not swell up, the *littérateurs* of the P. R. would say that the boxer 'did not seem inclined to adopt the early-closing movement with either shutter!'

BOXING-DAY, the day after Christmas, and so called in England from being the day on which *Christmas boxes*, or presents, are given to servants and others. See CHRISTMAS BOX.

BOXING THE COMPASS is one among many sea-phrases not easily traceable to their origin. It means simply a rehearsal or enumeration of the several points, half-points, and quarter-points of the mariner's compass, in their proper order; and is among the lessons which a young sailor has to learn.

BO'XTEL, a busy town in the Netherlands province of North Brabant, is six miles south of Bois-le-Duc. Pop. (January 1, 1875) 5034, who are employed in agriculture and in manufactures. B. is famed for its table-linens, and beer, leather, paper, and salt are extensively made. It has connection with the leading railways. The Anglo-Dutch army, under the command of the Duke of York, was here defeated with great loss by the French in 1794.

BOX-THORN (*Lycium*), a genus of plants of the natural order *Solanaceæ*, having funnel-shaped or tubular flowers, and 2-celled berries. The species are pretty numerous, and found in different quarters of the world. Several are natives of the south of Europe, thorny shrubs, with long slender shoots and simple lanceolate leaves. *L. Europæum* may be trained to a height of 30 or 40 feet, and is often planted—as are also other species—for ornament, to cover walls, &c. It has pale violet-colored flowers, reticulated with red veins. Some of the species are almost trees. *L. fuchsioides*, although destitute of spines, is used as a hedge-plant in its native country, the Andes of Quito. Its flowers are orange scarlet, and grow in umbels.

BOYA'CA, a town of the U. S. of Colombia, near which, in 1819, Bolivar, by a victory over the Spaniards, secured the independence of Colombia. It gives name to the department, which stretches from the plateau of Bogota to the borders of Venezuela, being watered by the Magdalena, Sogamozo, Zulia, Cazanare, and Meta. The capital, however, is not B. itself, but the neighboring city of Tunja; which is about 70 miles to the north-north-east of Bogota.

BOYAR. See BOJAR.

BOY'AU, in military engineering, is a winding or serpentine trench, dug to form a path or communication between the different armed trenches of a siege-work, and to prevent them from being enfiladed, or fired upon in flank.

BOY-BISHOP. The custom of electing a B. on St. Nicholas's Day dates from a very early period. Warton thought he could find some allusion to it in one of the anathemas of the Constantinopolitan Synod, 867 A.D. It quickly spread over most Catholic countries, and in England seems to have prevailed in almost every parish. Although the election took place on St. Nicholas's Day (6th December), the authority lasted to Holy Innocents' Day (28th December). The B. was chosen from the children of the church or cathedral choir, or from the pupils at the grammar-school. He was arrayed in episcopal vestments, and, attended by a crowd of subordinates in priestly dress, went about with songs and dances from house to house, blessing the people, who, as Bishop Hall says, 'stood grinning in the way to expect that ridiculous benediction.' The B. exacted implicit obedience from his fellows, who, along with their superior, took possession of the church, and performed all the ceremonies and offices except mass. The custom found countenance not among the populace only.

In 1299, Edward I., on his way to Scotland, permitted a B. to say vespers before him at Heton, near Newcastle-on-Tyne, and gave him and his companions a present. At Salisbury—and perhaps in other places also—the B., it is said, had the power of disposing of such prebends as happened to fall vacant during the days of his episcopacy; and if he died during his office, the funeral honors of a bishop, with a monument, were granted him. What secular shows and entertainments accompanied this practice, history does not inform us. Probably dramatic exhibitions of a rude nature were the principal. In England, the custom of electing a B. was abolished by a proclamation of Henry VIII., dated July 22, 1542; restored by Queen Mary in 1554; and again abolished during the reign of Elizabeth, though it seems to have lingered here and there in villages till about the close of her reign.

BOYD, ZACHARY, an eminent Scotch divine, born before 1590, was educated at Kilmarnock, and studied at the universities of Glasgow, and Saumur in France, of which latter he was, in 1611, appointed a regent or professor, and is said to have declined the principalship. The persecutions of the Protestans in France

caused him to return to Scotland in 1621. In 1623, he became minister of the barony parish, Glasgow, and was thrice elected rector of the university of that place. His principal prose work, *The Last Battell of the Soule in Death*, published at Edinburgh in 1629 in two vols. was reprinted with a life of the author, by Grabiel Neil, Glasgow, 1831. He was author of eighteen other works, chiefly of a religious cast. The third edition of his *Psalms of David in Meeter* appeared at Glasgow, 1646. He died in 1653 or 1654, leaving numerous MSS. and his library, with a considerable legacy, to the College of Glasgow, over the court gateway of which is his stone bust, whilst his portrait is in the Divinity Hall of the same university. Among his MSS. is a collection of quaint poems on Scriptural subjects, entitled *Zion's Flowers*, usually called Zachary Boyd's Bible. As a specimen of his homely style, the following extract from Jonah's soliloquy within the whale's belly may be quoted here:

What house is this, where's neither coal nor candle,
Where I nothing but guts of fishes handle?
I and my table are both here within,
Where day neere dawned, where sunne did never shine;
The like of this on earth man never saw,
A living man within a monster's maw.
Buried under mountains which are high and steep,
Plunged under waters hundredth fathoms deep.
Not so was Noah in his house of tree,
For through a window he the light did see:
He sailed above the highest waves—a wonder;
I and my boat are all the waters under;
Hee in his arke might goe and also come,
But I sit still in such a straitened roome
As is most uncouthe, head and feet together,
Among such grease as would a thousand smother.
I find no way now for my shrinking hence,
But heere to lie, and die for mine offence
Eight prisoners were in Noah's hulk together;
Comfortable they were, each one to other.
In all the earth like unto me is none,
Far from all living, I heere lye alone.

BOYDELL, JOHN, a liberal patron of art in England, born in 1719. At the age of 21, he apprenticed himself for seven years to an engraver in London, and on the expiration of his apprenticeship, published, by subscription, a series of views in England and Wales, with the profits of which he set up a print-selling business in the metropolis. English engraving was at a low ebb when B. threw his money and intelligent energy into the work of its improvement. Under B.'s liberal patronage of native artists, the importation of foreign prints, for the most part, not only ceased, but English prints were exported to the continent. B. now determined to do for English painting what he had done for engraving. He accordingly selected Shakspeare's works for illustration; and in the carrying out of his object, secured the most eminent painters in the kingdom, including Opie, Reynolds, Northcote, and West. The result was the magnificent 'Shakspeare Gallery,' from which was engraved a superb volume of plates (Lond. Boydell, 1803). B. also published, at Bulmer's press, a splendid edition of Shakspeare's works in 9 vols. fol. (1792—1801). The immense sums of money he spent on the Shakspeare illustrations, and the commercial depression consequent on the French Revolution, brought him into difficulties, from which he was not wholly extricated before his death, in December 1804. An alphabetical catalogue of plates containing engravings by the best artists, from the finest works of the Italian, Flemish, German, French, and English schools; sketches from Claude Lorraine, &c., were among the collections published by Boydell.

BOYER, ALEXIS BARON DE, a French surgeon of the greatest eminence, was born at Uzerche, in Limousin, on 30th March 1757, or, according to others, in 1760. He was for some years in the service of a notary, before he began his medical studies. In 1787 he was appointed second surgeon to the Hôpital de la Charité at Paris, and afterwards professor, first of operative surgery, and then of clinical surgery, at the École de Santé. In 1804, he was appointed first surgeon to the emperor, who also raised him to the rank of baron. He accompanied the emperor on his campaigns and journeys. After the Restoration, B. became professor of practical surgery in the university of Paris, and first surgeon at the Hôpital de la Charité. In 1823, he was appointed consulting-surgeon to the king; and in 1825, was admitted a member of the Institute. He died on 25th November, 1833. His greatest works are his *Traité Complet d'Anatomie*, 4 vols. (Par. 1797—1799, and other editions), and his *Traité des Maladies Chirurgicales et des Opérations qui leur conviennent*, 8 vols. (Par. 1814—1822). From 1798 to 1817, he was engaged with Roux and Corvisart in conducting the *Journal de Médecine, Chirurgie et Pharmacie*.

BOYER, JEAN PIERRE, a mulatto, president of the republic of Hayti, was born 2d February 1776, at Port-au-Prince, capital of that part of the island then belonging to France. At a very early age he was sent to France, where he received a European education; and in 1792, entered the military service. He very soon became a *chef de bataillon*, and fought against the British on their invasion of his native isle. After further fighting against the British under General Rigaud, leader of the mulattoes, and afterwards under General Leclerc, he entered into a combination which had for its object the union of the negroes and mulattoes, and a complete emancipation of the colony. After the negro Dessalines had seated himself upon the throne, B., along with Péthion, took the lead of the colored people. They assisted Christophe to overthrow the bloody tyrant in 1806, but deserted Christophe when they saw that he wished to make himself sovereign. Péthion now established an independent republic in the western part of the island; and B. made himself indispensable to him by his military and administrative knowledge, so that he was invested by the new president with the command of the capital, Port-au-Prince, and the rank of a major-general.

In this capacity he endeavored to discipline his troops after the European manner; drove back, more than once, the black hordes of Christophe, thereby preserving Port-au-Prince from destruction; was recommended to the people by Péthion, when dying, as most worthy to be his successor; and was unanimously elected president of the republic. He arranged the financial affairs, collected funds into the treasury, improved the administration, and encouraged arts and sciences. After the death of Christophe, he united the monarchical part of the island with the republic in 1820; and in 1821, the eastern district also, which had hitherto remained under the dominion of Spain; and he urgently sought the recognition of the independence of the youthful state by France, which was obtained, in 1825, upon payment of an indemnity of 150 millions of francs. B. carried on the government of the republic of Hayti for fifteen years, from this time, with the most perfect peace; but his policy, which was rather arbitrary, and directed to the object of depressing the negroes in favor of his own race, the colored people, resulted in a victorious insurrection in 1843. B. fled to Jamaica, whence he announced his resignation to the Haytian revolutionary committee, and condemned himself to a voluntary ostratism. From the proclamation of the provisional government, it appeared that he was the victim of his aristocratic policy; but the provisional government, after it had obtained the upper hand, conducted itself very moderately towards the defeated party. See HAYTI. After a protracted stay in Jamaica, B. went to Paris, where he died in the beginning of July 1850. He was a man of great perseverance, and of captivating manners, but artful, and often harsh and cruel to those under him.

BOYLE, a town in Roscommon county, in a picturesque valley on both sides of the Boyle, one mile above its expansion into Lough Key, and 8 miles north-west of Carrick-on-Shannon. Pop. (1881) 2994. It has a large trade in corn and butter. Latin and English annals of B. date from 420 to 1245, and have been published. An abbey was built here in the 12th c., and was reduced to its present ruined state in 1595 by the Earl of Tyrone.

BOYLE, RICHARD, the founder of the House of Cork and Orrery, and fitly styled the Great Earl of Cork, was born in 1566, at Canterbury, of a good but not wealthy family. At the age of 22, after having studied at Cambridge and the Middle Temple, he went over to Ireland with a few pounds in his pocket, to hew his way to fortune.

His energy, prudence, and signal capacity for government, received their reward. He bought estates and improved them, promoting the immigration of English Protestants, and triumphed over the envy of his enemies, making good his cause before Queen Elizabeth, and winning her favor. Due honors flowed in upon him, and at length he was knighted. In 1620, he became Viscount Dungarvan and Earl of Cork. In 1631, he was made lord high treasurer, an office which remained hereditary in his family. In his old age, the Munster rebels compelled him to gird on armor, and turn his castle into a fortress. He soon raised a little army of his servants and tenants, and with an auxilliary force commanded by his four sons (and paid, when his money was spent out of his plate-chest), the noble old earl took castles, smote the rebels, and quenched rebellion in his borders. He died in 1644, at the age of 78.

BOYLE, THE HON. ROBERT, seventh son, and fourteenth child of the first Earl of Cork, was born at Lismore, Waterford, January 25, 1626. As a child, he was distinguished by precocity of intellect and a rare love of truth. After studying at Eton, and at home, he went to the continent, where he stayed for six years. On his return in 1644, he found himself in possession, by his father's death, of the manor of Stalbridge, Dorsetshire, where he took up his abode, and resided till 1650. He took no part in political strife, but devoted himself to cultivation of science, and particularly of chemistry and natural philosophy. He was one of the first members of that association of scientific men which about that time (1645) held private meetings at Oxford and London, and some years after, became better known as the Royal Society. In 1654 he settled at Oxford. Here he experimented extensively in pneumatics, and improved the air-pump. At the same time, he devoted considerable study to theology. After the Restoration, he was urgently advised by Lord Clarendon to enter the church.

but he thought he could do better service to religion as a layman. Among the proofs which he gave of this, besides his own theological writings and eminent example, were his exertions as a director of the East India Company for the propagation of Christianity in the East, as well as in procuring and circulating at his own expense translations of the Scriptures, and his bequest for the foundation of the 'Boyle Lectures' (q. v.), in defence of Christianity. In 1668, he took up his residence permanently in London, and was thenceforth able to devote much of his time to the business of the Royal Society. In 1680 he was chosen president, but declined the honor. A peerage had repeatedly been offered to him, and declined.

In 1688, finding his health decline, he shut himself up against all interruption, in order to husband his remaining time for the labor of repairing the loss caused by the accidental destruction of his MSS. In 1691, his health finally gave way, and on the 30th of December 1692 he died, seven days after his beloved sister, Lady Ranelagh. B. was tall and emaciated in person, and extremely temperate in his habits, often subject to low spirits, but naturally lively and of rare conversational powers. His piety, benevolence, and charity would have made him remarkable, apart from his scientific attainments and reputation. His complete works (including his very interesting correspondence), with a life by Dr. Birch, and an index, were published in 5 vols. fol. (Lond. 1744).

BOYLE, CHARLES, third Earl of Orrery, was born at Chelsea, August 1676, and entered Christ Church, Oxford, in his 15th year, where he had for his tutors Drs. Atterbury and Friend. His attainments as an undergraduate were respectable for a nobleman; and probably this circumstance induced the master of the college, Dr. Aldrich, to select the youth for the annual task of editing a classic. In B.'s case, it unfortunately happened that the *Epistles of Phalaris* were chosen, Sir William Temple having about that time passed the most extravagant encomiums upon them. In 1695 the work appeared. Two years later, Bentley published his famous *Dissertation*, in which he proved that the Epistle, instead of being composed in the 6th c. B.C., were the production of the 2d c. after Christ. B. in reality, had little to do with the unlucky performance to which his name had been attached. It was the work chiefly of Atterbury and Friend. Nevertheless, in the following year, and while B. himself was absent from the country, the wits and scholars of Christ Church again exposed him and themselves to the merciless criticism of Bentley by publishing *An Examination of the Dissertation*, &c., *by the Hon. Charles Boyle*. In 1699 Bentley once more replied, and sealed the lips of his adversaries for ever. But for this *Battle of the Books*, in which he only seemed to be engaged, B.'s name would have been forgotten. In honor of him, the name of 'Orrery' was given to the scientific apparatus of that name by its constructor, to whom B. had been kind. He fought, as major-general, at Malplaquet, was promoted to diplomatic and court appointments, wrote some literary pieces, and died in 1731. Of his poems, even Sir Richard Blackmore said:

> After his foolish rhymes, both friends and foes
> Conclude they know *who did not write his prose.*

BOYLE LECTURES, so called from the founder, the Honorable Robert Boyle (q. v.), who settled an annual salary, charged upon his dwelling-house in St. Michael's Crooked Lane, London, for 'some preaching minister,' who shall preach eight sermons in the year for proving the Christian religion against Atheists, Deists, Pagans, Jews, and Mohammedans, not descending to any controversies among Christians themselves. Archbishop Tennison procured a yearly salary of £50, to be charged upon a farm at Brill, Bucks, instead of the original charge for the endowment. The office is tenable for three years.

The first series of lectures, *A Confutation of Atheism*, was preached in 1692 by Richard Bentley (q. v.). In 1704, Dr. Samuel Clark preached the lectures, entitled *A Demonstration of the Being and Attributes of God*, in answer to the arguments of Hobbes, Spinosa, and their followers. In 1709, Dr. Lilly Butler lectured on *Religion no Matter of Shame*. All the lectures preached up to 1732 were collected into a fine folio edition, in 3 vols. (Lond. 1739); since that period, till recently, few of the lectures have been published. In 1846, the course of lectures was preached by the Rev. F. D. Maurice, and published under the title, *The Religions of the World*. The more eminent lecturers of recent years whose courses have been published are: Merivale, the historian (1864—1865), who lectured on *The Conversion of the Roman Empire and Northern Nations;* Professor Plumptre (1866); Professor Stanley Leathes (1868—1870); and Dr. Hessey (1871—1873).

BOYLE'S FUMING LIQUOR is the term applied to a concentrated solution of ammonia, saturated by a stream of hydrosulphuric acid, which combining with it, forms the sulphide of ammonium (NH_4S). Exposed to the air, it fumes, and evolves a very disagreeable odor, resembling, but in an intensified degree, ordinary bilge or sewerage water.

BOYNE, a river in the east of Ireland, rises in the Bog of Allan, and flows through Kildare, King's County, Meath, and Louth. It passes Trim, Navan, Slane, and Drogheda, and enters the Irish Sea 4 miles below the last town, after a course of 65 miles in a carboniferous limestone basin, its total descent being 336 feet. Its chief tributaries are the Deel, Mattoch, and Blackwater. It is navigable for vessels of 250 tons to Drogheda, and for barges of 70 tons to Navan, 19 miles up. Its banks are studded with many ruins of monasteries and castles. In 838, Turgesius the Dane sailed up the B., and plundered Meath. But this river is chiefly famous for the battle of the Boyne, which took place on its banks, near Oldridge, on the 1st of July 1690, and in which William III. defeated James II. An obelisk, 150 feet high, marks the scene of the battle.

BOYS, SHIPS'. In nautical language, all the young or green hands on board are called *boys*, without much reference to their age; but in recent times, arrangements have been made to give a more precise meaning to the term, by engaging boys or lads as part of the crew.

In the royal navy, boys were first voted for in the estimates in 1834. There were 1000 in that year; 7000 in 1876; 6300 in 1878; and 5300 in 1879. The Admirality has, in recent years, made many regulations for attracting boys into the navy. Most of the seamen at present in the service entered it as boys. They enter mostly at about 14 years of age, but some as late as 18, and they are bound for 7 years. There are schools established for them at Portsmouth, Plymouth, Cork, and one or two other places. The boys are ranked in two classes, according to age and experience. When out of their time, they have a tendency to enter the merchant service for two or three years; but they usually return to the navy, and enter as ordinary seamen. See further under MANNING THE NAVY.

In the merchant service, boys are apprenticed to the shipowners; they learn their duties by degrees; and constitute the source out of which mates, masters, and captains are ultimately supplied. By the Merchant Seamen's Act of 1844, every merchant-ship was bound to take a certain number of boys as apprentices, according to tonnage; the better hands were apprenticed by their friends; the worst were picked up by the Marine Society from the poor and wretched of the streets, and apprenticed as a means of setting them up in life. The indenture was from 12 to 18 months. The regulations have been modified in form, but not in substance, by the Mercantile Marine Act of later date.

BOZZARIS, MARCOS, a Greek patriot who distinguished himself in the early part of the modern War of Independence, was born at Suli, in the mountains of Epirus, towards the close of the 18th century. His youth was spent amid the din of arms. In 1803, he was forced to retreat to the Ionian Isles, by Ali Pasha (q. v.), who, in a series of bloody combats, had nearly exterminated the Suliotes. In 1820 two events occurred which called forth his patriotic energies: Hypsilanti summoned the Greeks to insurrection, and war broke out between Ali Pasha and the sultan. On learning the news, B. put himself at the head of some 800 expatriated Suliotes, and passed over into Epirus Ali, who dexterously endeavored to identify his cause with that of the Greeks, soon found means to secure B.'s services against their common enemy, the sultan. B. obtained several victories, and on the death of Ali at the taking of Janina in 1822, he continued the war successfully against Khurshid Pasha, the Turkish general. Shortly after, Prince Mavrocordato landed at Mesonlonghi, with a body of disciplined troops, and being joined by B., he engaged the Turks at Petta, on the 16th July 1822.

Through treachery the Greeks were overpowered, their best soldiers perished, and B., along with Mavrocordato, was compelled to retire to Mesolonghi. This place he skilfully defended against the Turks, until a Hydriote fleet forced them to retire. In the summer of 1823, a Turco-Albanian army of 20,000 men, under the command of the Pasha of Scodra, descended from the north of Epirus. B., who knew that the fortifications of Mesolonghi were too weak to withstand an assault, determined to surprise his enemies by a sudden blow. He advanced swiftly at the head of 1200 men, and on the 20th of August reached Kerpenisi, where the van of the Turco-Albanian army, 4000 strong, was encamped. At night, the Suliotes burst in upon their startled foes, who were routed with great slaughter. The victors captured their camp, standards, and a vast quantity of baggage. This triumph was saddened by the loss of the heroic B., who fell while leading on his men to the final attack. His body was solemnly interred at Mesolonghi, and he was honored with the title of the 'Leonidas of Modern Greece.'

BO'ZZOLO, a town of North Italy, province of Mantua, situated on the right bank of the Oglio, about 16 miles west-southwest of Mantua. B., which was at one time a small independent republic, has remains of old fortifications, some silk-weaving, and an annual fair. Pop. about 4500.

BRA, a town in the province of Cuneo, North Italy, 25 miles north-east of Coni. It has metal foundries and silk manufactures, and a good trade in cattle, grain, and wine. Pop. 10,500.

BRABANÇONNE, the patriotic song of the Belgians, originally sung by the insurgents during the revolution of September 1830. A young French player, by name Jenneval, at that time connected with the theater at Brussels, was the author of the song; it was set to music by a singer named Campenhout. Jenneval fell in a combat with the Dutch at Berchem. The Belgians allowed his mother a pension of 2400 francs. Campenhout received from King Leopold a golden snuff-box, and was appointed director of the royal chapel. Each verse of the B. ends with the refrain—

La mitraille a brisé l'orange
Sur l'arbre de la liberté.

BRA'BANT was the name formerly given to an important province of the Low Countries, extending from the left bank of the Waal to the sources of the Dyle, and from the Maas and the plain of Limburg to the Lower Scheldt.

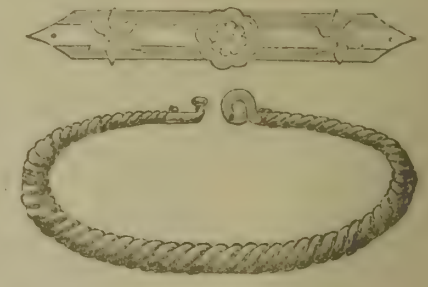
In the time of Cæsar, B. was inhabited by a mixed race of Germans and Celts; it afterwards came into possession of the Franks, and in the middle ages it formed a duchy by itself, dependent upon Lower Lorraine, with which, in 1107, the county of Antwerp was incorporated, and in 1347, for a time, the lordship of Mechlin or Malines, formerly connected with Liège. After many changes, B. (divided into the provinces of North and South B.) was made a part of the kingdom of Holland, at the Congress of Vienna; but at the revolution of 1830, South B. separated from Holland, and became part of Belgium (q. v.). Old B. is now divided into three provinces: 1. North or Dutch B., containing 1960 square miles, and (1875) 447,632 inhabitants; 2. The Belgian province of Antwerp which contains 1094 square miles, and (1873) 513,543 inhabitants; and 3. South B., also Belgian, containing 1260 square miles, and an extremely dense population of (1873) 922,468. The country consists of a plain gently sloping to the north-west, and rising in the south into gentle hills, which are offsets of those of the Ardennes. In the level northern part are many heathy and fenny tracts; one of them, a morass called the Peel, is 20 miles in length, and from 2 to 6 broad. In the hilly district of the south is the Forest of Soignies. The Maas and the Scheldt are the principal rivers; but some of their tributaries are also very useful for internal commerce, which is further promoted by canals and railways. The soil of North Brabant is fertile, and wheat, rye, oats, barley, beans, potatoes, beet, colza, madder, flax, and hay are extensively grown; also hops, tobacco, and chicory. Farm stock is large. Principal towns are 's Hertogenbosch, Tillburg, Breda, and Bergen-op-zoom. Soap-boiling, distilling gin, book-printing, refining salt, making beet-sugar, beer, cigars, thread, woollen cloths, leather, earthenware, weaving and printing cottons, Turkey-red dyeing, are chief industries. B. lace has long been celebrated. The inhabitants in the north are Dutch; in the middle district, Flemish; and in the south, of Walloon race. The boundary between the languages is a few leagues to the south of Brussels, the Walloon French being spoken to the south, and Flemish and Dutch to the north of this line.

BRACCIO, FORTEBRACCI, COUNT OF MONTONE, a celebrated condottiere (see CONDOTTIERI), born at Perugia in 1368, of an old patrician family, was, in early youth, the leader of a troop of mercenaries in the service of the Count of Montefeltro, against the Malatesti, lords of Rimini. He became the champion of the Perugian nobles who were driven into exile in 1393; and after serving in Lombardy under Alberico da Barbiano, he carried on a partisan warfare in the Marches of Ancona against the Marquis Ludovico Migliorati, nephew of Pope Innocent VII. In 1408, he entered the service of Ladislaus, king of Naples, who had designs on Central Italy, and, with his condotta, crossed the Apennines, scoured the valley of the Tiber, and took several towns. In June of the same year, the people of Perugia offered the dominion of their city to the Neapolitan king on condition that he would prevent the nobles from returning. He accepted it, and ungenerously sent a large force against B., who retired to the Marches. In 1416, however, B. obtained the sovereignty of his native city, when the banished nobles, after an exile of twenty-four years, were restored. In 1417, B. got possession of Rome by capitulation, but was soon obliged to evacuate it. He afterwards made terms with the pope (Martin V.), with whom he had a conference at Florence in February 1420, and subsequently accepted from Joanna, queen of Naples, the command of her land-forces, with the rank of high constable of that kingdom. Entering the Abruzzo, he surprised Capua, and having relieved Naples, then besieged by the queen's enemies, was created by her Count of Foggia and Prince of Capua. In 1423, B. was, by her order, crowned at Perugia, as Prince of Aquila and Capua. Aspiring to the throne of Naples, he overran Campania and Apulia with a considerable army, took Bari, and advanced into Calabria. In a battle which ensued for the relief of the strong town of Aquila, besieged by him, B. was wounded and taken prisoner. After lingering for three days, refusing food, he died June 5, 1424, in his 56th year. His deeds, in chronological order, and those of his contemporary, Piccinino, are commemorated by Lorenzo Spirito, in a poem of 101 chapters, in terza rima, entitled *L'Altro Marte* (Vicenza, 1489).

BRACE, in Carpentry, an oblique piece of wood used to bind together the principal timbers of a roof or other wooden structure. See ROOF, BORING.

BRA'CELET (Fr. *brachiale*, from Lat. *brachium*, the under part of the arm), an ornament worn on the arm, generally at the wrist. Bracelets and armlets (Lat. *armillæ*) have been used by every nation, both savage and civilized, from the earliest periods to our own. They are frequently mentioned in Genesis, as worn both by men (xxxviii. 18) and by women (xxiv. 30); both by the Hebrews and the surrounding nations (Numb. xxxi. 50). Similar ornaments were worn round the ankles, but they are stigmatized by Isaiah as marks of luxury (iii. 16). The Medes and Persians were remarkable, even amongst the Asiatics, for their love for ornaments of this class. They wore not only bracelets and armlets, but earrings, collars, and necklaces, which often consisted of strings of valuable pearls, or were enriched with other jewels. These ornaments were used to indicate the rank of the wearer, and this use has continued to be made of them in the East down to the present day. In Europe, bracelets and armlets were worn both by the classical nations and and barbarians from the earliest times. The Gauls wore them; and the Sabines, as early as the foundation of Rome, had ponderous golden armlets on the left arm. The same was the case with the Samians about the same period. It does not appear that armlets were worn by men during the historical period of Greece, but ladies wore both armlets and bracelets of the most various materials and forms. Both generally passed round the arm several times, and the form of B. now most in fashion has been accurately copied from those twisted spirals described by Homer in the eighteenth book of the *Iliad*, line 401. Many examples of this kind of B., as represented on painted vases, will be found in Sir William Hamilton's work. We are indebted to the Greeks even for the idea of giving to these spiral bracelets the form of a snake, the best models of our present goldsmiths being exact copies of antique bracelets. The goddesses of the Greeks, like the blessed Virgin in Roman Catholic countries, were represented as attired in the style of ladies of the highest rank; and the celebrated marble statue of Aphrodite, preserved at Florence, exhibits traces of a metallic armlet. Amongst the Romans, armlets were frequently conferred upon soldiers for deeds of valor, of which an instance is mentioned by Livy (x. 44). Roman ladies wore bracelets, not only for ornament, but also for the purpose of containing amulets, which wese supposed to effect miraculous cures. On this principle it is said that the Emperor Nero wore on his right arm the skin of a serpent, enclosed in a golden armilla. But at Rome also, it was chiefly an indication of rank or wealth that these ornaments were worn.

Many Roman bracelets have been preserved, and the accompanying wood-cuts, taken from Smith's *Dictionary of Greek and Roman*



Antiquities, to which we have been indebted for much of the information contained in this article, exhibit two antique bracelets of different forms.

BRACES, on shipboard, are ropes attached to the yard-arms, and employed to shift the sails in a horizontal direction round the masts, so as to receive advantageously the wind that may be blowing at any particular moment. The phrases, 'to brace to,' 'to brace about,' 'to brace the yards sharp up,' &c., apply to this operation.

BRACHE (Fr. *braque*, diminutive *brachet*), a term frequently employed by the older English authors to designate some kind of dog. To what kind this name belonged, is, however, not very certain. The probability appears to be, that it was applied to hounds or hunting-dogs in general. The term is believed to be of Celtic derivation (from *bracach*, grayish, badger-colored, or *breac*, spotted), and to have originally signified gray or spotted dog.

BRA'CHIAL A'RTERY is that portion of the great arterial trunk supplying the upper extremity between the armpit and the elbow; in other words, it is the continuation downwards of the axillary artery. The B. A. runs along the inner side of the arm, just behind the inner margin of the biceps muscle, and behind the great median nerve. Here it may be pressed against the bone, in cases of bleeding from any point below. In its course, the B. A. gives off, 1*st*, the superior profunda branch, which winds round the back of the arm-bone, and reappears on the outer side, where it joins some twigs coming up from the radial artery; 2*d*, an artery which enters the bone to supply its medullary membrane; 3d, the inferior profunda, which, running down behind the internal condyle (the funny bone) of the humerus, joins branches coming from the ulnar artery; 4*th*, a short branch, the anastomotica magna, which breaks up into numerous branches inosculating round the elbow.

Brachial Artery: *c*, brachial artery; *d*, superior profunda branch; *e*, inferior profunda; *f*, anastomotica magna.

BRACHIO'PODA (Gr. arm-footed), or PA'LLIO-BRANCHIA'TA (Gr. mantle-gilled), a class of molluscous animals, having bivalve shells, but differing in important points from the vast majority of recent mollusks with bivalve shells, the *Lamellibranchiata* (q. v.). The chief differences existing in the shelly covering itself have been already pointed out in the article BIVALVE SHELLS (q. v.), but those of internal structure are still more important. The mantle or *pallium* (see MOLLUSCA) in the B. consists of two broad expansions or lopes, covered by the two valves of the shell, and enclosing all the other soft parts of the animal; whilst respiration or the aëration of the blood is carried on by the surface of these lobes themselves, traversed by minutely ramifying blood-vessels, extended into processes, and furnished, especially along the edge, with vibratile cilia which create a continual current in the surrounding water, and thus keep up a fresh supply, from which the necessary air may be obtained.

The organs by which food is procured are also remarkable—two long arms arising from the sides of the mouth, and disposed wholly or partly in spiral curves, when not extended to seek or seize prey. These arms are usually furnished with numerous vibratory filaments, which are supposed not only to aid in the capture of prey, but in the maintenance of the current necessary for respiration. The B. are attached to solid bodies either by a footstalk or by one of the valves of the shell. Of existing species, the *Terebratulæ* or Lamp-shells (q. v.) are by far the most numerous; but even these appear to have existed in far greater numbers in former geologic periods, and of some of the other families of B. only a single species is known to exist, or the existing species are very few, whilst the fossil species are very numerous. The existing species are very widely diffused over the globe. All of them are marine, and one (*Crania personata*) has been brought up from the depth of 255 fathoms. The B. are regarded as exhibiting structural affinities not only to the *Ascidia* (q. v.) and the *Lamellibranchiata*, between which they are commonly placed, but also to the class *Bryozoa* or *Polyzoa* (q. v.).

BRACHY'PTERÆ, or BRACHY'PTERES (Gr. short-winged), in Ornithology, that section of the order of *Palmipedes* (q. v.), or web-footed birds, in which the wings are short, and the feet are placed far back, so as to compel the birds to assume a nearly erect posture when on land. They are all very aquatic in their habits, and excel in diving, so that the name DIVERS is sometimes used as equivalent to B.; but that name is also not unfrequently applied to other aquatic birds, and is sometimes restricted to the genus *Colymbus*. Auks, puffins, penguins, grebes, guillemots, and divers (*Colymbus*) are among the Brachypteræ.

BRACT, or BRA'CTEA, in Botany, a leaf from the axil of which a flower or a floral axis is produced, instead of an ordinary leaf-bud or branch. Bracts are sometimes called floral leaves. The term B. is not, however, generally employed when, as is often the case, there is no marked difference from the ordinary leaves of the plant; but the flowers are said to be axillary, or in the axils of the leaves. On the other hand, the term B. is very frequently applied to all altered leaves interposed between the ordinary leaves and the flower or flowers. In this case, they are sometimes very small and scale-like. The ordinary leaves often pass, by imperceptible gradations, into bracts, diminishing in size, becoming more simple, and often also scariose. Bracts are generally entire, even when the ordinary leaves are divided. They are sometimes colored so as apparently to form part of the flower, and sometimes crowded, so as to resemble an involucre o an outer calyx. They appear to serve purposes analogous to those of leaves, or, when colored, of petals. When the primary floral axis is branched, bracts (sometimes distinguished as *bracteoles* or *bractlets*) are often to be ssen at its ramifications. Bracts sometimes fall off at an early stage, sometimes they are more permanent, and sometimes they even remain to cover and protect the fruit

BRA'CKET, an ornamental projection from a wall, used for the purpose of supporting a statue, bust, or the like. See CORBEL. Brackets may be either of stone or wood, and they are sometimes

Ornamental Brackets.

elaborately designed and carved. The term B. is also employed in joinery, &c., to designate supports, in the form of a bent knee, or shelves, galleries, &c. B. is also generally applied to such gaslights as project from the wall.

BRA'CKLESHAM BEDS, a group of highly fossiliferous strata in the middle Eocene formation, included in the Bagshot series (q. v.).

BRADDOCK, EDWARD, a British major-general, commander against the French in America in 1755, arrived in February of that year at Richmond, Virginia, and with a force of 2000, British and provincial troops, reached the Monongahela, a branch of the Ohio, on July 8. Leaving the baggage behind, on the 9th his force moved forward to invest Fort du Quesne, now Pittsburg, Pennsylvania, when, from his slighting the warning of his American officers, of the probability of a surprise, the troops, in passing through a deep forest ravine, fell into an ambuscade of Indians, while they were attacked in front by the French, and half of them slain. The rest made a hasty retreat under Colonel, afterwards General Washington, B.'s aide-de-camp, the only one of his officers who escaped with life. B., mortally wounded, was carried on a tumbril 40 miles to where the baggage had been left, and there he died.

BRADDON, MISS MARY ELIZABETH, one of the most popular novelists of the day, was born in London in the year 1837. Her father, Mr. Henry Braddon, was a solicitor. She very early showed a turn for literature, which she indulged in the usual manner, by sending verses and other trifles to the magazines and newspapers. In 1860, she essayed a somewhat more sustained effort in a little *commedietta* called *The Loves of Arcadia*, which was brought out at the Strand Theater; and the year after, she published a volume of verse entitled *Garibaldi and other Poems*. Neither these, however, nor the tales which she now began to issue through the medium of the *Temple Bar* and *St. James's Magazine—Lady Lisle, The Captain of the Vulture, Ralph the Bailiff*, &c.—in any decisive way succeeded in drawing to her the attention of the public. Her first great success came with the publication, in 1862, of *Lady Audley's Secret*, which instantly attained a great popularity. This has since been extended by the appearance of *Aurora Floyd, Eleanor's Victory, John Marchmont's Legacy, The Trail of the Serpent, The Ladies' Mile, Sir Jasper's Tenant, Only a Clod, The Doctor's Wife, Run to Earth, The Lovels of Arden, Birds of Prey, Dead Sea Fruit, To the Bitter End, Strangers and Pilgrims, Weavers and Weft, The Cloven Foot, Mount Royal* (1882), &c. Miss B. has contributed very extensively to *Belgravia*, a magazine which she conducted for a time. Few books of the period have secured a wider circle of readers than Miss Braddon's. They mainly depend for their interest on good bold effects of what is termed, in the slang of the day, *sensation*, and the art of their appeal to 'that low vice, curiosity,' in the conduct of a story, carefully leading up to some suspended and unforeseen *dénouement*. In their particular way, though without much claim to attention as regards either character or sentiment, they display undoubted talent: in style, they are fresh and vigorous, and their narrative power strongly excites the reader's interest. Miss B. is still in uninterrupted literary activity.

BRA'DFORD, an important manufacturing town in West Riding, Yorkshire, on a tributary of the Aire, at the meeting of three vales, 8 miles west of Leeds. Pop. in 1871, 145,827; in 1881, 180,459; of whom more than half are immigrants from other districts. The area of the parish is 34,146 acres, extending to the confines of Lancashire. It returns two members to parliament, having been created a parliamentary borough in 1832. It became a municipal borough in 1847. B. is the chief seat in England of

the spinning and weaving of worsted yarn, and the great mart for the long wools used in worsted fabrics. Cottons are also manufactured. There are more than 200 mills, employing 40,000 persons.

Notwithstanding the large population, and the nature of their employment, the annual rate of mortality is now only 24 per thousand. Twenty years ago, the rate was 30. The Saltaire alpaca and mohair mills, on the Aire, 3 miles from B., cover more than 6 acres. This establishment, erected by Sir Titus Salt, Bart., is the most splendid manufacturing concern in England. Here is also the largest silk-mill in England, built by Mr. S. C. Lister. Coal and iron mines occur near Bradford. There are over twenty churches belonging to the establishment in the borough, and many Dissenting and R. C. churches. The gross estimated rental of the borough is £600,000, and the rateable value £500,000. It has two public parks, each containing more than 50 acres, besides smaller ones, and also many excellent charities. The Romans seem to have worked iron-mines here, Roman coins having been found in foundry refuse near the town. The early history of B. is connected with the castle of the Laceys here. In the civil wars, the people of B. took the parliament side, and twice defeated the royalists, but were afterwards themselves defeated by the Earl of Newcastle. In a riot at B., against the introduction of worsted power-looms, in 1826, two of the rioters were shot dead by the defenders of the mill which contained the obnoxious machinery, and many more were wounded. In 1825, a strike for increased wages, in which 20,000 persons were concerned, lasted six months. The Baptists, Independents, and Wesleyans have colleges near Bradford. This town is the seat of the first English temperance society. At Fulneck, 3 miles east of B., is a Moravian settlement, founded in 1748, where Montgomery the poet was educated. B. has been latterly much improved in its buildings, and possesses a spacious and elegant public hall, in which the National Association for promoting Social Science met in 1859, and the British Association in 1873. The merchants of B. are distinguished by their liberality and enterprise. Their warehouses form the great wholesale market in the worsted and alpaca trade.

BRADFORD, GREAT (Sax. *Bradanford*, broadford), a town in the county of Wilts, on both sides of the Avon, and on the Kennet and Avon Canal, six miles E.S.E. of Bath. Pop. (1871) 4871. It has been noted for many centuries for its manufacture of fine broadcloths. Kerseymeres were first made here. An India-rubber manufactory has been also lately established. The remains of a monastery, founded in the 7th c. by St. Aldhelm, are still visible.

BRADFORD CLAY, a member of the Lower Oolite, is a blue unctuous clay, occurring at Bradford near Bath, and extending for a few miles around: it is never more than 40 or 50 feet in thickness. It is remarkable for the occurrence in it of large numbers of a crinoid (q. v.), (*Apiocrinites Parkinsoni*). The upper surface of the calcareous rock on which the clay rests is completely incrusted over with a continuous pavement formed of the stony bases of this crinoid. It had once formed the bottom of a sea, in which these animals lived, their stems bending with every motion of the water, and their star-like crown of arms outstretched in search of food. At length, however, the clear water was invaded by a current largely charged with mud, which broke most of their stems off near the base. The stem, body, and arms have been dismembered, and are confusedly scattered through the clay.

BRADLEY, DR. JAMES, one of the most distinguished astronomers and discoverers of any time or country, was born at Sherborne, in Gloucestershire, in 1692. He received his early education at a boarding-school at North Leach, whence, being destined for the church, he proceeded to Oxford. Soon after graduating, he obtained successively the livings of Bridslow and of Welfrie, in Pembrokeshire; but there is reason to fear that his mathematical pursuits considerably distracted his attention from his clerical duties. Devoting himself to mathematics and astronomy, he soon exhibited such a genius for these pursuits as to win the friendship of all the leading mathematicians of his time, among others, of the great Isaac Newton, and to get elected a member of the Royal Society. About the time of his election, 1721, he became, in his 29th year, Savilian professor of astronomy at Oxford, resigned his livings, and devoted himself wholly to science. In 1727, he published his theory of the aberration of the fixed stars, containing the important discovery of the aberration of light, to which, it is related, he was led somewhat by accident, as Sir Isaac Newton was to the theory of gravitation. What suggested this discovery to B., it is said, was the observation that the vane of a yacht in which he was sailing never lay in the line of the wind, but was always inclined to it at an angle depending on the line and amount of the yacht's motion. This led him to a train of thought resulting in the proposition, that the direction in which we see a star is not that in which it actually lies, but inclined to it by an angle depending on the direction of the earth's motion around the sun at the time of the observation, and the ratio of its velocity to that of light. See ABERRATION.

Three years after this publication, B. became lecturer on astronomy and physics at the Oxford Museum. His next discovery was that the inclination of the earth's axis to the ecliptic is not constant, a fact including the explanation of the precession of the equinoxes and the nutation of the earth's axis. This discovery constitutes a great epoch in astronomy. Latterly, B. became Regius Professor of Astronomy at Greenwich, where, by his observations, he still further enriched the science. He declined the living of the parish of Greenwich, which was offered to him, and was favored by the crown with a pension of £250 a year for his services to commerce and navigation. Towards the end of his life, B. was elected member successively of almost all the leading scientific societies in Europe. He died on the 2d of July 1762, in his 70th year. B. is described as having been gentle, modest, compassionate, and liberal; little given to speaking or writing, from diffidence and the fear of hurting his reputation. No man ever better merited the title of a great astronomer.

BRADSHAW, JOHN, an eminent Puritan, was born in 1586, of a good family in Cheshire, and studied law at Gray's Inn. Called to the bar, he gained a good practice by his ability and learning, especially as a chamber counsil. In October 1646 he was appointed a commissioner of the Great Seal, and in February 1647 chief-justice of Chester. In October 1648 he received the degree of serjeant, and in the following January, was elected president of the high court of justice for the trial of King Charles I. As the reward of his services on that solemn occasion, he was made President of the Council of State, and Chancellor of the Duchy of Lancaster, besides the grant of estates worth £4000 per annum, the deanery house of Westminster for a residence, and £5000 to furnish it. B., however, refused submission to the Protector. He was an able lawyer, but not an able politician. His mind was rigid rather than broad, and, in consequence, he was unable (like so many others of the stern fanatical republicans of his time) to see or comprehend the necessity for a great iron rule like Cromwell's. He even engaged in some Fifth Monarchy and other plots against Cromwell, but his respectable character and past services saved him from molestation. He was deprived, however, of his office as chief-justice of Chester. After Oliver's death, he was Lord President of the Council of State, and a commissioner of the Great Seal under Richard. His last public act was to protest against the violent seizure of Speaker Lenthall by the army. He died November 22, 1659. His body was buried with pomp in Westminster Abbey, but it was afterwards exhumed and hung on a gibbet, with those of Cromwell and Ireton.

BRADSHAW'S RAILWAY GUIDE, the pioneer, and still the type, of that now extensive class of publications whose object is to convey all necessary information in regard to traveling. It derives its name from George Bradshaw, originally an engraver and printer in Manchester, who in 1839 issued an occasional work called the *Railway Companion*, which was corrected by means of another work, in the form of a broad sheet, styled the *Monthly Time Tables*. This sheet was frequently delayed to the 5th or 6th of the month, and was subject to changes made by the Companies, perhaps in the middle, or even the latter end of the month. By great efforts, the Railway Companies were induced to consent to adjust their tables, once for all, for the beginning of each month; and Mr. Bradshaw having established an agency in London, the first number of the monthly *Railway Guide* was brought out in December 1841. The second number now before us, published '1st month (January), 1842,' runs to 32 pages, and contains 42 or 43 lines of railway, in England only, without any advertisements. Through the suggestions and exertions of Mr. W. J. Adams, the London agent and publisher, the plan was gradually enlarged and perfected, and resulted in the *Railway and Steam-navigation Guide* for Great Britain and Ireland, so well known to the public. The *Guide* now extends to upwards of 450 pages, which comprise the needful knowledge regarding all lines and branches in the three kingdoms; besides copious steamboat information; full details regarding coaching in Scotland; and numerous advertisements—price 6*d*. The information is obtained from the Companies, at the last moment, in time to appear on the 1st of the month. The *Guide* has attained an immense circulation, and given birth to many publications of a similar character. Its plan has been imitated in France and Germany, in America, and even at the antipodes, where a *Bradshaw* is published at Sydney; and in spite of many rivals, the original work has always maintained its place in general estimation.

In 1847, the first number of *Bradshaw's Continental Railway Guide* was issued, which has prospered no less than the British *Guide*. In addition to the tables, as furnished by the companies abroad, it contains a large quantity of topographical information. A series of *handbooks* was also projected by Mr. Bradshaw, which includes Great Britain, France, Switzerland, &c., but is still incomplete. The handbooks of the *Overland Journey*, and to the

Presidencies of India, were published after Mr. Bradshaw's death, which occurred in 1853.

BRA'DYPUS. See SLOTH.

BRAEMA'R (including the united parishes of Braemar and Crathie), an extensive Highland district, occupying the south-west corner of Aberdeenshire, in the heart of the Grampian Mountains, and intersected by the upper part of the Dee and its tributaries. The chief mountains are Ben Macdhui (q. v.); Cairntoul, 4220 feet; Braeriach, 4225; Ben-a-Buird, 3851; and Ben Avon, 3826, on the north; and Lochnagar (q. v.), on the south. Patches of snow lie on these mountains all the year round. The rocks of B. are granite, gneiss, and quartz, with beds of primary limestone, and masses of serpentine, trap, and porphyry. Most of the district is uncultivated, and consists of heathy tracts, while about a twentieth of the surface is in wood. The natural woods are birch, alder, poplar, and rowan, and the planted chiefly larch and Scotch fir. The fir-timber of the ancient Caledonian forest of Mar, now nearly all cut down, is, for size and quality, the best in the kingdom. Red-deer, roes, grouse, ptarmigan, and alpine hares abound. Many rare alpine plants are found on the mountains and in the glens. Black-faced sheep and small black-horned cattle are reared. Here the Earl of Mar first raised his standard for the Pretender in September, 1715. The district is intersected by the great military road from Blairgowrie to Fort George, made by General Wade. In the east part of the district is Balmoral (q. v.); and near its center is the small village of Castleton of B., a favorite resort for travelers, sportsmen, and lovers of grand scenery. Pop. (1881) 1611, many of whom still speak Gaelic.

BRA'GA, a city of Portugal, capital of the province of Minho, is situated on an eminence between the rivers Cavado and d'Este, about 35 miles north-east of Oporto. The neighborhood is charming, especially along the banks of the river Cavado. B. is surrounded by old walls, flanked with towers, and defended by a castle. It is the residence of the primate of Portugal, who has a palace here. It has also a fine Gothic cathedral, several spacious squares; and manufactures of linen, hats, cutlery, firearms, jewelry, &c. Pop. (1878) 20,258.

It is a very ancient place, being supposed to owe its origin to the Carthaginians. In the time of the Romans, the city was named *Bracara Augusta*, and the ruins of a temple, an amphitheater, and an aqueduct, belonging to that era, still remain. Not far from B. stands the celebrated *Sanctuario do bom Jesus do Monte*, which is still a place of pilgrimage. After the Suevi had taken Lusitania from the Romans, B. was made the metropolis; and here, at a council held in 563 A.D., the Suevi, with their king, renounced the errors of Arianism, and submitted to the teaching of the Roman Catholic Church. After the fall of the Suevian and West-Gothic kingdom, B. fell into the hands of the Arabs, from whom it was taken by the forces of Old Castile in 1040. After the establishment of the Portuguese dynasty, it was annexed to the crown of Portugal.

BRAGA'NÇA, the name of two considerable towns in Brazil.—1. B., a seaport of about 6000 inhabitants, at the mouth of the Caite, which enters the Atlantic about 100 miles to the east-south-east of the Amazon.—2. B., an inland city of about 10,000 inhabitants, 50 miles to the north-east of San Paulo, and about 200 to the west of Rio de Janeiro.—The first is about a degree to the south of the equator, and the second about a degree to the north of the Tropic of Capricorn.

BRAGA'NZA, or BRAGANÇA, a city of Portugal, capital of the province Tras-os-Montes, is situated in a pleasant and fertile district, on the river Fervença, an affluent of the Sabor. The city is surrounded with walls; has two castles, partly in ruins, of which one was the ancestral seat of the Dukes of Braganza; and has manufactures of silk and velvet. Pop. 5000. This city gives its name to the House of Braganza, the present ruling dynasty in Portugal. John, eighth Duke of Braganza, having ascended the throne as John IV., when the Portuguese liberated themselves from the Spanish yoke in 1640. See PORTUGAL.

BRAGI, son of Odin and Frigga, in the Norse or Scandinavian mythology, was the god of poetry and eloquence. Upon his tongue were engraved the runes of speech, so that it was impossible for him to utter a sentence that did not contain wisdom.

According to the older or poetic Edda, he was the most perfect of all scalds or poets, and the inventor of poetry, which is designated by a kindred word, *bragr*. Unlike Apollo, who, in the Greek mythology, is represented as enjoying eternal youth, B. was supposed to be an old man with a long flowing beard; but his brow was always mild and unwrinkled. B.'s wife was Idunna. Together with Hermothr or Hermode, he received and welcomed all those heroes who had fallen in battle, on their arrival in Valhalla. On festive occasions, as well as on the burial of a king, a goblet, called Bragafull (B.'s goblet), was presented, before which each man rose up, made a solemn vow, and emptied. Several German periodicals and works, intended to cherish a national spirit, have taken the name of Bragi.

BRAHAM, JOHN, a celebrated tenor-singer, of Jewish origin, was born in London in 1777, and died February 15, 1856. He had an unusually long professional career, having sung on the stage at the age of ten, and continued to make occasional appearances at concerts until within a few years of his death. About the close of the 18th c. he visited France and Italy for improvement; returning to London, his triumph was transcendent, and from that time, for half a century, he held the reputation of one of the greatest tenor singers in Europe. It was as a concert singer that he excelled most, and his great declamatory power and florid execution made his singing of the national songs wonderfully effective.

BRAHÉ, TYCHO, one of the most distinguished names of which astronomical science can boast, was born at Knudsthorp (a place near the Baltic), in Denmark, in 1546. He was descended from a noble family, originally Swedish, and sent, at the age of 13, to the university of Copenhagen, where he had not been more than a year, when an eclipse of the sun turned his attention to astronomy. His uncle, who destined him for the law, furnished him with a tutor, and sent him to Leipsic in 1562; but B., who cared nothing for that study, devoted just so much time to it as would save appearances, and while his tutor slept, busied himself nightly with the stars. By these surreptitious observations of the heavens, and with no other mechanical contrivances than a globe about the size of an orange, and a pair of rude compasses, he succeeded, as early as 1563, in detecting grave errors in the Alphonsine and Prutenic tables, and set about their correction.

The death of an uncle, who left him an estate, recalled him to his native place in 1565; but he very soon became disgusted with the ignorance and arrogance of those moving in the same sphere with himself, and went back to Germany. At Wittenberg, where he resided for a short time, he lost part of his nose in a duel with a Danish gentleman; but for the lost organ he ingeniously contrived one of gold, that fitted so admirably, and was so naturally colored, that few could have detected that it was artificial. After a couple of years spent in Augsburg, he returned home, where, in 1572, he discovered a new and brilliant star in the constellation Cassiopeia. In 1573, he married a peasant girl, which his fellow-noblemen thought even more undignified than being addicted to astronomy; and that they considered very degrading in a gentleman, whose only becoming qualification was, in their estimation, expertness in the use of arms. After some time spent in travel, B. received from his sovereign, Frederick II., the offer of the island of Hven or Hoëne, in the Sound, as the site for an observatory, the king also offering to defray the cost of erection, and of the necessary astronomical instruments, as well as to provide him with a suitable salary. B. accepted the generous proposal, and in 1576 the foundation-stone of the castle of Uraniberg ('city of the heavens') was laid. Here, for a period of 20 years, B. prosecuted his observations with the most unwearied industry—with a zeal, in fact, sufficient to create a new epoch—one of the three great epochs indeed—in astronomy as a science of observation. See ASTRONOMY. The scientific greatness of B. was no protection against the petty prejudices of the nobles, who could not bear to see honor heaped on one who, according to their notions, had disgraced their order, nor against the meaner jealousies of physicians, who were annoyed at his dispensing medicine gratis to the poor. So long as his munificent patron, Frederick II., lived, B.'s position was all that he could have desired, but on his death in 1588, it was greatly changed. For some years under Christian IV., B. was just tolerated; but in 1597, his persecution had grown so unbearable, that he left the country altogether, having been the year before deprived of his observatory and emoluments. After residing a short time at Rostock and at Wandsbeck near Hamburg, he accepted an invitation of the Emperor Rudolf II.—who conferred on him a pension of 3000 ducats—to Benatek, a few miles from Prague, where a new Uraniberg was to have been erected for him; but he died at Prague on the 13th October, 1601. At Benatek he had Kepler as his assistant, and to the advice of B. that celebrated astronomer owed much. The scientific publications of B. are numerous.

BRAHILO'V, IBRAI'L, or IBRAILA, is a free port of the principality of Rumania, on the left bank of the Daunbe, about 99 miles from its mouth, and the chief shipping port in Walachia, whence large quantities of corn and other products are exported. The sturgeon fisheries on the Danube are a source of considerable profit to B. A railway from Galatz to B., thence to Bucharest, was completed in 1873. Pop. about 30,000. During the war of 1854—1856, B. was occupied by Russian troops.

BRAHMA. In the religion and philosophy of the Hindus, this word has two meanings. The crude or undeclined form is *brahman*, the etymological signification of which is doubtful; when declined as a neuter noun, it has the nominative Brahma (with the final syllable short); as a masculine, it is Brahmā with the

a long). Brahmă (neuter) designates the universal Spirit, the ground and cause of all existence; which is not, however, conceived as an individual personal deity to be worshiped, but only as an object of contemplation. It is spoken of as 'that which is invisible, unseizable, without origin, without either color, eye, or ear, eternal, manifold (in creation), all-pervading, undecaying—the wise behold it as the cause of created beings.' The human soul is a portion of this universal Spirit, and a man can only be freed from transmigration, and be reunited to Brahmă, by getting a correct notion of it and of the soul.—Brahmā (masculine) is one of the three chief gods of the Hindu pantheon, and is specially associated with the function of creation. See TRIMURTI. Yet he himself is a creation of or emanation from Brahmă, the First Cause. The origin of Brahmā, and the way in which he created heaven and earth, is thus narrated by Manu:

'This universe was enveloped in darkness, unperceived, undistinguishable, undiscoverable, unknowable, as it were entirely sunk in sleep. Then the irresistible self-existent Lord, undiscerned, causing this universe with the five elements, and all other things, to become discernible, was manifested, dispelling the gloom. He who is beyond the cognizance of the senses, subtile, undiscernible, himself shone forth. He, desiring, seeking to produce various creatures from his own body, first created the waters, and deposited in them a seed. This [seed] became a golden egg, resplendent as the sun, in which he himself was born as Brahmā, the progenitor of all the worlds. Being formed by that First Cause, undiscernible, eternal, which is both existent and non-existent, that Male (purusha) is known in the world as Brahmā. That lord having continued a year in the egg, divided it into two parts by his mere thought. With these two shells he formed the heavens and the earth; and in the middle he placed the sky, the eight regions, and the eternal abode of the waters.'—See Dr. J. Muir's *Original Sanscrit Texts*, vol. iv., 31.

In later times at least, B. has had few special worshipers; the only spot where he is periodically adored being at Pushkara in Rājputana. He sometimes receives a kind of secondary homage along with other deities. B. is represented with four heads. See INDIA (section on *Religion*), TRIMURTI, VISHNU, SIVA.

BRA'HMAN, or BRAHMIN, the name of the highest Caste (q. v.) in the system of Hinduism.

BRAHMANBE'RIA, a town of India in the presidency of Bengal, division of Chittagong. It has sea and railway communication with Calcutta. Pop. (1872) 12,364.

BRAHMAPU'TRA, a river which rises in Tibet, and, after partially mingling with the Ganges, flows into the Bay of Bengal by three mouths. It is formed by the junction, in Assam, of two main branches—the Brahmaptura, from the north-east, and the Sampoo, from the north-west; the entire length rather exceeds 900 miles from the one source, and 1700 from the other. The B. proper rises about lat. 28° 30' N., and long. 97° 20' E.; while the Sampoo springs from the same swamp as the Sutlej and the Indus. About 360 miles below their confluence, the B. leaves Assam, near Goulpara, and after 60 miles more in a south-west direction, takes a sweep round the west extremity of the Garrow Mountains. In lat. 25° 10' N., and long. 89° 43' E., it throws off the Konaie, and after a course of 180 miles, is named the Meghna. Ninety miles from the sea, it combines with the Ganges in cutting up their common delta into a network of inland navigation.

BRAHMIN OX. See ZEBU.

BRAHMO SOMAJ (*Theistic Church*) is a religious and social association in India, originated by the celebrated Hindu Rajah, Rammohun Roy, in 1830, under the title *Society of God*. The accession of Debendra Nath Tagore, a wealthy Calcutta Brahman, in 1842, gave the movement a great impetus, which was also much aided by the spread of the English education. Its latest and most advanced development took place under Keshub Chunder Sen, who joined it in 1858, and whose visit to Europe in 1870 created so much interest. It has been Sen's aim to apply the principles of the church to practical life, and under his leadership the progressive party have seceded from the original church, and assumed the title of 'Bramo Somaj of India.' Their fundamental principles are that there is but one Supreme God, the object of worship; that nature and intuition are the sources whence our knowledge of God is derived; and that religion admits of progressive development.

They ignore all distinctions of caste, and consider all men as God's children; they abjure all idolatrous rites, and acknowledge no sacred books or places, but value what is good and true in all religions, and recognize the necessity of public worship. They have about a hundred branches throughout India, and maintain two periodicals and several schools.

BRAIN is the nervous center in which reside consciousness and power over the voluntary movements of the body. It consists of one or more masses of *gray* and *white* nervous matter, or what are technically called vesicular and tubular neurine. When these substances are blended together, the mass is termed a *ganglion*, and from it proceed prolongations of the tubular matter, which are called nerves, and are conductors of impressions to or from the vesicular neurine. The number and size of these ganglia vary with the powers of the animal. In the lowest forms of mollusk, we find a single ganglion, from which proceed all the nerves of the animal; in the higher, there are two ganglia, joined by a nervous cord round the gullet, and distinct from, though connected with, the ganglion which supplies nerves to the foot, and the one for the respiratory apparatus. In the common slug, we have these cephalic ganglia united so as to form one bilobed mass or B. above the œsophagus.

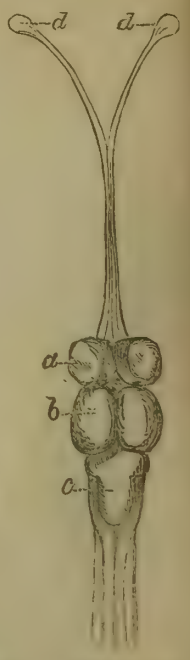


Fig. 1.—Brain of Cod: Drawn *in situ* – shown by removing roof of skull.

a, cerebral lobes, or hemispherical ganglia; *b*, optic ganglia; *c*, cerebellum; *d*, *d*, olfactory ganglia, or bulbs, connected to brain by long prolongations or roots.

In the ARTICULATED ANIMALS (q. v.), the B. consists of two cephalic ganglia over the œsophagus; there are also two nervous cords, one on each side of the body connected with each other. In the *Cephalopoda*, as the pearly nautilus, the B., or mass of nervous matter situated over the gullet, is a transverse *cord*-like ganglion; in the cuttle-fish (*Sepia officinalis*) we find a distinct rounded mass, supported by a rudimentary skeleton. In FISHES, we find, instead of one supra-œsophageal mass of ganglion, several separate masses, the nerves ending in their own special ganglia; i. e., where each nerve ends or begins in the B., there is a collection of vesicular neurine. In addition to these ganglia in fishes, there are parts corresponding to the cerebral lobes or hemispheres of the human brain. There is also a cerebellum.

Suppose we examine a cod's brain (fig. 1). Removing the roof of the skull, we see three pair of neurine masses; two small and round in front, *a*, the hemispherical ganglia; two larger in the middle, the *optic* ganglia, *b*; and a little triangular appendage behind, the cerebellum, *c*. From just in front of the anterior of those three pairs of masses diverge nervous prolongations, which end in two bodies, *d*, *d*, called the *olfactory* ganglia. On lifting the appendage we have named cerebellum, we see on each side of the spinal cord a deposition of neurine, which represents the *auditory* ganglia of more fully developed brains. The olfactory ganglia vary in their distance from the general mass. In REPTILIA, they are placed very near the cerebral hemispheres, which are small, as is also the cerebellum. But when we reach the BIRDS (fig. 2), the size of the cerebral lobe *a*, in proportion to all the other parts is much increased, so that they overlay the different ganglia, which are not placed one in front of the other, as in fishes and reptiles, but packed one above the other. We now begin to find some indications of *convolutions*.

On the surface of the B. in the parroquet, Leuret describes the furrowing as distinct, though many birds have perfectly smooth hemispheres; these also are not hollow, as in fishes and reptiles; and it will be seen that the convoluting or folding of the B. substance backwards and forwards, must allow of more being packed into the space than could be admitted by any other arrangement. The middle part of the cerebellum is very large, *c*, and divided into laminæ or leaflets; its laternal portions are much smaller than in Mammalia; the olfactory ganglia are small, *b*, and close to the cerebral hemispheres. The optic ganglia and other nerves rising from them are very large, and the wedge-shaped portion, called *medulla-oblongata*, connecting the B. with the spinal cord, is also large. We now approach the MAMMALIA, and in the *Monotremata*, which in some important respects resemble birds—the *Ornithorhynchus paradoxus*, for instance—we find small smooth hemispheres in a B. which to the whole body bears only the proportion of 1 to 130. Even this is greater in the Marsupials; the kangaroo's B. is as 1 to 800.

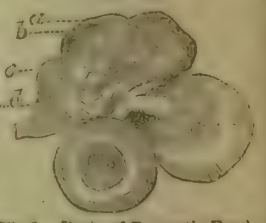


Fig 2.—Brain of Domestic Fowl: *a*, cerebral ganglia; *b*, olfactory ganglia; *c* cerebellum; *d*, optic ganglion of the right side, seen under cerebral ganglion. The optic nerves and eyeballs have been left in the preparation.

If we examine a rabbits's B., we find it to consist, apparently, of three parts—the *olfactory bulb*, the *cerebral hemispheres*, and the *cerebellum*. The cerebral hemispheres are connected by a transverse band of union, or what is technically termed a *commissure*

Continuing the dissection, we turn aside the hemispheres, and find they have concealed *four ganglia*, which represent the single pair of optic ganglia we found in birds. There are two other bodies in front of those just alluded to—viz., the *optic thalamus*, and in front of it another (inferior) *longitudinal commissure*. This forms a communication between the anterior and posterior portions of

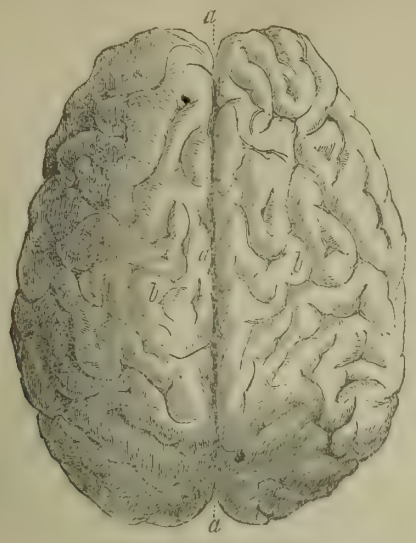


Fig. 3.—Human adult Brain.
Seen from above—membranes removed.
a, a, a. the longitudinal fissure, separating the two hemispheres, *b, b.*

the hemisphere, on the same side. Two little white lines, running from the back of the thalami, join a little body called the *pineal gland*, interesting in connection with some fantastic physiological theories. It will be observed that the hemispheres lie over these structures like a cap; the space between the two, on each side, is termed the *lateral ventricle*.

We have now the most complicated B. before us, the human encephalic mass of ganglia (figs. 3, 4, 5), and include with it the *medulla oblongata*, the link which unites the B. to the spinal cord. First viewing the B. from its upper surface (fig. 3), we see that it is divided by longitudinal fissure into two equal halves or hemispheres, which are broader behind than in front. They are irregularly marked by convolutions, *b*, and a smooth appearance is given to the whole surface by the glistening arachnoid membrane (q. v.). On slicing them transversely with a knife, the section appears white in the center, and gray at the margins, of the *convolutions*, which are now seen penetrating to various depths below the surface. The white substance is dotted with the blood-vessels which supply the brain. On drawing the hemispheres asunder from each other with the fingers, the great commissure, or uniting band, is seen, the *corpus callosum*, which is streaked both longitudinally and transversely. The hemispheres should now be completely sliced off on a level with this commissure, and its transverse fibres will be seen to extend into their substance, constituting a large white surface, called by anatomists the *white oval center*.

If we take the handle of the knife, and scratch with it through this white substance, the instrument soon opens a cavity, which is the *lateral ventricle* (fig. 4). Let this be done on both sides, and the ventricles exposed to view. They are shaped somewhat like the italic *S*.

Their extremities are termed cornua, and the anterior look from each other, and are nearer than the posterior, which are turned the opposite way. We have now removed the hemispherical ganglion, and uncovered the others. The pia mater, which supports the vessels bringing blood to the B. substance, is seen in a purple wreath lying in each ventricle, and passing down into a depression termed the *middle horn* of the ventricle. This is the *choroid plexus*, and, if lifted, it will be found continuous with that on the opposite side, through an aperture called the Foramen of Monro, *e*, after the great Scotch anatomist of that name. If the remains of the corpus callosum are now scraped away, the choroid plexus will be found continuous with a web of pia mater called the *velum interpositum*, which lies over the central cavity of the B., or third ventricle. In front and behind will be seen portions of the inferior longitudinal commissure or *fornix*, *h*, the body of which has been removed to show the velum; but, placed vertically between its anterior part and the under surface of the corpus callosum, are two layers of gray matter, between which is a narrow space termed the *fifth ventricle*, *g*. Behind, there will be seen a small hole, through which a probe will pass into the *fourth ventricle*, *l*.

The accompanying cut (fig. 4) shows the parts now exposed. The mass most in front is the *corpus striatum*, *d*, behind it is the *optic thalamus*, *e*. Through the former, motor fibres pass from the anterior columns of the spinal cord into the hemisphere; through the latter, the sensory fibres from the posterior columns of the cord. These are by some considered to be the ganglia of motion and *common* sensation.

Behind these are the *corpora quadrigemina*, *n*, which are analogues of the optic ganglia of the lower animals. Upon them lies the *pineal gland*, *m*, and behind them, projecting into the fourth ventricle *q*, some gray matter, said to be the auditory ganglia. We now come to the upper surface of the *cerebellum*, consisting of two hemispheres split transversely into leaflets, and connected by a central portion to each other, and by two bundles of white fibres to the corpora quadrigemina, *p*. Between these is the *fourth ventricle;* and stretched across between them is a thin layer of gray matter, called the *valve of Vieussens*, *o*.

We now turn what remains of the B. upside down, and examine the base or under surface. It is very irregular in outline. The cerebral hemispheres are now found to be divided on each side by a *fissure* (*Sylvian*), *f*. The part in front is called the *anterior lobe;* that behind the *middle*, as far as the cerebellum, when it is called the *posterior lobe*.

The diagram (fig. 5) gives a better idea of the appearance than words could possibly do. The olfactory lobes, *h*, *h*, are now seen lying in a fissure in the anterior lobes. The optic tracts are seen meeting at their commissure, *i*, interchanging fibres, and passing on as the optic nerves to the orbit. The larger bundles behind, and directed outwards, are the *crura cerebri*, *p*, passing towards the hemispheres, emerging from the transverse mass called the *pons varolii*, *s*, which lies like a clamp between the two halves of the cerebellum, *d*. From the inner side of each crus arises the third nerve, *o*, destined to supply four of the muscles which move the eyeball. The fourth nerve *q*, comes from the valve of Vieussens, and is seen on its way to supply the superior oblique muscle which turns the eye upwards and outwards, hence called *patheticus*. From each side of the pons the fifth pair, *r*, arises; the sixth, *t*, between the pons and the anterior pyramids of the medulla oblongata; *w* is the eighth, consisting of: 1. The Glossopharyngeal, or nerve of deglutition; 2. The Pneumo-gastric distributed to the respiratory apparatus and stomach; and with it, 3. The Spinal Accessory.

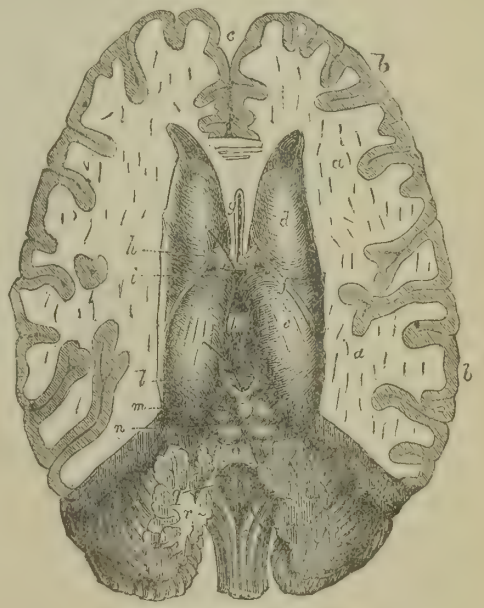


Fig. 4.—Human adult Brain:

In this dissection the cerebral lobes have been sliced off, and the lateral ventricles opened; to allow a view of the cerebellum, the posterior part of the cerebrum has been cut off opposite *n*.

a, a, remains of white oval center; *b. b*, gray outer portion of hemispheres; *c*. longitudinal fissure; *d*, corpus striatum, or streaked body, lying in lateral ventricle; *e*, optic thalamus; *f*, tænia semicircularis, or worm-like body; *g*, the two layers of septum lucidum, open to show fifth ventricle; *h*, anterior crura, or portions of the fornix, one of the great antero-posterior commissures; *i*, points to the foramen of Monro, a bristle is sticking down into the third ventricle; *k*, is the middle or soft transverse commissure, joining the two optic thalami—sometimes absent, and easily destroyed; *l*, a bristle passed from the third to the fourth ventricle (*q*), the transverse lines beneath it indicate the posterior transverse commissure; *m*, the pineal gland, lying on *n*, the corpora quadrigemina; *o*, valve of Vieussens a layer of gray matter from cerebellum; *p*, processes which connect the cerebellum to corpora quadrigemina; *q*, section of cerebellum line, points to gray matter in fourth ventricle; *r*, white matter projecting into the gray, giving a toothed or arborescent appearance, hence the name, arbor vitæ; *s*, posterior pyramids, or back of medulla oblongata.

The chemical composition of B. matter averages in 100 parts—

Water	75½ parts.
Albuminous matter	7 "
Fat	11½ "
Salts (containing 1½ of phosphoric acid)	6 "

The proportion of these constituents varies not only in different species of animals, but also in different members of the same animal group, and appears to be much influenced by the age, temper, and intellectual capabilities of each individual. Thus, the normal quantity of salts in the B. of a healthy man is 6 per cent., and in the B. of an insane patient, only 2¼ per cent. were found.

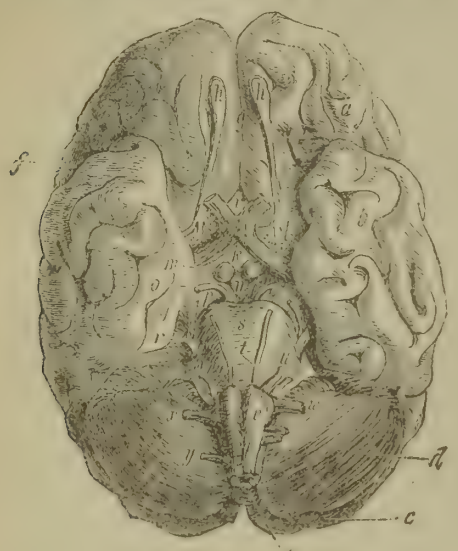


Fig. 5.—Human adult Brain:

a, anterior lobe of cerebrum; *b*, middle lobe; *c*, posterior lobe of cerebrum, appearing behind; *d*, cerebellar hemisphere; *e*, medulla oblongata; *f*, fissure of Sylvius; *g*, longitudinal fissure; *h*, *h*, olfactory bulbs; *i*, optic commissure—the optic nerves are seen interchanging fibres; *l*, three roots of olfactory process; *m*, white round bodies (*corpora albicantia*), the terminations of the anterior portions of fornix; *n*, where the vessels perforate the brain substance, hence called posterior perforated space; *o*, third pair of nerves coming to supply muscles of the eyeball, from *p*, the crus-cerebri; *q*, fourth nerve, turning round from the valve of Viensens; *r*, fifth pair; *s*, pons varolii; *t*, sixth pair of nerves; *u*, seventh pair, portio dura for muscles of face, and portio mollis for hearing; *v*, posterior pyramids of cerebellum, seen to interchange fibers; *w*, and two below, are eighth pair—viz., glosso-pharyngeal, vagus pneumo gastric, and spinal accessory nerve; between *w* and *v* is the small prominence called olivary body; *x*, *y*, two roots of ninth pair of nerves, motor, nerve of tongue.

Softening of the Brain (ramollissement) is a frequent result of chronic inflammation of the brain. The patient has been for some time in low health, troubled with headaches, loss of appetite, depression of spirits, and a gradual loss of memory, and acute perceptions of things in general. Then a spasm may occur, followed by paralysis, or the legs and arms may be bent up, and remain in that position. This condition of B. may be caused by want of proper nourishment to the cerebral substance, owing to plugging up, or from disease of its arteries. When the softening is caused by inflammation, we frequently find pus forming an abscess of the brain. Induration may also occur as the result of inflammation.—The other diseases, as hydrocephalus, will be treated under their own names.

Diseases of the Brain.—Inflammation (acute) of the B. (*phrenitis*, or popularly, *B.-fever*) rarely occurs separately, and can scarcely be distinguished from inflammation of its membranes (meningitis). According to Dr. Watson of London, when the disease begins in the latter, the first remarkable sympton is a convulsion fit; when in the B. substance itself, nausea and vomiting generally usher in the attack.

In the first stage there is rapid pulse, severe headache, the eyes suffused, and their pupils contracted to a small point, very intolerant of light. The patient is constantly watchful, and much annoyed by even ordinary sounds. Then furious delirium sets in, and lasts for a period, varying with the case, generally from twelve to forty-eight hours; when it is succeeded by collapse, in which the patient lies—his face devoid of color, and covered with cold sweat—in a state of stupor. If roused, he now speaks with slow, indistinct utterance; his pupils are now dilated, and indifferent to the brightest light; and the loudest speaking ceases to annoy him. The stupor increases with the general prostration, and continues till death. After death, we find serous fluid upon and in the B., deposits of lymph, thickening of the membranes, and softening of the B. substance itself.

General and local bleeding, with antimony and digitalis, to subdue the pulse; mercury, to prevent the deposit of lymph; blisters, as counter-irritants, to the back of the head and neck, are the usual remedies for this rare, but terrible disease. The younger school of practitioners, however, as Dr. Tanner expresses it, prefer waiting to see if nature unaided, or only *gently guided*, will not carry the patient through a disease where the efforts of art are notoriously futile, and are rather content to *watch the symptoms*, to calm excitement by sedatives, to lessen increased heat of body by diluents and tepid sponging, to prevent accumulations in the intestines by purgatives, and to diminish maniacal delirium by the application of cold to the head.

BRAINE-LE-COMTE, a busy town of the province of Hainault, Belgium, about 13 miles north-north-east of Mons. It is an ancient place, and formerly belonged to the monks of St. Waudru at Mons, from whom it was bought by Count Baldwin in 1158. It has an old church of the 13th c.; and cotton and corn mills, dyeworks, breweries, &c. Some of the finest flax that can be produced is grown in the district. Pop. (1870) about 6400.

BRAINSTONE CORAL, the popular name of certain kinds of Coral (q. v.) or Madrepore (q. v.), included in the Linnæan genus *Madrepora*, but now forming the much more restricted genus *Meandrina*. They derive their name from the general resemblance to the brain of man or of a quadruped exhibited in their large rounded mass, and numerous winding depressions. Perhaps the true B. C. is *Meandrina cerebriformis*, a species always nearly hemispherical. When the hemispherical mass is broken, the ridges which bound its furrows may be traced inwards through its substance, even to the central nucleus from which they commenced. The mouths of the polypes, in all the species of this genus, are in the furrows or elongated hollows, in which they are ranged side by side, in sinuous series. The brainstone corals are very common in collections, and are much admired for their beauty. They are found chiefly in the seas of warm climates, particularly in the Indian and South Atlantic Oceans. They sometimes attain a large size. Ehrenberg noticed single masses (polypidoms) in the Red Sea, from six to nine feet in diameter. Their rate of growth, however, appears to be slow. The fossil species are few, and chiefly belong to the oolitic formation.

BRAI'NTREE, a market-town of Essex, about 40 miles north-east from London. It is an old place, having been constituted a market-town by King John. Its streets are narrow, and many of its houses are of wood. It has manufactures of silk, crape, and straw-plait. It is one of the polling-places of North Essex, and has obtained some notoriety in connection with political and ecclesiastical proceedings. Pop. of parish (1871) 4790.

BRAKE, a genus of Ferns of the division *Polypodeæ*, distinguished by spore-cases in marginal lines covered by the reflexed margin of the frond. The COMMON B. or BRACKEN (*P. aquilina*) is very abundant in Britain and in most parts of the continent of Europe, growing in heaths, parks, &c., often covering considerable tracts. It is a widely distributed plant, and is found in many parts of Asia, and in some parts of Africa. It has a long, creeping, black rhizome, or root-stock, from which grow up naked stalks of 8—18 inches in height; each stalk divides at top into three branches; the branches are bipinnate, the inferior pinnules pinnatifid. The root-stock, when cut across, exhibits an appearance which has been supposed to resemble a spread eagle, whence the specific name *aquilina* (Lat. *aquila*, an eagle). The root-stock is bitter, and has been used as a substitute for hops; it has also been ground, mixed with barley, and made into a wretched bread in times of distress. The plant is astringent and anthelmintic; and as such, it had at one time a high reputation, although it is now little used, at least by medical practitioners. It is employed in dressing kid and chamois leather. The ashes, containing a large quantity of alkali, were formerly used in the manufacture of soap and of glass, so that the collecting of them for sale was a considerable resource of the poor in some parts of the Hebrides. B. is also employed for thatching, for littering cattle, &c., and occasionally chopped up with straw or hay, for feeding cattle. It is a favorite covert of deer and of other game. The abundance of this plant is sometimes regarded as a sign of poor land, although, probably, its absence from the richer soils is very much a result of cultivation. To extirpate it, nothing more is necessary than a few successive mowings of the young shoots as

Common Brake:

a, end of a branch, much reduced; *b*, end of pinnule, the lower side, showing fructification.

they appear. The annual growth of B. is killed by the first frosts of autumn, but remains rigid and brown, still affording shelter to game, and almost as characteristic a feature in the landscape of winter as in that of summer, perhaps adding to its general desolateness.—*Pteris caudata*, a large species of B. very similar to that of Europe, is one of the worst pests which the farmer has to contend with in the south of Brazil.—*Pteris esculenta*, a native of New Zealand, Van Diemen's Land, &c., has a more nutritious rhizome than the common brake. See TARA FERN.—Rock B. (*Cryptogamma crispa* or *Allosorus crispus*, formerly *Pteris crispa*) is a pretty little fern, common on stony hills in the northern parts of Britain.

BRAMA, a genus of fishes of the family *Chætodontidæ* (q. v.). *B. Raii* is common in the Mediterranean, and occasionally found on the British shores. It is one of the fishes to which the name Bream (q. v.) or Sea-bream has been given; and it has also been described as a Gilt-head (q. v.); but these names belong to fishes of other families, with some similarity of general appearance. The genus B. has the body very deep and compressed, the head rather obtusely terminated, a single elongated dorsal fin, and the anal fin with a very lengthened base. The tail is forked, its points extremely divergent. This fish is sometimes more than two feet in length. Its flesh is of exquisite flavor.

BRAMAH, JOSEPH, an eminent practical machinest, the son of a farmer, was born at Stainborough, Yorkshire, April 13, 1748, and early exhibited an unusual talent for mechanics. Incapacitated in his 16th year from agricultural labors by an accidental lameness, he was apprenticed to a carpenter and joiner, and afterwards obtained employment with a cabinet-maker in London. Subsequently, he established himself in business in the metropolis, and became distinguished for the number, value, and ingenuity of his mechanical inventions, such as safety-locks, improvements in pumps and fire-engines, in the construction of boilers for steam-engines, in the process of making paper, in the construction of main-pipes, wheel-carriages, the beer-machine used at the bar of public-houses, and many others. In the year 1795 he patented the hydrostatic press known by his name. See HYDRAULIC PRESS. In all, he took out about twenty patents. He died 9th December 1814.

BRAMA'NTÉ, DONATO LAZZARI, one of the most celebrated Italian architects, and also distinguished as a painter, was born at Monte-Asdroaldo, in the duchy of Urbino, 1444. From 1476 to 1499, he resided in Milan, where he studied geometry and perspective, neither of which sciences was well understood by artists in his day. He was noted as one of the best painters in Lombardy; but his success in architecture eclipsed his fame as a painter. In Milan, he built the choir of Santa-Maria delle Grazie, and the church of Santa-Maria presso San-Satiro. After the fall of Ludovico Sforza, B. went to Rome, where he was first employed by the pope Alexander VI., and afterwards by Julius II. The first great work which he undertook for the latter was to connect the Vatican palace with the two pavilions of the Belvedere by a series of immense galleries; the second was the rebuilding of St. Peter's Church, of which he laid the new foundation in 1506.

When only a small portion of his plans had been realized, B. died at Rome, 1514, and succeeding architects departed widely from the original design of a grand cupola over a Greek cross. Among other works of B. in Rome may be mentioned the palaces Cancellaria and Giraud (now Torlonia), in which he adhered more strictly than in other works to antique forms, but not without a characteristic grace in his application of these.

BRAMBANA'N, a district of the province of Soorakarta, Java, rich in remains of Brahmanical temples, which are superior in magnificence to any in India. The edifices are composed entirely of hewn stone, and no mortar has been used in their construction. In all, there are 296 temples, disposed in five parallelograms one within the other. The outer one consists of 84 temples; the second, of 76; the third, of 64; the fourth, of 44; and the inner one, of 28. In the center stands the largest and most imposing structure of all. It is 90 feet high, and profusely decorated with mythyological figures, which are executed in a very fair style of art. On the south face of the outside parallelogram, there are two monstrous figures, with uplifted clubs, kneeling in a threatening attitude. The great temple is pretty entire, as are also about a third of the others, but the rest lie strewn upon the ground.

BRA'MBLE (*Rubus fruticosus*), a plant common in Britain and most parts of Europe, having prickly stems, which somewhat resemble those of the Raspberry (q. v.). The flowers do not appear till the summer is considerably advanced, and the fruit ripens towards the end of it, continuing to be produced till the frosts of winter set in. The fruit (brambleberry or blackberry) is too well known to need description. Besides affording much enjoyment to children, who collect it from hedges and thickets, it is sometimes offered for sale in towns, and jelly and jam are prepared from it of very delicate flavor, besides a wine, which, both in strength and flavor, is held by many to excel all products of similar native fruits of Britain. The B. is rarely cultivated, perhaps because it is in most districts so abundant in a wild state; but it seems to deserve attention at least as much as the raspberry, and might probably be as much improved by cultivation.

A slight rail on each side of a row of brambles, to restrain the straggling stems, affords the necessary security for neatness and order, and the care bestowed is repaid by abundance of fruit, very acceptable where wild-brambles are not plentiful, and at a season when there is no other small fruit in the garden.—There are many different species of B., according to some—varieties according to other botanists—to which the name is indiscriminately given, and which may almost all be regarded as belonging to the Linnæan *Rubus fruticosus*. From this was separated *R. corylifolius* of Smith, a common British plant, and from these some German and British botanists have separated many other alleged species. *R. suberectus* has more the habit of the raspberry than most of the other kinds, but even its claims to be received as a species are not admitted without doubt by some of the most eminent botanists. A variety of B. with white fruit is occasionally met with.—Species of *Rubus* very similar to the common B., or varieties of it, abound in the northern parts of Asia, the Himalaya Mountains, and North America. See RUBUS.

Bramble.

BRAMBLING, BRAMBLE FINCH, or MOUNTAIN FINCH (*Fringilla Montifringilla*; see FINCH and FRINGILLIDÆ), a bird nearly allied to the Chaffinch (q. v.). It is a little larger than the chaffinch, which it much resembles in its general appearance, its bill, and even the disposal of its colors. The tail is more forked. In the males, the crown of the head, the cheeks, the back and sides of the neck, and the upper part of the back are mottled in winter with brown and black; but in spring, the whole of these parts become of a rich velvety black; the throat and breast are of a rich fawn color, which is also the prevailing color of the wings, but they are crossed, when closed, by an oblique band of jet-black, and by another oblique band of white. The quill-feathers are also black, edged with yellow on their outer webs; the tail-feathers black, edged with reddish white; the rump and the belly are white; a small tuft of feathers under each wing and some of the lower wing-coverts are bright yellow.

The B. is a mere winter visitant in Britain, and the period of its arrival appears to vary according to the severity or mildness of the weather in the more northerly regions. The B. has never been known to breed in any part of the British islands, and even in the south of Sweden it is a mere winter visitant. It breeds in the more northerly parts of Scandinavia. It has no song, its call-note is a single monotonous chirp. It is a very widely distributed species, being found as far east as Japan, and, in its winter migrations, visiting Italy, Sicily, Malta, Smyrna, &c.

Brambling, or Mountain Finch.

BRA'MPTON, a very ancient town in the county of Cumberland, near the Arthing, 8 miles E.N.E. of Carlisle. It is surrounded by hills; and the Castle-hill commands a very extensive view. Pop. (1871) 2617. The chief manufacture is the weaving of check and ginghams; and there are coal-mines in the vicinity. On a rock, two miles to the south, is a Roman inscription, supposed to have been cut by one of Agricola's legions in 207 A.D. Two miles to the east stands Lanercost Abbey, founded in 1116.

BRAN is the material obtained from the outer covering or husk of grain during the process of grinding, and which is separated from the finer flour before the latter is made into bread (q. v.). It is generally met with in commerce in thin scaly yellowish-brown particles, with sharp edges, and its composition in 100 parts is as follows:

Water	13·1
Albumen (coagulated)	19·3
Oil	4·7
Husk, with a little Starch	55·6
Ash or Saline matter	7·3
	100·0

Bread made of flour, containing B., is known as *Brown Bread*. See BREAD. The main uses to which B. is put are in the feeding of horses and cattle, and poultry, and in clearing and brightening goods during the processes of Dyeing (q. v.) and Calico-printing (q. v.). In the practice of medicine, B. is employed as a warm poultice in abdominal inflammation, spasms, &c., and an infusion is used as an emollient footbath. It is also used internally in catarrhal affections.

BRANCH, in Botany, is a part of a tree or other plant not taking its rise immediately from the root, but rather forming a sort of division of the stem, and which is often divided into secondary branches, again, perhaps, to be further much ramified into *branchlets* and twigs, the ultimate ramifications producing leaves, flowers, and fruit. Branches originated in leaf-buds, which are produced at the *nodes* of the stem, or of the already existing branches. See BUD, PLANT, and STEM. The buds being formed in the axils of leaves, the arrangement of the branches, as alternate, opposite, whorled, &c., varies like that of the leaves, but buds often remain dormant, according to a regular law of alternation. The angles of ramification are very different in different plants, producing great variety of appearance, and giving marked characteristics to different kinds of trees. The great difference between the ramifications of the *Coniferæ* in general (Pines and Firs) and that of other trees must have attracted the attention of every one. In many herbaceous plants whose axis is scarcely developed into a stem, instead of branches there proceed from the lateral buds *runners*, which lie close to the ground, send down roots and produce new plants, as in the strawberry.

BRA'NCHIÆ. See GILLS.

BRANCHIO'PODA (Gr. gill-footed), an order of *Crustacea* (q. v.) of the division *Entomostraca* (q. v.) deriving this name from the distinctive peculiarity of having the *branchiæ*, or gills, which are numerous, attached to the feet. They are all small creatures, many of them almost microscopic, and chiefly abound in stagnant fresh waters. Some are popularly known by the name of Water-fleas (q. v.); the Brine-shrimp (q. v.) is another example; and the genera *Cyclops* and *Cypris* may be mentioned, the former on account of its great frequency in stagnant fresh waters, the latter because its hard shells resist decomposition, and are therefore abundant in a fossil state.

BRA'NCO, RIO, a river of that portion of Brazil which, originally comprised within the understood limits of Guiana, lies to the north of the Amazon. It rises in the Parime Mountains, on the very borders of Venezuela; and after a southerly course of about 400 miles, it joins, near lat. 1° 20′ S., and long. 62° W., the Rio Negro, of which it is the principal tributary, on its way to the Amazon.

BRA'NCURSINE. See ACANTHUS.

BRAND, a name given in some parts of Britain to some of those diseases of plants, especially of corn-plants, which are also called BLIGHT, BUNT, MILDEW, RUST, and SMUT.—See these heads.—It is the German name for the disease, generally known in Britain as BUNT, and sometimes as *Pepper-brand*. Both as a German and an English word, it appears to be derived from the verb *brennen* to burn, and to refer to the burnt appearance which characterizes the diseases to which it is applied.—Its most common application in Britain, however, is not to any of the diseases already mentioned, but to a peculiar spotted and burned appearance often seen on the leaves, and sometimes also on the bark of plants which does not seem to be in any way connected with the presence of parasitic fungi, but which sometimes becomes so extensive as to cause the death of the plant. The nature of this disease is still somewhat obscure. Occurring most frequently when warm sunshine succeeds to moist weather or to hoar-frost, and frequently affecting plants in hotbeds upon which drops of condensed moisture fall from the frame, it has been ascribed to the concentration of the sun's rays by the drops of water on the leaf or bark—a theory utterly untenable, as no concentration can take place in such circumstances. The probability appears to be, that the action of the moisture unequally distributed, and particularly when sudden changes of temperature take place, deranges the vegetable functions, and destroys the fine tissues.—BRAND, a mark made on a cask for trade or Excise purposes. See FISHERIES, and TRADE MARKS.

BRA'NDENBURG, a province of Prussia, in the center of the kingdom, in lat. 51° 30′—53° 45′ N., long. 11° 13′—16° 8′ E. B. has an area of 15,350 sq. m., pop. (1871) 2,863,229; (1880) 3,389,155. It formed the neucleus of the Prussian monarchy, but the modern province does not quite correspond with the old *Mark* of B., which included also a part of the province of Saxony and of Pomerania, while it lacked certain small portions of territory now contained in the province of Brandenburg. Almost the whole province is a plain, so low that at Potsdam the surface of the river Havel is only 14·6 Prussian or about 15 English feet above the level of the sea. The ground becomes slightly hilly towards Silesia. In general, the soil is sandy and naturally unfruitful. Without its numerous rivers and canals, B. would be one of the most barren tracts on the continent.

The inhabitants are mostly Germans, mixed with French and Dutch colonists, who, however, are almost completely Germanized; and in the south of the province, with people of Wend extraction. With the exception of 87,000 Roman Catholics, and 41,000 Jews, they belong to the Protestant Church. Agriculture and the rearing of cattle afford occupation for a considerable number of the inhabitants. The manufactures are silk, cotton, wool, linen, sugar, leather, paper, metals, &c. There are also numerous distilleries throughout the province. B. is divided into the governments of Potsdam and Frankfurt—Berlin, which is the capital, forming a separate jurisdiction. In the beginning of the Christian era, B. was inhabited by the Suevi, and afterwards by Slavonic tribes. It was subjugated by Charlemagne in 789, but it again acquired independence under his weak successors, and remained free until 928, when Henry I. possessed himself of it. After passing through numerous changes in connection with the general history of the German empire—of which we need here mention only the facts that Albert the Bear (q. v.) became the first Markgraf of B. in 1142, and Frederick of Nürnberg the first elector in 1417—it became associated with the rise of the Prussian state into a monarchy under Frederick I., Elector of Brandenburg, in 1701. See PRUSSIA.

BRA'NDENBURG (the ancient *Brennaborch* or *Brannabor*), the town from which the province Brandenburg is named, is situated on the line of the Berlin and Magdeburg Railway, about 37 miles west-south-west of Berlin. The river Havel divides it into two parts, Old and New B., which are both surrounded with walls. On an island in the river there is a third quarter, containing the castle, cathedral, equestrian college, &c. The cathedral has a fine old crypt, and several interesting antiquities. The inhabitants, amounting in 1880 to 29,066, inclusive of the garrison, are engaged in the manufacture of woollen, linen, hosiery, paper, leather, beer &c. Boat-building is also carried on to a considerable extent.

BRANDENBURG, NEW, a walled town in the grand duchy of Mecklenburg-Strelitz, North Germany, is situated near the north end of Lake Tollen, about 50 miles west-north-west of Stettin. It is a beautiful town, with regular, broad, and well-built streets The grand duke has a palace in the market-place. It has manufactures of woollen, cotton, damask, leather, paper, tobacco, &c., besides corn-mills, oil works, and a trade in hides and horses, and is altogether a very thriving place. Pop. (1880) 8406.

BRANDING was a mode of punishment practised in England for various offences. It was effected by the application of a hot iron, the end of which had the form which it was desired should be left imprinted on the skin. But B. by such means has long ceased, and now it is practically confined to the case of desertion from the army—the B. or marking being not done by a hot iron, but with ink, or other similar preparation. By the Mutiny Act of 1858, 21 Vict. c. 9, it is enacted by section 35 as follows: 'On the first, and on every subsequent conviction for desertion, the court-martial, in addition to any other punishment, may order the offender to be marked on the left side, two inches below the armpit, with the letter D, such letter not to be less than an inch long, and to be marked upon the skin with some ink or gunpowder, or other preparation, so as to be visible and conspicuous, and not liable to be obliterated.' Formerly, B. was employed in the case of all *clergiable* offences by burning on the hand (see BENEFIT OF CLERGY); and with a view still further to repress theft and petty larceny, the 10 and 11 Will. III. c. 23, s. 6, provided that such offenders as had the benefit of clergy allowed them should be '*burnt in the most visible part of the left cheek, nearest the nose.*' This additional severity, however, not having the desired deterrent effect, but the reverse, was repealed by the 5 Anne c. 6, which nevertheless provided for offenders being burnt on the hand as formerly. The latter punishment, however, was entirely abolished by an act passed in 1822, the 3 Geo. IV. c. 38. Brawling in church (q. v.) was, by the 5 and 6 Edw. IV. c. 4, made an offence punishable by having one of the ears cut off, or, the offender having no ears, by B. with the letter F on the cheek. This punishment

was repealed by the 9 Geo. IV. c. 31. B., therefore, in the case of felonies, has been entirely abolished.

BRANDIS, Christian Aug., professor of philosophy in Bonn, was born at Hildesheim, 13th February 1790, his father being J. D. Brandis, one of the most distinguished physicians of his time. Having studied philology and philosophy at Kiel and Göttingen, he began lecturing in the university of Copenhagen, from which he removed to Berlin (1816). Here he was soon called upon to take part in the preparations for the great critical edition of the works of Aristotle, contemplated by the Berlin Academy of Science, 4 vols. (Berlin, 1831–1836); and with this object, spent several years, along with Immanuel Bekker (q. v.), in exploring the chief libraries of Europe In 1821, he resumed his academic career in the university of Bonn, where he edited Aristotle's *Metaphysics* (vol. ., Berl. 1823), *Scholia in Aristotelem* (Berl. 1836), and *Scholia Græca in A. Metaphysicam* (Berl. 1837). He accepted, in 1837, a call from the young king of Greece, and spent several years in that country as cabinet counsellor. As a result, we have his *Mittheilungen über Griechenland*, Communications on Greece (3 vols., Leip. 1842). Other works of his are—*Handbuch der Geschichte der Griech.-Röm. Philosophie* (3 vols., Berlin, 1835—1866), and *Geschichte der Entwickelungen der Griech. Philosophie und ihre Nachwirkungen im röm. Reiche* (Berlin, 1862—1864). He died July 24, 1867.

BRANDLING. See Par, and Salmon.

BRA'NDON, a town on both sides of the Little Ouse of Brandon River, where it separates Norfolk from Suffolk, 78 miles north-north-east from London by road. Pop. (1871) 2116. It has a considerable corn-trade. Great rabbit-warrens occur near Brandon. There was formerly an extensive manufactory of gun-flints here, the army being exclusively supplied with these articles from B. before the introduction of percussion-caps.

BRANDT, Sebastian, the author of a very popular German book, the *Narrenschiff*, or Ship of Fools, was born at Strasburg, 1458; studied law and the classics with zeal at Basel, where he received permission to teach; and soon became one of the most influential lecturers in that city. The Emperor Maximilian showed his regard for B. by appointing him an imperial councillor. He died at Strasburg in 1521. His Ship of Fools, a satire on the follies and vices of his times, which was published at Basel, 1494, is not very poetical, but is full of sound sense and good moral teaching, and was so much esteemed that the German popular preacher Geiler occasionally took his texts from it. It was translated into Latin by Locher (1497); and into English by Henry Watson, *The Grete Shyppe of Fooles of the Worlde* (1517); partly translated and partly imitated by Alexander Barclay, *The Shyp of Folys of the Worlde* (1508); and imitated by W. H. Ireland in the *Modern Ship of Fools* (1807). It has also appeared in French, and indeed in almost all European languages.

BRANDY (Ger. *Branntwein*, Fr. *eau de vie*) is a term sometimes applied generically to all kinds of ardent spirits, but usually restricted to the liquid obtained by distilling the fermented juice of the grape. See Distillation. The fermented liquors or wines which are employed for that purpose are various, and contain a proportion of alcohol (q. v.), which runs from 10 to 25 per cent. of their weight. The red wines are generally preferred, as containing most alcohol; but though they yield a larger amount of B. than the white wines, yet the latter afford a spirit which possesses a finer flavor and more agreeable taste. 1000 gallons of wine give by distillation from 100 to 150 gallons of B., which varies in strength, but is commercially judged of according to the quantity of *eau de vie* or B. *à preuve de Holland* which it contains, and is generally diluted with water till it contains from 50 to 54 per cent. by weight of absolute alcohol. When originally distilled, B. is clear and colorless, and if wished to remain so, is received and kept in glass vessels; but when placed in wooden casks, the spirit dissolves out the coloring-matter of the wood, and acquires a light sherry tint, which is deepened by burnt sugar and other coloring-matter, intentionally added by the dealers. The pleasant aroma of B. is due to the presence of more or less fusal oil (q. v.) accompanied by œnanthic ether (q. v.). The most famous B. is that distilled in Cognac, a district in the west of France, from the choicest wines, but comparatively little of that sold under the name of *Cognac* comes from the district. A second class B. is obtained from the red wines of Portugal, Spain, &c., as also from the refuse (*marc*) of the grapes left in the winepress, the scrapings of wine-casks and vats, the deposits in wine-bottles, &c.; and very much of the B. sold in Great Britain and Ireland is prepared at home from ordinary grain alcohol, by adding thereto argol (q. v.) bruised French plums, some French wine-vinegar, a little good Cognac, and redistilling, when the spirit which passes over may be colored with burnt sugar, or by being kept in an empty sherry cask.

Occasionally, grains of paradise and other acrid matters are added, to give the B. a fictitious strength; and catechu or oak-bark, to give it an astringent taste. B. is the form in which alcohol is administered medicinally either internally or externally. It is distinguished from other ardent spirits by its light, cordial, and stomachic properties, and especially when set fire to for a minute or two, forming what is known as *Burnt B.*, it is valuable as a household remedy for diarrhœa. B. is administered internally (1), in *mild cases of diarrhœa*, unaccompanied by inflammation, but attended with griping pain, and the addition of nutmeg is productive of good; (2), as a *powerful excitant* for restoring patients who are suffering from suspended animation, and to relieve those who are laboring under fainting symptoms during an operation in surgery; (3), as a *stimulant and restorative*, where patients are much depressed in the ultimate stages of fever; and (4), as a *general stomachic stimulant* in indigestion after taking food, in the relief of flatulency and spasms of the stomach, and to check vomiting, especially in sea-sickness. Externally, B. is employed (1), in healing sores, and in stopping hemorrhage or the oozing out of blood from bruised or injured parts, and is generally applied by soaking linen or cotton with it, and laying the cloth on the part; and (2), in hardening the skin or cuticle over tender parts, the soles of feet which have been blistered, and the nipples of females for several days before delivery. The action of B. externally appears to be strictly chemical, as it coagulates the albumen of blood, and otherwise tends to render more solid all flesh tissue.

The duty on B. imported into Great Britain, which from 1814 had been as high as 22*s.* 10*d.* a gallon, was reduced in 1846 to 15*s.*, and in 1860 to 8*s.* 2*d.*, but was soon afterwards raised to 10*s.* 5*d.* The consumption in the United Kingdom from 1822 to 1862 averaged about 1,400,000 gallons. From 1862 to 1872, it averaged 4,600,000 gallons. The import in 1880 was 3,006,335 gallons.

BRA'NDYWINE CREEK, a stream 36 m. in length, rising in Pennsylvania, and flowing through Delaware. In the latter state, it enters Christiana Creek, about 2 m. above its confluence with the Delaware River, and immediately below Wilmington, a port of entry. It possesses a historical interest in connection with the War of Independence—a battle, in which the British had the advantage, having been fought on its banks in Sept. 1777.

BRANK, or BRANKS, an instrument formerly used for the punishment of scolds in England and Scotland, and often in the former country called 'the scold's bridle.' It seems to have come in place of the ducking-stool or cucking-stool (q. v.). 'I look upon it,' says Dr. Plot in his *Natural History of Staffordshire*, published in 1686, 'as much to be preferred to the cucking-stool, which not only endangers the health of the party, but also gives the tongue liberty betwixt every dip: to neither of which is this at all liable; it being such a bridle for the tongue as not only quite deprives them of speech, but brings shame to the transgression, and humility thereupon, before it is taken off.' The B., in its simplest form, is a hoop of iron, opening by hinges at the sides, so as to enclose the head, and fastened by a staple with a padlock at the back; a plate within the front of the hoop projecting inwards, so as to fit into the mouth of the culprit, and by pressing upon the tongue, be an effectual gag. There must have been difficulty in keeping such a hoop in its place; and so it received the addition of a curved band of iron, having a triangular opening for the nose, passing over the forehead, and so clasping the crown of the head that escape from it was scarcely possible. This may be regarded as the second form of the brank. In the third form, the curved band was hinged in the middle, and, passing over the whole head, was locked into the staple at the back of the hoop. The next addition seems to have been a second band crossing the first at right angles, so as to clasp the sides of the head, and keep the B. still more firmly in its place. In its last more complicated shape, the B., by the multiplication of its hoops and bands, took the form of a conical cage or lantern, with a door behind opening by a hinge and fastened by a staple, the front being fashioned into a rude mask, with holes for mouth, nose, and eyes. In one instance, the mask quite covers the face, the iron plate being hammered out to fit the nose, with apertures for the nostrils and the eyes, a long hollow conical peak, perforated with holes being affixed before the mouth. The way in which the punishment of the B. was inflicted, may be described in the words of an eye-witness, reported by a country gentlemen of Northumberland, Ralph Gardiner of Chriton, in a work, called *England's Grievance Discovered in Relation to the Coal Trade*, published in 1655, and dedicated to Cromwell: 'John Willis of Ipswich, upon his oath, said that he was in Newcastle six months ago, and there he saw one Anne Bidlestone drove through the streets by an officer of the same corporation holding a rope in his hand, the other end fastened to an engine called the branks, which is like a

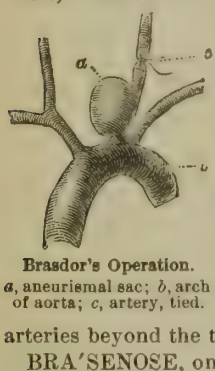
Branks.

crown, it being of iron, which was muzzled over the head and face, with a great gap or tongue of iron forced into her mouth, which forced the blood out; and that is the punishment which the magistrates do inflict upon chiding and scolding women, and that he hath often seen the like done to others.'

When the B. first came into use is unknown. It is found at Edinburgh in 1567, at Glasgow in 1574, at Stirling in 1600, and at Macclesfield, in Cheshire, in 1623. One B. in the church of Walton-on-Thames, in Surrey, has the date of 1633. In another, called 'the witches' bridle of Forfar,' dated in 1661, the gag for the mouth is not a flat plate, but a long piece of iron with three sharp spikes. Of two examples in private custody in England, one has the date of 1688, the other the crowned cipher of King William III. The B. was used at Langholm in Dumfriesshire, in 1772; it was used still more recently at Manchester and at Macclesfield; and in the *Archæological Journal* for 1856, it is stated that at 'Bolton-le-Moors, in Lancashire, the iron bridle was still in use, not many years since, for the correction of immorality: it was fixed in the female's mouth, and tied at the back of the head with ribands, and thus attired, the offender was paraded from the cross to the church steps, and back again.' Examples of the B. may be seen in the Ashmolean Museum at Oxford, in the National Museum of the Antiquaries of Scotland at Edinburgh, in the county hall at Forfar, in the Guildhall at Litchfield, in the town hall at Macclesfield, in the parish church of Walton in Surrey, and in St. Mary's Church at St. Andrew's in Fife.—Brank was at one time a common name in Scotland for any sort of bridle. The word is supposed to be derived from the Teutonic *pranghe*, a bridle. In the Dutch Netherlands, the pillory was called *pranghe*, from the yoke or collar in which the neck of the culprit is held. An instrument resembling the B., in its simplest form, is said to have been in use among the Spaniards in the West Indies for the punishment of refractory slaves. See JOUGS.

BRANTOME, PIERRE DE BOURDEILLES, SEIGNEUR DE, was born at Perigord, in Gascony, about 1527. He traveled in several countries in the capacity of chamberlain to Charles IX. and Henry III.; fought against the Huguenots (1562), in Barbary (1564), and went in 1566 to Malta, to fight against the Turks. After his return to the court of France, he retired into private life, and wrote his *Mémoirs*, full of self-praise but very interesting, as they afford a lively portraiture of the manners and morality of his times, the women in particular, being very severely handled. The style is charmingly piquant, full of ingenious turns of expression, sudden sallies of wit, occasional flashes of eloquence, and withal so naïvely simple, that if the author cannot on account of the abundance of his gossip be reckoned a grave historian, he must needs be considered a most fascinating chronicler. B. died July 15, 1614. His complete works were published at the Hague (10 vols. 1740), and were republished by Buchon in the *Panthéon Littéraire* (2 vols., Paris, 1837).

BRASDOR'S OPERATION. It is stated in the article ANEURISM, that a cure is effected in that disease by successive layers of the fibrine of the blood being deposited in the aneurismal sac, and that surgeons bring about this desired end by tying the artery at some point between the heart and the aneurism. In some situations it is impossible to do this, and therefore it was suggested by Brasdor that the course of the blood should be impeded *beyond* the aneurismal sac. This has not been tested to any great extent, but most surgeons think favorably of it; and the same principle can be carried out by pressure, without any cutting operation, as was shown by Mr. Edwards of Edinburgh, who succeeded in obliterating aneurisms at the root of the neck by pressure applied to the arteries beyond the tumor.



Brasdor's Operation.
a, aneurismal sac; *b*, arch of aorta; *c*, artery, tied.

BRA'SENOSE, one of the colleges of Oxford University, sometimes called King's Hall and College of Brasenose, was founded in the year 1509, by the joint benefaction of William Smith, Bishop of Lincoln, at one time Chancellor of the University, and Sir Richard Sutton, Knight of Prestbury, in Cheshire. The original foundation was for a principal and twelve fellows. Eight fellowships were afterwards added by various benefactors, from 1522 to 1586. This college is also very rich in scholarships and exhibitions; more particularly the Hulme exhibitions, 15 in number, of value £135 per annum each, besides £20 to be spent in books, to be approved of by the principal. The statutes of this college which were issued in 1520, three years after the publication of Luther's theses, seemed to have been framed by a person warmly attached to the Roman Catholic faith. They enjoin devotional exercises of a peculiarly popish character, such as repeating five times each day the Lord's Prayer in honor of the five wounds of the crucifixion, of the angelic salutation in honor of the five joys of the blessed virgin, &c. These devotions were in some cases enforced by fines and whipping. The origin of the name of the college is obscure.

Legends say that it was originally 'Brewing-house,' which became corrupted into the present appellation; but Anthony Wood tells us that the college was 'near finished out of the ruins of several hostels, the chief of which was Brasenose Hall, so called, without doubt, from such a sign, which was in ancient time over its door, as other halls also had viz., Hawk or Hieron Hall, Elephant, Swan, or Bull Hall.' The former theory is supported by the fact, that B. has always been celebrated for the excellence of its beer; the latter is borne witness to by a nose in brass, curiously fashioned, which is now conspicuous over the great gateway. Till lately, all the fellowships were confined to natives of certain counties. The senior fellowships, owing to the appropriations of fines to the seniors, were very valuable, about £500 per annum; while the junior fellowships were about £80. By the commissioners appointed under 17 and 18 Vict. c. 81, many important alterations have been introduced. Five out of the twenty fellowships have been suppressed, one being elevated to the endowment of a professorship, the remaining four to the establishment of additional scholarships. All the remaining fellowships have been thrown open. The senior fellowships have been limited to £300 per annum; the junior raised to £150. Various oaths, previously taken by the fellows, committing them to statements which were untrue, and binding them to duties impossible to be performed, have been by the same authority abolished. B. presents to 24 benefices, besides 29 pieces of preferment vested in the trustees of the Hulme exhibitions, for behoof of the exhibitioners. Though considered what is commonly called a 'good college,' B. has never attained much distinction in the 'schools.' In all probability this has been owing to the restrictions subject to which its endowments were so long administered. The number of names on the books is about 500; the number of resident undergraduates is considerably over 100.

BRASH. See PYROSIS.

BRASH, SHIVERS, BLAZE, and RUBBLE, are names given in different districts to layers of broken and angular fragments of rock. They occasionally form the basement bed of alluvial deposits. At Canonmills, and other places near Edinburgh, the boulder-clay rests on a bed of shivers composed of fragments of the subjacent bituminous shale.

BRASIDAS, the bravest and most energetic Spartan general in the earlier years of the Peloponnesian war. Having distinguished himself (B.C. 431) by the courage with which he relieved the town of Methone from a hostile attack, he was made one of the chief-magistrates of Sparta. In 424 he relieved Megara; and in his expedition to Macedonia, in the same year, to aid the states which had thrown off their allegiance to Athens, he was completely successful. In 422, B., who could obtain no reinforcements from Sparta, had to encounter with his helots and mercenaries the flower of the Athenian army under Cleon. A battle took place at Amphipolis, in which both Cleon and B. were killed, but the army of the former was completely beaten. He was buried at Amphipolis, within the walls, and for long after his death his memory was honored as that of a hero, by the celebration of yearly sacrifices and games. The Greek writers speak highly of Brasidas. Thucydides notices his eloquence, unusual in a Spartan, his justice, liberality, and wisdom, while Plato compares him to Achilles; but circumstances are not wanting to show that he was as much endowed with Spartan duplicity as with Spartan courage.

BRASS is an alloy of copper and zinc, largely used for household furnishings, certain parts of machinery, and other ornamental and useful articles. Technically, the term B. is extended so as to include compounds of copper and tin, as in *brass-ordnance*, the *brasses* or bearings of machinery, &c., but such alloys of copper and tin, though styled *hard* B., are more strictly varieties of BRONZE (q. v.), and the present notice will be confined to the alloys of copper and zinc, or *yellow* brass. In ancient history, biblical and profane, frequent allusions are made to the employment of B. in the construction of musical instruments, vessels, implements, ornaments, and even gates; but as no mention is made of its mode of manufacture, or even of its composition, it is doubtful if the B. of the ancients was composed of copper and zinc. In the manufacture of B. on the large scale, two parts by weight of copper to one part of zinc are used, the zinc being one-half the weight of the copper; but alloys are made for particular purposes with less or greater proportions of zinc.

Thus, where a material of more than ordinary tenacity is required, the zinc is reduced to one-fourth the weight of the copper; and where an alloy of a hard and brittle nature, possessing little resisting power, is wished for, the zinc is increased to an amount equal with the copper, or greater. In the manufacture of B., either of two processes may be followed. The direct method is to fuse the zinc in a crucible, and gradually add the copper in pieces. But this process is attended with disadvantage, owing to the vola-

tile and oxidizable nature of zinc. The indirect method of forming B. is that which is generally followed in England and elsewhere, and consists in heating in crucibles or pots a mixture of calamine (carbonate of zinc, $ZnOCO_2$), charcoal, and thin pieces of scrap or grain copper. The calamine (q. v.) is generally first calcined or roasted, so as to expel any traces of sulphur, then mixed with one-fourth of its weight of charcoal, and this mixture introduced into the crucible, after which the metallic copper is diffused through the mixture by being beaten in with hammers or mallets. The proportions employed are 3 parts of the mixture of calamine and charcoal to 2 parts of copper; and when introduced into a furnace, and subjected for 5 to 24 hours to the action of a white heat, the charcoal reduces the calamine and separates the zinc, which, combining with the copper, forms 3 parts of B., containing about 2 of copper to 1 of zinc.

For ordinary purposes, B. is first cast into plates of about 100 lbs. weight, and ¼ to ½ inch thick, which can be readily broken up, remelted, and cast in a mould of any desirable shape or size. The crude casting so obtained is generally screwed to a turning-lathe, and turned and bored into the required form with iron tools. B. is very largely employed in the construction of door-handles, window-shutter knobs, &c.; and since the introduction of gas, though the brazen candlesticks have almost ceased to exist in towns, yet the immense number of stop-cocks, and brass-pendants and brackets required, has given a considerable impetus to the brass manufacture. The proportion of copper and zinc in the alloys resembling B., and which are known as *gilding metal*, *Mannheim gold*, *pinchbeck*, *bath metal*, *Bristol brass*, *Muntz sheathing metal*, *spelter solder*, and *Mosaic gold*, have already been noticed under ALLOY (q. v.).

BRA'SSARTS, the name of the pieces which, in plate-armor, protected the upper part of the arms, and united the shoulder and elbow pieces. Brachiale was the ancient name for brassarts. When the front of the arm only was shielded, the pieces were called demi-brassarts.

BRASSES (*sepulchral*), large plates of brass, or of the mixed metal called *latten* or *laton*, inlaid on slabs of stone, and usually forming part of the pavement of a church. The figure of the person intended to be commemorated was generally represented either by the form of the brass itself, or by lines engraven on it. Such, however, was not always the case, an ornamented or foliated cross, with other sacred emblems, being frequently substituted for the figure. Nor was the practice of imbedding them in the pavement uniform, as we sometimes find them elevated on what were called altar-tombs. It has been ascertained that the incised lines on these B. were originally filled up with some black resinous substance, and that in the case of armorial decorations, and the like, the field or background was often cut out by the chisel, and filled up with some species of coarse enamel, by which means the appropriate tinctures were produced. In England, the brass was usually of the form of the figure, the polished slab forming the ground, and the ornaments, arms, inscription, &c., were also inserted each as a separate piece. On the continent, where the metal was more abundant, the B. were one long unbroken surface, formed of plates soldered together, on which were engraved all the objects represented, the portions of the plate not so occupied being ornamented by elaborate flower-work. B. are known to have been used for monumental purposes from a very early period, though there are no existing traces of them in England previous to the middle of the 13th century. There is reason to think, that if not imported from France, they were at first executed by French artists. Latterly, the art took root in England, and English B., like English architecture, acquired a distinctive national character. The oldest complete specimen in England is that on the monument of Sir John d'Aubernoun, at Stoke Dabernon. The knight died in 1277, and it is probable that the brass was executed shortly after that date. Next in antiquity are those of Sir Roger de Trumpington, who died in 1289, and of Sir Richard de Buslingthorpe, 1290; the former at Trumpington in Cambridgeshire, the latter at Buslingthorpe in Lincolnshire. In addition to the interest which they possess from their age, these B. are remarkable as being still unsurpassed in the beauty of the workmanship and the spirit of the design.

As regards the earliest English B., it is further worthy of note, that they are so similar, both in design and execution, as to lead to the conjecture that they are the work of one artist; whilst from their differing in many respects from the B. which were executed on the continent at the same period, it would seem that this artist, if not an Englishman, at all events worked exclusively in this country. In the following century (1325), on the brass of Sir John de Creke, at Westley Waterless, in Cambridgeshire, the artist's mark is affixed by a stamp—a fact which has been regarded as a proof that his craft had attained to some importance, and that his services were pretty frequently called into requisition. But in this case, as in every other, with one exception, the name of the artist has perished. The exceptional case is that of the brass which once covered the tomb of Bishop Philip, in the church of the Jacobines at Evreux, in Normandy, where the inscription ended with the words, 'Guillaume de Plalli me fecit.' Many of the B. executed in England in the 14th c. are probably Flemish; and in the churches at Bruges some exist which appear to be by the same hand with others which are found in England. There can be little question, indeed, that for this, as for most of the other departments of the arts, which were afterwards successfully cultivated in England, we were indebted to continental artists. Nor will it surprise those who know the results of recent archæological investigations in similar subjects, to learn that the artists of France and Flanders in their turn were debtors to those of the worn-out empire of the East. As in painting, sculpture, and architecture itself, so in the art of working in brass, the sparks of antique genius which smouldered in Byzantium were the means of kindling those which afterwards burned so brightly in modern Europe. The taste for lingering

> Among the knightly brasses of the graves,
> And by the cold *hic jacets* of the dead,

has grown to something like a passion of late, and there are few subjects which have been more carefully illustrated than that of sepulchral brasses. References to most of the leading works, too numerous to be mentioned here, will be found in Parker's *Glossary of Architecture*, in an article in which their results have been carefully condensed. Of modern B., the most remarkable is that in the Cathedral of Cologne, engraved in 1837, as a monument to the late archbishop.

Inlaid brass Monument of Eleanor Bohun, Duchess of Gloucester. About 1400.

BRASSICA, a genus of plants of the natural order *Cruciferæ* (q. v.), distinguished by a round and tapering 2-valved pod (*silique*), of which the valves have each only one straight dorsal rib and no lateral veins, the seeds globose, in one row in each valve, and the cotyledons (q. v.) conduplicate (folded laterally). The species are chiefly natives of the temperate and colder regions of the old world; several are British plants. A number of species are very extensively cultivated, both in field and gardens, and are of great importance in an economical point of view, particularly the CABBAGE (q. v.), of which Kale, Borecole, Colewort, and different kinds of Greens, Savoy, Cauliflower, Broccoli, Brussels Sprouts, and Kohl Rabi are varieties; TURNIP (q. v.); RAPE (q. v.) (Colza, Cole-seed) and NAVEW (q. v.). Among the British species is one, called Isle of Man Cabbage, or Wallflower Cabbage (*B. monensis*), which differs from all these, and in some measure departs from the strict generic character, in having the valves of the pod 3-nerved, and one or two seeds in its beak. It has deeply pinnatifid leaves. It is found on the sandy shores of the west of Scotland, the Isle of Man, the north of Ireland, &c. Sheep and oxen are very fond of it, and it has been suggested that it might be profitably cultivated for feeding cattle. Its peculiar adaptation to sandy soils ought to recommend it to attention.

BRAUN, AUG. EMIL., an eminent archæologist, was born 19th of April 1809, at Gotha, in Germany. He studied at Göttingen and Munich, where he made the friendship of his teachers, Schelling and Gerhard; with the latter of these he went to Rome in 1833, and in a short time was made librarian, and subsequently secretary, to the Archæological Institute. He died at Rome, on the 12th September 1856. B. wrote many valuable works on art in German, Italian, and even English. Among these may be mentioned, *Il Giudizio di Paride* (Paris, 1838), *Kunstvorstellungen des geflügelten Dionysus* (Munich, 1839), *Griechische Mythologie* (Hamburg and Gotha, 1850), *Griechische Götterlehre* (Gotha, 1851—1855), *Vorschule der Kunstmythologie* (Gotha, 1854, with 100 copperplate engravings), translated into English by Mr. Grant; and an admirable guide-book, *Die Ruinen und Museen Roms* (Brunswick, 1854), translated into English, 1855. B. also executed numerous electrotype copies of ancient works of art.

BRAUNSBERG, a walled town of East Prussia, in the government of Königsberg, about 35 miles south-west of the city of that name. It is situated on the Passarge; contains a Catholic seminary and gymnasium; and has manufactories of woollen and linen, and a considerable trade in yarn, grain, ship-timber, &c. Pop. (1876) 10,796.

BRAUWER, or BROUWER, ADRIAN, a painter of the Flemish school, was born at Oudenarde (or as others say, at Haarlem) in 1608. He was apprenticed to the well-known artist Franz Hals, who made profitable use of his pupil's great talents; keeping him in a garret like a prisoner, and making him work almost night and day, in painting small pictures, which Hals sold at very good prices. By the advice of a fellow pupil, Adrian Van Ostade, young B. ran away from his hard taskmaster, and going to Amsterdam found, to his own astonishment, himself famous as a painter. He now worked for himself, and might soon have made a fortune; but his intemperance was so extreme, that, it is said, he would never apply himself to painting, while he could have credit or be supplied with liquor at a tavern. During the war in the Netherlands he went to Antwerp, where he was seized as a spy, and taken to the citadel. Here, to prove himself a painter, he executed a sketch of the guards who had him in their custody. This picture was shown to Rubens, who immediately exclaimed: 'That is the work of Brauwer! no other artist could treat the subject in that style.' B. was liberated through the interposition of Rubens, who gave him a lodging, supplied him with clothing and food, and in every way acted as a generous friend. But the sole return for all this kindness was, that B. secretly fled from the house of his patron, in order to renew his career of low dissipation. After visiting Paris, and failing to find work, he returned to Antwerp, where he died in the hospital (1640), and was interred, at the cost of Rubens, in the Carmelites' Church. All B.'s paintings are marked by power and harmony of coloring, and clearness of chiaroscuro. They are pervaded by a jovial humor, and betray the favorite haunts and associations of the painter.

BRA'VI, were those individuals in Italy, but especially in Venice, who undertook to perform any dangerous deeds for money. It is now employed chiefly to designate hired assassins. The Italians also gave the name of B. to those fanatics in the Turkish army, who, after maddening themselves by opium, rushed upon the ranks of the enemy, and so met death.

BRA'VO, 'Excellent!' 'Well done!' an Italian exclamation of praise, the superlative form of which is *Bravissimo!* It is commonly used in England without distinction of number or gender; but the Italians say *bravo!* to a male singer or actor, *brava!* to a lady, and *bravi!* to a company of actors or singers.

BRA'VO DEL NO'RTÉ, or RI'O GRA'NDÉ, the largest river in the Gulf of Mexico next to the Mississippi. It is politically important, as being throughout its whole course the boundary between Texas and Mexico; while physically its mouth may perhaps be regarded as that point on the coast where Central America, in its geographical aspect, begins to taper itself off towards the south. It rises in the Rocky Mountains, near lat. 38° N., and long. 106° 30' W.; and after a course of 1800 miles in a generally south-east direction, it enters the sea near lat. 25° N., and long. 97° W. The commercial value of the river is not great, for, besides being for the most part very shallow, it is here and there beset by rapids and sand-bars. Small steamers, however, have got up as far as Kingsbury's Rapids, about one-fourth of the entire length of the stream.

BRAVU'RA, an Italian word, in music applied to a composition as well as style of performance. As a composition, the B. is an air or song, with many difficult passages and divisions of notes, requiring great spirit and volubility of execution. The intention of merely astonishing by execution has brought this species of composition into undeserved discredit. The B. style first came from the Neapolitan school. Rossini, Bellini, &c., united the B. with the cantabile style; and instead of leaving the embellishments to the taste of the singer, wrote the whole of the notes in the music. The compositions of Mozart, Beethoven, &c., give abundant proofs of how they united true artistic merit with the B. style.

BRAWLING IN CHURCHES, in the law of England, is an offence against the public peace. This offence may generally be described as quarrelling or creating a disturbance in a church; therefore, mere quarrelsome words, which are neither an affray nor an offence in any other place, are penal here. It was enacted by 5 and 6 Edw. VI. c. 4, s. 3, that if any person shall, by words only, quarrel, chide, or brawl in a church or churchyard, he might be prohibited from entering the church; and persons assaulting others there might be excommunicated, or have an ear cut off and be branded in the cheek. But that statute was repealed in 1860 as regards laymen, and justices of the peace, under the statute 23 and 24 Vict. c. 32, now deal with riotous, violent, and indecent behavior in churchyards or in churches and dissenting chapels, by finding the offender £5, or committing him to prison for two months. This enactment protects all kinds of religious services, though the jurisdiction of the Ecclesiastical Courts continues to some purposes. Constables and church-wardens may immediately apprehend and remove the offender. Other regulations respecting the disturbance of a congregation, or molestation of a clergyman during divine service, will be found in the 1 Mary, c. 3 (1553), which, although the Roman Catholic origin and application, is still held to be the law for the protection of the Protestant Established Church. It enacts (section 2) that if any person or persons shall willingly and of purpose, by overt word or deed, molest or disquiet any preacher . . . . in any sermon, preaching, or collation, that he shall make in any church, chapel, *churchyard*, or in *any other* place or places, used or appointed to be preached in; or (section 3) if any person or persons shall molest a priest preparing or celebrating mass, 'or *other such* divine service, sacraments, or sacramentals as was most commonly frequented and used in the last year of the reign of the late sovereign lord, King Henry VIII., or that *at any time hereafter* shall be allowed, set forth, or authorized by the queen's majesty; or shall abuse the blessed sacrament—such person or persons shall be liable to be committed to gaol, there to remain without bail or mainprize for the space of three months then next ensuing; and further, to the next quarter-sessions, at which the persons so offending shall only be delivered and discharged out of prison upon sufficient sureties for their good behavior during one whole year. The act contains other regulations for the protection of the ministration of the church, and it saves the jurisdiction of the ecclesiastical law.

By another act, 1 Will. and Mary, c. 18, s. 18, passed in 1688, it is provided that if any person or persons shall disquiet or disturb any cathedral or parish church, chapel, or other congregation, or misuse any preacher or teacher, such person or persons may be committed to prison, and on conviction, be fined £20.

It remains to be added, that reviling church ordinances subjects to fine and imprisonment—and profaning the Christian religion, and depraving the Book of Common Prayer, are also subjects of penal legislation. See on this subject 1 Eliz. c. 2, and the 14 Chas. II. c. 4. See also BLASPHEMY and RELIGION, OFFENCES AGAINST, in which latter, the Scotch law on the subject of this article will be found stated.

BRAWN, a preparation of meat made from the head and belly-piece of a young pig, with the addition of ox-feet, to render it gelatinous. The whole is rolled up tight in sheet-tin, and boiled for four or five hours. The moisture is then well pressed out of it, and having been allowed to stand for some ten or twelve hours, the meat is put into cold salt and water, and is then fit for use. B. seems to have been a well-known dish as early at least as the latter part of the 15th c., for in Tyndale's version of the Book of Common Prayer, revised by Cranmer, and still in use, in the 70th verse of the 119th psalm, we find the words: 'Their heart is as fat as *brawn*.' The B. of Wiltshire is celebrated, and it is also a famous dish in Canterbury.

BRAXY, BRAXES, BRAXIT, BRACKS. These words are given as synonymous in Jamieson's *Dictionary*, indicating a disease in sheep. In the dialect of Angus, it is called braik and bracks. The derivation of the word is uncertain. The vague way in which the term braxy is used, renders it difficult to define the disease, for in different parts of the country, totally different disorders are included under this head. Of the two most generally recognized as braxy, the one is an intestinal affection attended with obstinate diarrhœa, the other is a blood disease, and the result of plethora or fulness of blood. The second, which is spoken of by the better informed shepherds as the true braxy, may best be described here.

Causes.—A very lean flock of sheep placed on rich food is very apt to be decimated by braxy. By rich food is meant more particularly these substances containing an abundance of nitrogenous principles, such as luxuriant heather, strong and succulent grass, the best turnips, &c. Hilly land is favorable to the production of braxy, from the firm nature and nutrient qualities of food growing on it. We find the disease in such situations in the winter season. About the month of November, many of the well-fed hogs placed on turnips died suddenly from braxy; and, again, when farmers resort to the forcing-system towards spring, the mortality is great, particularly when, in addition to much artificial food, sheep are allowed rich pasture. The mortality is greatest at the period of full moon, from the sheep grazing during the light nights as well as by day. The shepherd very frequently at these times finds one or two dead in the morning. Some assert that, in the winter, exposure induces braxy; and it is very possible that it may be produced by any sudden check to the exhalations, which tend so much to maintain the balance of the functions and purify the blood.

Symptoms.—The animal, in full health, suddenly ceases to eat, has a staring look, is peculiarly excitable, and separates itself from the flock. The head is lifted high, the breathing becomes labored,

the countenance appears anxious, and the animal loses the power of its limbs. It totters, falls over, is seized with convulsions, and dies within five or six hours, and often within an hour from the first symptoms of the disease.

Cadaveric appearances.—If the sheep's throat is cut before it dies, the absence of any peculiar appearances within the body is very remarkable: the flesh appears of a dark-red color, and the veins are charged with dark blood, but, on the whole, the body of the sheep looks so well that the mountain-shepherd cuts it up to make 'braxy mutton.' If the sheep is allowed to die of itself, the body soon swells, putrifies, and is rendered useless.

Treatment.—The prevention of the disease alone affords hope, and it consists in regulating the animal's diet, to prevent sudden transitions from low to rich keep; to mix food so as to modify the action of the more highly nitrogenized kinds; and to check the development of plethora or fulness of blood by saline purgatives and diuretics, such as Epsom and Glauber salts or nitre. The principles to be followed out in preventing this disease are precisely similar to those referred to under the head BLACK QUARTER in cattle. Shelter during severe winter weather is insisted on by shepherds as essential to prevent the malady.

Braxy mutton, above alluded to, is, as a general rule, not unwholesome; though in warm climates the same disease in sheep assumes a very malignant type, and indeed constitutes one of the carbuncular diseases. Though the flesh can be eaten with impunity in the mountains of Scotland, it is most dangerous and condemned in Southern Europe.

BRAY, a maritime town, situated partly in the county of Dublin, partly in that of Wicklow, 13 miles S.E. from Dublin, with which city it is connected by the Dublin, Kingstown, and Bray Railway, and the Dublin, Wicklow, and Wexford Railway. The pop. in 1861 was 4182, and in 1871 had risen to 6087, of whom 4562 were Roman Catholics, and 1315 Protestant Episcopalians; in 1881 the pop. was 6090. Some years since, B. was a small fishing-village; but the beauty of its situation has made it a popular watering-place, as well as a favorite position for villa residences; and under the enterprise of a few active speculators, it has not only grown in its dimensions, but the extensions have been carried out with excellent taste and spirit. The most striking buildings are the new hotels, and a Turkish bath, recently diverted to other purposes. The affairs of the municipality are administered by town commissioners. B. has a weekly newspaper.

BRAY, MRS. ANNA ELIZA, an authoress, is daughter of the late John Kempe, Esq., of the New Kent Road, Surrey, and was born towards the end of last century. At an early age, she showed much of the imaginative faculty, and a taste for design, which later brought her the acquaintance of the celebrated Mr. Stothard, R.A. From Stothard she took lessons in drawing; and in February, 1818, married his second son, Charles Alfred Stothard, also an artist, and author of a well-known work entitled *The Monumental Effigies of Great Britain, selected from our Cathedrals and Churches, &c.* In July 1818, she accompanied her husband to France. Their tour and residence in France lasted until about the middle of November in the same year; and Mrs. Stothard wrote an agreeable and lively account of her first foreign experiences, under the title of *Letters written during a Tour through Normandy, Brittany, and other parts of France, in* 1818, *with Numerous Engravings after Drawings by C. Stothard, F.S.A.* (Lond. 1820, 4to) Subsequently, Mrs. Stothard accompanied her husband on a similar tour in the Netherlands. In May 1821, however, she had the severe misfortune to lose her husband, who was killed by falling from a ladder. In 1823, Mrs. Stothard wrote a life of her husband, entitled *Memoirs, including Journals, Letters, Papers, and Antiquarian Tracts of the late C. A. Stothard, with Connective Notices of his Life, and some account of a Journey in the Netherlands.*

Distress of mind brought on ill health, and Mrs. Stothard suffered from an affection of the eyes, which obliged her to give up literary labor altogether for more than two years. In 1825, she married the Rev. E. A. Bray, vicar of Tavistock; and in the following year, published a historical romance entitled *De Foix*, which she had begun during her first husband's lifetime. The idea of this romance was conceived during the tour in Normandy; and similarly, that of her second romance, *The White Hoods*, during her tour in the Low Countries. This was published in 1828, and was followed by *The Protestant*, also in 1828: *Fitz of Fitz-Ford, a Legend of Devon* (1830); *The Talba, or Moor of Portugal* (1830); *Warleigh, or the Fatal Oak, a Legend of Devon* (1834); *Trelawny of Trelawne, or the Prophecy, a Legend of Cornwall* (1837); *Trials of the Heart* (1839); *Henry De Pomeroy* (1842); and *Courtenay of Walreddon, a Romance of the West* (1844). A collective edition of all these romances were published in ten volumes in 1845. Her letters to Southey were published, and reached a second edition in 1879. Mrs. B. who died in January 1883, was also the author of *The Borders of the Tamar and the Tavy* (1836), *The Mountains and Lakes of Switzerland* (1841), *Trials of Domestic Life* (3 vols. 1848), *Life of Thomas Stothard, R.A.* (1851), *A Peep at the Pixies* (1854), and *Händel, his Life, Personal and Professional, with Thoughts on Sacred Music* (1857). In July 1857, Mrs. B.'s husband died; and in 1859, she published his *Poetical Remains*. In 1870, appeared *The Good St. Louis and his Times*, and *The Revolt of the Protestants of the Cevennes*. In 1871 came *Hartland Forest: a Legend of North Devon;* in 1873, *Joan of Arc, and the Times of Charles VII., King of France;* and in 1874 *Roseteague.*

BRAYERA. See CUSSO.

BRAZI'L, the most extensive state of S. America. Towards the interior, it borders on all the other states of S. America except Chili and Buenos Ayres—on Uruguay, the Argentine Confederation, Paraguay, Bolivia, Peru, Ecuador, the U.S. of Colombia, Venezuela, and Guiana, English, Dutch, and French; while its sea-board, beginning about 200 miles to the north of the Amazon, and reaching to within the same distance of the Plata, projects into the Atlantic fully 1000 miles to the east of the direct line—pretty nearly a meridian—between the two extremes. This immense country extends between lat. 4° 30′ N. and 33° S., and between long. 35° and 70° W., being, in round numbers, 2600 miles long and 2500 broad. The area, according to official accounts, is 3,200,000 square miles. But B. was not always, in point of extent, what it is now.

The Portuguese, who, in 1500, accidentally discovered the south-east coast of the country (but that only after one of the Pinzons had, on behalf of Spain, followed the shores of the continent from its eastern angle to the mouth of the Orinoco), claimed all between the Plata and the Amazon. Soon, however, the Spaniards of Buenos Ayres, feeling that the complete command of their mighty river was to them a necessary of life, colonized the left bank by founding Monte Video. But nearly twenty years earlier, B. had acquired more territory on the Amazon than it was to abandon on the Plata, having, in 1509, wrested from France, then at war with Portugal, what may now be designated Brazilian Guiana. It was only in 1531 that the Portuguese, busy as they were in India, here planted their first settlement. In 1578, B. fell, along with Portugal itself, under the power of Spain—a connection which, besides being essentially detrimental, speedily threw it as a prey into the hands of the Dutch Republic; and though Portugal regained its own independence in 1640, it was not until 1654 that B. was entirely recovered from the Hollenders. Thenceforward, the colony entered on a new era. Supplanted, in a great measure, throughout the east by the Dutch, the mother-country was now directing most of its attention to its possessions on either side of the Atlantic. About a century and a half later, a still more beneficial change—and that, too, arising from the mother-country's own disasters—was inaugurated in the colony. In 1808, under the pressure of French invasion, the monarchy, in the persons of the royal family, was virtually transferred from Portugal to B., an event, which, doubtless through British counsels and influence, was immediately followed by the opening of the ports to foreigners. As a remoter benefit, too, of an incident which had no parallel either in English or in Spanish America, B., on shaking off, like its neighbors, the European yoke altogether, found a merely nominal revolution sufficient for its purpose, establishing, or rather accepting, an hereditary empire instead of restless and precarious republicanism; and ever since the transition-period of 1821—1825, this consolidated government, with subordinate institutions for local objects, has secured to B.'s twenty vast provinces comparative unity and peace. A war was undertaken in 1865, in concert with the Argentine Republic and Uruguay (formerly a province of B.) against Paraguay, which terminated in the defeat of the Paraguayans; and in 1872 Paraguay ceded to B., as a war-indemnity, the long disputed territory comprised between the Paraguay and the Paraná, north of the Apa and Igatim. This territory has an extent of about 16,000 square miles.

The executive authority is vested in the emperor, who, besides being aided by a council of state, must act through responsible ministers. The legislature consists of two chambers, which sit four months every year. Both the deputies and the senators, who must have annual incomes respectively of 800 milreis and 1600 are indirectly elected by voters who must possess 200 milreis per annum—the former for four years, and the latter for life. The senate, however, appears to represent the crown as well as the people, inasmuch as each constituency merely nominates three individuals for his majesty's choice of one. Justices of peace, also, are appointed by the respective communities; and in the courts generally, whether civil or criminal, there prevails trial by jury. The budget of 1882–83 gave a revenue of 127,483,000 milreis (£12,748,300), more than half of which comes from the heavy custom-duties, and about one-fifth from direct taxes; and an expenditure of 127,443,000 milreis; the public debt in 1882 was 818,574,800 milreis—nearly £82,000,000. The standing army is fixed at 3000 men on the peace-footing, and at 32,000 on the war-footing; and the standing naval force is 4000 men (8000 in time of

war). The navy in 1880 consisted of 57 vessels, including 39 steamers and 18 ironclads.

The population in 1872 amounted to 10,108,291 negroes, mulattos, and Europeans, besides about 1,000,000 aboriginal Indians, who are here proportionally fewer than in most parts of South America. Of the total population, 1,119,168 were slaves in 1880. The Africans continued to be imported till 1854, and their amalgamation with the Europeans produced perhaps the finest variety of the mulatto in the world. A law for the gradual emancipation of the slaves was passed in 1871. It enacts that henceforth the children born of slave women shall be 'considered of free condition,' but bound to serve the owners of their mothers for the term of 21 years, under the name of apprentices. Roman Catholicism is the prevailing religion. Notwithstanding the recent efforts of the legislature for the advancement of education, it is still very defective. In 1874, the attendance at the public schools was only 140,000.

But physically, as well as politically and socially, B. differs in many respects from most of the other divisions of the new continent. It knows nothing of the volcanoes and earthquakes of the Pacific coast; with winds blowing constantly from the Atlantic Ocean, it is exempted from those droughts which are always blighting one or other of the slopes of the Andes, the remoter slope in Peru and Chili, and the nearer in Buenos Ayres, and Patagonia; its mines, again, are as famous for gold and diamonds as those of the Western Cordilleras for silver. In its hydrography, B. contrasts unfavorably with the other divisions. While the Amazon and the Plata, the Mississippi and the St. Lawrence—not to mention countless rivers of inferior magnitude on both shores—are for the most part practicable almost to their sources, the streams of B., with the exception of the Amazon, are mostly impeded throughout by cataracts and shallows, thus counterbalancing, as it were, its matchless seaward facilities by the deficiencies of its inland communications. Further, the most navigable of these streams, instead of entering the open sea, mingle their waters with those of the Plata or of the Amazon—the Parana and the Uruguay joining the former, and the Madera, the Tapajos, the Zingu, and the Tocantins, the latter; and even among those that do send their tribute at once to the ocean, a similar direction is sometimes impressed by the dividing ridges—the San Francisco, for instance, by far the largest of them, running to the northward parallel with the south-east coast through 11° of lat., and leaving only 4° of long. for its remaining course to the Atlantic. A humid surface and a luxuriant vegetation conspire to render ordinary roads all but impossible. B. possessed, at the commencement of 1878, railways of a total length of 791 miles, and it has also a system of telegraphs, the lines at the same date being 3875 miles in extent. Telegraphic communication has been established between B. and Europe; the first message was despatched by the cable to Lisbon, June 23, 1874.

Among the mineral treasures, besides gold and diamonds already mentioned, iron of superior quality is abundant; and salt, also, is extensively produced in saline marshes by the alternate processes, according to the season, of inundation and evaporation. The productions of the soil, which are, of course, equally various and rich, will be more satisfactorily considered under the heads of the respective localities.

Suffice it to say, that the cotton is naturally excellent, and that the tea-plant of China has been introduced, but hitherto with indifferent success. The exports are necessarily different from the different sections. From the north, they are india-rubber, cotton, cocoa, sugar, and tobacco; from the south, coffee, hides, tallow, horns, &c.; and from the middle, drugs, diamonds, gold-dust, dyes, rice, manioc, tapioca, spirits, and rosewood. Their value in the last years of the decade, 1870–80 was close on £17,000,000 a year; that of the exports was between £20,000,000 and £22,000,000. More than half the value of the exports is for coffee. The imports from the United Kingdom in 1872–81 were valued at from £4,500,000 to £9,500,000 a year; the exports hence, from £5,560,000 to £7,550,000. The chief cities of B. are Rio de Janeiro (the capital), Para, Maranhão, Bahia, Pernambuco, and San Paulo in the interior.

BRAZIL CABBAGE, or CHOU CARAIBE (*Caladium sagittifolium*, or *Xanthosoma sagittifolia*), a plant of the natural order *Araceæ*, nearly allied to Cocco (q. v.), and very similar to it, although it differs in having arrow-shaped pointed leaves. It is supposed to be originally a native of tropical America, but is now in common cultivation throughout the whole tropics; not only the root being used for food like that of cocco, but also the leaves, boiled as greens. Both root and leaves are almost entirely destitute of the acridity so generally characteristic of the order.

BRAZI'L NUTS are the seeds of the *Bertholletia excelsa*, a majestic and beautiful tree of the natural order *Lecythidaceæ* (q. v.). The tree grows to the height of 100 or 120 feet, and abounds on the banks of the Orinoco and in the northern parts of Brazil. It produces a round woody pericarp or seed-vessel, almost as large as a man's head, within which are many of the seeds or nuts. The pericarp is very heavy and solid, requiring a blow of a sledge-hammer to break it; and at the time when this great fruit is ready to fall, it is dangerous to walk under the tree. The seeds, which are popularly called nuts, and much resemble fruits of that description, are wrinkled and triangular, having a hard shell and a pure white kernel, which, when fresh, is very agreeable. They are chiefly exported from Para and French Guiana, and are well known in our shops. They yield a large quantity of oil, which is good for burning.

The nuts or seeds of the *Lecythis ollaris*, or POT TREE, are produced in a pericarp which resembles a rusty iron pot with a lid, the lid dropping off and letting the seeds out, which are oblong,

Brazil Nut:
a, the fruit; *b*, the same, with half of the pericarp removed to show the nuts or seeds; *c*, a single seed or nut; *d*, a nut cut across; *e*, a kernal of a nut; *f*, the central placenta, to the lower end of which the nuts are attached in the pericarp; *g*, a leaf.

grooved, and esteemed of a very superior quality to the common B. N.; but they have not yet become an article of commerce, as the tree grows chiefly in the interior parts of the country, from which the nuts are only occasionally sent to the coast.

BRAZI'L WOOD, a dark-red or yellowish-brown dye-wood, which forms a considerable article of export from Brazil, where some of the trees which yield it are very abundant. It is the prod-

Brazil Wood:
a, a branch with leaves and flowers; *b*, a pod.

uce of different species of *Cæsalpinia* (q. v.). The best kinds are those called Pernambuco Wood, All Saints' Wood, and St. Martha Wood. Much of the B. W. of commerce is obtained from *Cæsalpinia Brasiliensis*, a tree which is a native of the West Indies,

commonly growing in dry places and among rocks, and seldom exceeding 30 feet in height. It has bipinnate leaves, with many smooth, obtuse, oblong leaflets, and no terminal leaflets flowers in pannicles, with downy stalks. The heart-wood alone is of any value. —PERNAMBUCO WOOD is the produce of *Cæsalpinia echinata*, a prickly tree, with prickly pods, and of which the red and yellow flowers have a delicious smell, resembling that of the lily of the valley. The sap-wood is extremely thick, and the valuable heart-wood bears a small proportion to the whole diameter of the stem. —The Sappan Wood (q. v.) of the East Indies nearly approaches B. W. in quality. It is the produce of *Cæsalpinia Sappan*, a small thorny tree.—The BRAZILETTO WOOD, sometimes also called B. W., which is brought from the Antilles, is much inferior. *Cæsalpinia crista*, probably yields some of the inferior West Indian Brazil-Wood.—It is a curious circumstance, that B. W. is said not to take its name from Brazil, but to be mentioned under the name *Braxilis* in documents much older than the discovery of America, the Sappan Wood of the East Indies being probably intended, and the name of Brazil has even been supposed to be derived from that of this product of its soil.

When freshly cut, the color of B. W. is yellow; but when exposed to air, moisture, and light, it becomes red, and is generally sent into market ground down to the size of ordinary saw-dust. When treated with water, alcohol, or ether, the weathered B. W. readily yields up its red coloring matter, called *Brazéléin*. The latter is supposed to be produced from the oxidation of a colorless substance called *Brazilin*, which exists in the original yellow wood of the tree. Strong decoctions of B. W. are used by the dyer and calico-printer in the fabrication of reds, browns, &c.; it is also used in the manufacture of red ink. See INK.

BRAZI'LIAN GRASS, an incorrect popular name applied to a substance used in the manufacture of a very cheap kind of hats, known as B. G. hats, and also as *chip* hats. It consists of stripes of the leaves of a palm, *Chamærops argentea*, which are imported into Britain for this manufacture, and chiefly from Cuba. See CHAMÆROPS.

BRAZI'LIAN PLUM. See HOG PLUM.

BRAZING, or BRASS SOLDERING, is the process of uniting together two pieces of brass, two pieces of copper, or one of each, by means of a hard solder, partaking more or less of the composition and properties of ordinary *brass*. The edges or parts of metal to be joined are first filed bright, so as to be thoroughly clean, then there is strewed over the gap or crevice a mixture of the solder and borax. The solder employed varies in composition according to the kind of work, and may be rendered more fusible by the addition of a larger amount of zinc, but the general proportions are (1) 16 copper, 16 zinc, and 1 tin; (2) 12 brass, 4 zinc, and 3 tin; or (3) 18 brass, 3 zinc, and 2 tin. When the whole has been fused together, it is allowed to cool, and is then filed down to a coarse powder, in which state it is used. The borax is employed to form a glaze over the brightened surfaces, and thus prevent the oxidation of the metal, which would seriously interfere with B., and even stop the operation. An outward coating or layer of charcoal is likewise serviceable in the exclusion of the air during the B. of large pieces of metal. Where a very high heat is required in the process, a little powdered glass is mixed with the borax. The mixture of solder and borax may be applied dry, but it is better to moisten it with water, and to lay it on the filed surfaces with a spoon.

The whole is then gently heated, when the water evaporates and leaves a crust of borax and solder. The work may now be strongly heated before the blow-pipe, or over a clear fire, and at a bright red heat the solder fuses and the zinc begins to burn with a pale-blue flame. At this stage, the solder *flushes* or becomes liquid enough to permeate the joint or crevice; but should it be tardy in acting thus, several slight taps will insure the proper result. The whole is now cooled, and towards the close, the articles may be introduced into cold water for more rapid reduction in temperature. Pieces of metal which have undergone the process of B. are so firmly united that they may be rolled and re-rolled without the parts yielding. See SOLDER.

BR'AZOS DE DI'OS, a river of Texas, North America, the second, if not the first, in magnitude that flows within the state. It runs towards the south-east, rising in the table-land of Bexar County, and falling into the Gulf of Mexico about 40 miles to the south-west of Galveston. With a course of about 900 miles it is navigable at all times to a distance of 40 miles from its mouth, and at certain seasons to a distance of 300 miles. The valley of the river, the lower half being merely an alluvial plain, presents extensive forests, interspersed with plantations of maize, sugar, and cotton.

BRA'ZZA, an island in the Adriatic, belonging to Dalmatia, Austria, in lat. 43°—44° N., and long. 16°—17° E. It has an area of about 170 square miles, and a population of 16,000; and is separated from the mainland by a channel of some 8 or 10 miles in breadth. Its surface is mountainous, and extensively wooded; vines, yielding excellent wine, are grown in the valleys, and figs, saffron, almonds, and oil are produced in considerable quantities, but not much grain is raised. Bees and silk-worms are reared in large numbers. B. is also celebrated for its cheese, and the delicacy of the flesh of its lambs and kids. Excellent building-stone, which is largely exported, is found in the east part of the island. St. Pietro di Brazza is the chief town.

BREACH, in siege-works, is a gap in any of the defensive walls or gates of a city; and *breaching* is the operation by which the gap is produced by the guns of the besiegers. *Breaching batteries* are employed, consisting of several pieces of ordnance, so chosen as to kind and size, and so placed as to distance, as to burst a hole through the defences in the shortest practicable time.

The greatest effect is produced by lodging the balls in two vertical lines, from the parapet of the wall downwards, and in a horizontal line, connecting the lower ends of those vertical lines; and then overturning the mass of material thus loosened by an irresistible salvo or volley. When a hole has once been made, by thus knocking away the masonry or earthwork, the breaching is continued until the crumbling mass has so accumulated as to form a practicable slope, up which the storming-party of the besiegers may run. See ASSAULT. During the Peninsular war there were some formidable examples of breaching. At Badajoz, 14,000 shot brought down 180 feet of wall in 104 hours, from a distance of 450 yards. At Ciudad Rodrigo, 6700 balls brought down 105 feet of wall in 32 hours, from a distance of 560 yards. At St. Sebastian, 13,000 shot brought down 100 feet of wall in 62 days, from a distance of 620 yards. It was calculated, from these and other instances, that 10,000 24-lb. shot, or 240,000 lb. of iron, will breach 100 feet of wall from a distance of 500 yards—the wall being of fair average masonry, and the height and thickness a fair average of those used in fortified towns. It must be remembered, however, that this estimate was made before the days of rifled cannon and Armstrong guns; and, on the other hand, that the walls adverted to were not constructed of granite.

BREACH, in law, signifies a breaking or violation of a right or of an obligation or engagement legally binding; and in this sense it has numerous applications, of which the following are those more particularly treated in law-books:

BREACH OF ARRESTMENT, in the practice of the Scotch law, is the disregard or violation of the process of arrestment, or attachment, by the arrestee, or party in possession of the arrested or attached property, but who, notwithstanding, pays the sums or delivers the goods arrested; and such B. is viewed by the courts as a contempt. But at present the only consequence of the B. is, that the person guilty of it, where it is a question as to *money*, is liable in damages to the extent of the funds paid away, and the costs. Where goods are arrested, and the arrestment is removed on bail (or 'loosed on caution,' as the Scotch lawyers say), if the goods themselves cannot be recovered, or their value cannot be clearly ascertained, the surety or 'cautioner' is held to be liable for the original debt. See ARRESTMENT. In England, the disputing or disobeying a rule or order by a judge for attachment of a debt very nearly means the same thing. See ATTACHMENT, GARNISHEE.

BREACH OF CLOSE is a trespass by which an unwarrantable entry is made on another man's land for satisfaction of which injury an action will lie to recover damages. It is called a trespass for breaking a man's *close*, because every man's land is, in the eye of the law, enclosed and set apart from his neighbors; and that either by a visible and material fence, as one field is divided from another by a hedge; or by an invisible boundary, existing only in the contemplation of the law, as when one man's land adjoins to another's in the same field. The liability to this injury attaches not only to the party himself trespassing, but also to trespass by his cattle. And the law gives the party injured a double remedy in this case, by permitting him to distrain the cattle till the owner small make satisfaction, or else by leaving him to the ordinary remedy by action for the damage done.

But in some cases this trespass is justifiable; as where it is done in exercise of a right of way, a right of common, or the like; or where a man comes to demand or pay money payable on the particular land; or to execute, in a legal manner, the process of the law; or by the license of the plaintiff himself. Also, a man may justify entering into an inn or public-house without the leave of the owner first specially asked; because when a man professes the keeping of such an inn or public-house, he thereby gives a general license to any person to enter his doors. So a landlord may justify entering to distrain for rent; and a reversioner to see if any waste be committed on the estate, for the apparent necessity of the thing; and it has been held that the common law warrants the hunting of ravenous beasts of prey, as badgers and foxes, in another man's land, if no greater damage be done than is necessary, because the destroying such creatures is said to be profitable to the public. But in cases where a man misdemeans himself, or

makes an ill use of the authority with which the law intrusts him, he is accounted a trespasser *ab initio;* as if one comes into a tavern, and will not go out in a reasonable time, but remains there all night, contrary to the inclinations of the owner; such wrongful act is held to affect and have relation back even to his first entry, and make the whole a trespass. But a bare nonfeasance, as not paying for the wine he calls for, will not make him a trespasser, for this is only a B. of contract. See Blackstone and Stephen's *Com.* respecting 'civil injuries.'

In the Scotch law, the term *close* is not used, and not known—but there any violation of a right of property in land may be redressed by legal process, and in many cases form the ground of an action for the recovery of damages. See CLOSE. The term *Inclosure*, in Scotch law, has a different meaning, although the penalties for breaking such inclosure are somewhat analogous to those for breach of Close. See below, BREAKING INCLOSURE, and see TRESPASS.

BREACH OF COVENANT is one of those civil injuries by which is meant a violation of a covenant or agreement contained in a deed of conveyance, either to do or omit to do something, and which B. gives a right of action against the party who made the covenant and his representatives. See COVENANT.

BREACH OF CONTRACT is a general description of injury, by which is understood the violation of any contract or legal engagement, and for which, at law, damages may be recovered, according to the nature of the breach and character of the contract. In 1854, jurisdiction was conferred upon the courts of common law, by which a plaintiff can compel a defendant to fulfil any actual duty. But till the constitution of the new High Court of the Justice in 1873, it was only in the courts of equity that complete relief was given by enforcing the specific performance of contracts. See CONTRACT; DAMAGES; SPECIFIC PERFORMANCE; EQUITY, COURTS OF; CHANCERY, COURT OF.

In Scotland, although there is no distinction between law and equity, the remedy for this injury is very much the same. The party wronged may either conclude for damages, or *ad factum prestandum*, or for both of these remedies.

BREACH OF DUTY, may be legally defined as either the non-execution of an office, or the performance of it in such a way that the conditions on which it was undertaken are violated. Such misconduct may either violate the conditions of an express contract, or it may be equally opposed and do equal violence to any implied engagement or *assumpsit*, as it is technically called in the law of England, not from the express determination of any court or the positive directions of any statute, but from natural reason and the just construction of law, which assumes and intends that every man has engaged what his duty or justice requires at his hands. And he must do this with integrity, diligence, and skill; for if by his neglect injury accrues to individuals, they have their remedy against him in damages. See CONTRACT, DUTY, OBLIGATION, DAMAGES, EQUITY, PERFORMANCE OF CONTRACTS.

BREACH OF THE PEACE is an offence against the public tranquillity and safety, and is either felonious or not felonious. But the law on this subject will be best considered under PEACE, OFFENCES AGAINST THE PUBLIC.

BREACH OF POUND is an indictable offence, and means the breaking any *Pound* (q. v.), or place where cattle or goods distrained are deposited, in order to rescue them. When once impounded, such goods or cattle are understood to be in the custody of the law, and an action for treble damages will lie for illegally taking them out of pound upon a distress for rent. Further, it is enacted by the 6 and 7 Vict. c. 30, that if any person shall release, or attempt to release, cattle lawfully seized by way of such distress, from the pound or place where they shall be impounded, or on the way to or from such pound or place, or shall destroy such pound—he shall be liable to a penalty not exceeding £5, and in default may be committed to the house of correction. See Stephen's *Com.*, vol. iii., and see DISTRAIN, DISTRESS, POUND.

BREACH OF PROMISE TO MARRY. See PROMISE and MARRIAGE.

BERACH OF TRUST. See TRUST.

BREAD. The earliest and most primitive way of making B. was to soak the grain in water, subject it to pressure, and then dry it by natural or artificial heat. An improvement upon this, was to pound or *bray* the grain in a mortar, or between two flat stones, before moistening and heating, and from this *braying* operation some etymologists propose to derive the word *bread* (as if *brayed*). A rather more elaborate bruising or grinding of the grain leads to such simple forms of bread as the *oat-cakes* of Scotland, which are prepared by moistening oatmeal (coarsely bruised oats) with water containing some common salt, kneading with the hands upon a baking-board, rolling the mass into a thin sheet, and ultimately heating before a good fire, or on an iron plate, called a girdle, which is suspended above the fire. In a similar manner, the barley-meal and pease-meal *bannocks* of Scotland are prepared; and in the East Indies (especially the Punjab and Afghanistan), as well as in Scotland, flour is kneaded with water, and rolled into thin sheets, as *scones*. The *passover cakes* of the Israelites were also prepared in this way. A similar preparation of wheat-flour, but where the sheet of dough is made much thicker, forms the *dampers* of Australia.

The Indian corn-meal, kneaded with water and fired, affords the *corn-bread* of America. The kinds of B. referred to above are designated *unleavened*, as no leaven has been added to the dough to excite fermentation. Even in the time of Moses, however, *leaven* was employed in making bread. It is held probable that the Egyptians were the first to use leaven; that the secret afterwards became known to the Greeks; and that the Greeks communicated the process to the Romans, who spread the invention far and wide in the northern countries during their campaigns.

The grain of wheat is generally employed in the manufacture of B. among the better classes, and more advanced nations, though rye, barley, Indian corn, and rice are also extensively used. The average composition of the grain of wheat when dried, so as to evaporate about 14 per cent- of moisture, is

Gluten and albumen	13½
Starch	54½
Gum, sugar, oil, and fibre	30
Saline matter	2

The proportion of these ingrediants varies, however; and though the native country of wheat is unknown, yet it is found that, within the wheat zone (see WHEAT), the quality improves as we travel south. Thus, Scotch wheat is inferior to English, the latter to French, that to the Italian; and the finest wheat in the world is grown in Barbary and Egypt. The principal constiutents of wheat may be separated from each other without much difficulty. Thus, if wheat-flour be placed in a cloth-bag with the mouth well closed, and the whole introdnced into a basin of water and pressed by the fingers for some time, the starch is squeezed through the cloth as a fine white powder, and the gluten is left in the cloth as a viscid or sticky substance. Again, if wheat-flour be burned on a porcelain plate on a fire, or oven, or gas-lamp, till it can burn no longer, it leaves behind a small amount of ash or saline matter.

Previous to being employed in the fabrication of B., the grain of wheat undergoes the process of *grindiug*, with the double object of reducing it to a fine state of division, and separating the more hard and indigestible parts. See MILL. During the grinding operations, the wheat, as it passes from grain to flour nearly doubles its bulk. The products come from the dressing-machime divided into different qualities, a qnarter of wheat yielding—

	Bushels.	Pecks.
Fine flour	5	3
Second flour	0	2
Fine middlings	0	1
Coarse middlings	0	0½
Bran	3	0
Twentypenny	3	0
Pollard	2	0
	14	2½

In the making of bread in Great Britain, the finest flour is employed in making *firsts* or *the fine 4-lb. loaf;* a coarser flour is made into *seconds* or household B.; and a still coarser into *thirds* or coarse bread. There is no bran in *firsts*, but a greater or less proportion of the finer bran in *seconds* and *thirds*. In the making of good B. three things are absolutely requisite: flour or meal, yeast or leaven, and water containing salt. The yeast (q. v.) or leaven (q. v.), is added to give a start to the fermentation (q. v.) process, thereby supplying carbonic acid, which communicates a spongy or light texture to the bread. Leaven is the more primitive ferment, and is simply a portion of moistened flour or dough in which the putrefactive agencies have begun to work. It may be procured by allowing moistened flour to lie in a warm apartment (summer heat) for six or eight days, and when sufficiently formed has an acid taste and reaction, and a somewhat fusty odor. When brought into contact with a new portion of flour and water, and incorporated therewith by kneading, it very quickly acts as a ferment, and develops partial fermentation in the whole. Hence it is that where leaven is used, it is customary to retain a portion of the leavened dough for the next baking. On the continent, leaven is still very extensively employed, especially in districts far from breweries. In Britain, yeast is generally used as the ferment.

The materials being at hand, and the proper benches, utensils, and oven being within reach, the baker takes a quantity of water and adds to it the yeast and salt; after which the flour is added, and the whole thoroughly and laboriously kneaded together till it assumes a ropy consistence. It is then called the *sponge*, and is placed in a kneading-trough in a warm place, which is styled *setting the sponge*. In a short time, the yeast begins to act on the gluten, starch, and sugar of the flour, compelling the latter to pass into alcohol and carbonic acid gas in every part of the dough,

which thereby becomes inflated with innumerable air cavities. When the fermentation has sufficiently advanced, the baker takes the sponge, adds more flour, water, and salt, and a second time subjects the whole to a thorough process of kneading, to prevent portions being so far fermented as to become *sad*, and again allows the mass to lie in a warm place for a few hours. The dough swells considerably from distension by gas, and is weighed out into lumps of the proper size, which are shaped into loaves, constituting the *batch*, or placed in tin pans, and are allowed to lie for a short time till they get further distended.

The oven has been previously been heated by flues, by heated air, or by wood being burned within it, to a temperature of at least 320° F., which is the lowest temperature at which B. can be baked, and ranging up to 572° F.; and when it has been thoroughly cleaned out, the loaves are introduced and placed on the floor, and the oven shut up. The heat acts in dissipating much of the water from the dough, in distending the air cavities more fully, and in partially *boiling* the starch and gluten of the dough, and developing some gum from the starch. Indeed, though the temperature of the oven is much higher, yet the loaves beyond the mere crust are bathed in an atmosphere of steam, and are never heated above 212°, as has been proved by direct experiments with the thermometer. One effect of the heat is to arrest any further fermentation (q. v.; see also YEAST). After several hours' baking in the oven, the length of time being determined by the temperature, the loaves are withdrawn, and allowed to cool. The brown appearance of the crust of loaves, and the pleasant taste of the crusts, are due to the action of the heat on the starch and the formation of dextrine (q. v.), a sort of gum. The number of quartern (4 lb.) loaves which a sack of flour weighing 280 lbs. yields, is 90. It will be apparent, therefore, that as 280 lbs. of flour yield 360 lbs. of B., that a good deal more water must be present in the latter than in the former ; and, indeed, ordinary good wheaten B. contains about 45 per cent. of water. This water is retained even after the loaf is apparently dry, and even mealy, as the gum and gluten have a great affinity for water.

Improvements in the process of making B. are occasionally effected. Thus a form of yeast, called German barm or yeast (q. v.), has been introduced, which is more cleanly than ordinary yeast or leaven, but appears to be too rapid in its power of causing fermentation to be manipulated easily in the making of ordinary loaves, though it does well for pan-loaves and fancy B. in general. Ovens heated by flues are being constructed, instead of the primitive method of heating them by wood, which smokes the whole oven.

Instead of raising the dough by the action of yeast, which decomposes a part of the flour and causes the loss of about 2 per cent., bicarbonate of soda and hydrochloric acid are sometimes employed. The proportion by this process are 4 lbs. of flour intimately mixed with 320 grains of bicarbonate of soda; to this is added a mixture of 300 grains of common salt in 35 ounces of water and 6½ fluid drachms of hydrochloric acid, sp. gr. 1·16, and the whole is kneaded and placed in the oven. When the mixture is made, the acid acts on the bicarbonate of soda, forming common salt, which is left in the dough, and carbonic acid is liberated at every point, and communicates a spongy texture to the dough. The disadvantage attended on this mode of raising the dough is, that it is apt to leave too much common salt in the B. This is obviated by using water charged with carbonic acid, as described under AERATED BREAD. Sesquicarbonate of ammonia is employed to some extent in the preparation of rusks, ginger B., and other light fancy B.; when heated, it entirely passes into gas, and thus yields a very spongy mass. *Short-bread* is prepared from flour which has been incorporated with butter. See UNFERMENTED BREAD.

The appearance which good wheaten B. ought to present, is that of a vesicular or spongy mass, from which layers can be readily detached; and this, known to bakers as *piled B.*, is the best index of good wholesome and easily digested bread. When the layers cannot be detached, and the loaf cannot be crumbled down by the fingers into a coarse powder, or the fragments be thoroughly soaked and be readily diffused through water, but become a permanent tough mass of dough, the B. is imperfectly made.

Rye B. is very extensively used in northern European countries, where the soil being sandy is admirably adapted for the growth of that grain. It yields a flour darker than wheat-flour. It is almost equal in nutritive value to wheaten-bread. Barley and oats, which when used as B. are generally made into cakes or bannocks, possess also a composition not unlike wheat. Indian corn, which thrives luxuriantly on the American soil, and is largely used there for B., as also to a considerable extent in the Old World, is little different from wheat in the proportion of its ingredients. Rice is occasionally employed in making B., but it is not nearly so nutritious as wheat.

But although, with the exception of rice, the various kinds of grain do not sensibly differ in the amount of nutritious matter contained in the meal, yet there is a great difference as to the quality of yielding a light, spongy bread. In this respect, the flour of wheat excels all others. This quality seems to depend upon the mechanical structure of the gluten of wheat, which gives a glutinous, sticky consistency to the dough, rendering it impervious to the carbonic acid gas formed in it during the fermentation, so that the gas thus imprisoned swells it up. The meal of other grains forms a more granular and less tenacious dough, which allows the gas to escape with more or less ease as it is formed. It is thus impossible to make a light, spongy loaf of oatmeal, however finely it might be ground. In the case of whole-meal B. or brown B., the rough, hard particles of the bran interfere with the ordinary tenacious quality of wheaten-flour, and make the dough slightly porous, so that much of the gas escapes, and thus this kind of B. is never so much raised as B. of fine flour.

BROWN, COMPOSITION, or WHOLE FLOUR B. is made from the ground but undressed wheat, and therefore contains the bran as well as the flour. Some years ago it was suggested, that as the bran contained more nitrogenized matter than the flour, the whole meal must be more nutritious than the finer flour alone. But that opinion is now considerably modified: for while it is true that the whole meal (bran and fine flour) contains chemically more nutritive matter than the fine flour alone, yet the gritty particles that are present in the former, cause an unnatural irritation in the alimentary canal, and lead to a quicker evacuation of the but partially digested and absorbed food. This explains why brown B. possesses laxative properties, and why laborers fed on it consider that it makes them hungry soon again; they feel that it does not last in the stomach, and consequently think it has little nourishment in it.

The *adulterations* of B. are various. Very commonly boiled potatoes are added to the flour and water in the making of the dough, and some consider that this yields a lighter and more palatable bread. It must be remembered, however, that the addition of any substance of a nature foreign to the composition of any material is an adulteration (see next article); and that though potatoes may be supposed to improve the B., yet good B. can be made without them, and the addition of the potatoes lessens the nutritive value of the wheat-flour.

Alum is occasionally added to the dough, to increase the whiteness and improve the general texture of the B.; and this it appears to do by arresting the passage of the starch into gum and sugar, which tends to take place during the process of baking. In Belgium, sulphate of copper is often used for a similar purpose, but it is not employed in this country. All such admixtures are destructive of the nutritive value of a certain part of the B., and are injurious to the animal system. For the nutritive qualities of B. see NUTRITION and FOOD, and for biscuit-bread, see BISCUIT.

The *law* on the subject of bread, so far as relates to England and Scotland, is regulated by a local act for London, the 3 Geo. IV. c. 106, the provisions of which are imitated by a general act for the country, the 6 and 7 Will. IV. c. 37. These provisions are as follow : B. may be made of flour or meal of wheat, barley, rye, oats, buckwheat, Indian corn, pease, beans, rice, or potatoes, or any of them, or with any common salt, pure water, eggs, milk, barm, leaven, potato or other yeast, and mixed in such proportions as bakers may think fit, and with no other ingredient or matter whatsoever; and with the exception of French or fancy B. and rolls, the B. so made must be sold by weight, and in no other manner. It has been settled by many recent cases that bakers must weigh the bread before selling it, whether asked by the customer or not to do so. For this purpose, they must provide in their shops, on or near the counter, a beam and scales, with proper weights, or other sufficient balance, in order that the same may be weighed in the presence of purchasers—a regulation that also applies to delivery of B. by cart or other conveyance, it being directed that the scales and weights shall be constantly carried in the cart or other conveyance, under a penalty, in either case, not exceeding £5. From this regulation, however, fancy B., or French B., or rolls, are also excepted. The act further provides that B. made of mixed meal or flour—that is, B. made wholly or partially of pease, or beans, or potatoes, or of any sort of corn or grain other than wheat—shall be marked with the large Roman letter 'M,' under a penalty, in case this rule be neglected, of a sum not exceeding 10*s*. for every pound weight of such mixed B. sold, and so on in proportion for any less quantity. From this regulation, however, is excepted B. made of the meal or flour of wheat, in the making of which potato-yeast shall be used.

The following are the enactments against the adulteration of B.: 1. No baker shall, in the making of B. for sale, use any mixture or ingredient whatsoever other than those above mentioned, under a penalty for every offence not exceeding £10, or less than £5, with the alternative of imprisonment, with or without hard labor, for any time not exceeding six calendar months; for the offender's name, place of abode, and offence may be published in the local newspapers. 2. Any person adultering corn-meal or flour,

by the introduction of any ingredient not being the real produce of the corn or grain; or any person selling meal or flour of one sort of corn or grain as the meal or flour of another sort, whether separate or mixed, shall forfeit and pay, according to the discretion of the magistrates or justice, a sum not exceeding £20, nor less than £5. 3. Magistrates or justices of the peace, and also peace-officers authorized by warrant, may, at seasonable times in the daytime, enter a baker's premises, and search for adulterated flour or B.; and if any be found, the same may be seized, and carried with all convenient speed to the nearest resident magistrate or justice of the peace, to be disposed of as he may think proper, the penalties varying from £2 to £10, with alternative imprisonment for six months; the offenders' names may also be published. Parties obstructing such search of bakers' premises, or upon the occasion of the search, carrying away the adulterated flour or B., are liable to a penalty not exceeding £10. Should it, however, appear that any offence against the act shall have been occasioned by the wilful act or neglect of the baker's journeyman or other servant, the magistrate may issue his warrant for bringing such servant before him, and, on conviction, may adjudge him to pay a reasonable sum to his master, by way of recompense. The Adulteration of Food Act gives a more efficient mode of prosecuting these offences, and exposing them when detected.

The act further provides that bakers shall not bake bread, rolls, or cakes on the Lord's Day; or, on any part of that day, after half-past one o'clock in the afternoon, sell such bread, rolls, or cakes; or bake meat, pies, or other victuals; or in any other manner exercise the trade of a baker, save and except so far as may be necessary by way of preparation for the following day's baking. For a first offence against this regulation, a penalty of 10*s.* shall be paid; for a second offence, 20*s.*; and for a third and every subsequent offence, respectively, the penalty of 40*s.*, together with the costs of prosecution, a portion of the penalty to be paid to the prosecutor, and the residue to be applied towards the poor-rate of the place. This regulation as to Sundays does not extend to Scotland.

The law of Ireland on the subject of this article is contained in several acts of the Irish parliament, the leading provisions of which are similar to the above.

BREAD, Army. In camps and in barracks of any size, the bread for the army is baked on the spot by bakers of the supply sub-department of control organization. Though perhaps a little rough in its manufacture, the article supplied is made from the best ingredients, and is genuine and wholesome. On a march, the control bakeries supply bread at the several halting-places. In smaller barracks, bread has to be obtained by contract, but the most vigorous supervision is exercised to secure proper quality. Formerly, army bread was notoriously bad. A contractor would sometimes send in a tender so low, in order to obtain the contract, that he could not possibly make good bread at a profit; and then he relied on small fees paid him by the soldiers as a means of obtaining better. This discreditable state of things was ascertained by a committee of inquiry some years ago; it was found that the average of army bread was not equal in quality to that of workhouse bread. Steps were forthwith taken to remedy the evil; experiments were made to determine whether troops could bake their own bread in the field, and the result was the adoption of the present system of army baking. With the improvement of the bread, a visible amelioration in the health of the soldiers has taken place.

BREA'D-FRUIT TREE (*Artocarpus incisa*), a tree of the natural order *Artocarpaceæ* (q. v.), a native of the islands of the Pacific Ocean and of the Indian Archipelago—one of the most important gifts of nature to the inhabitants of these regions, its fruit supplying the principal part of their food, and its inner bark a considerable part of their clothing, whilst its timber and its milky juice are also employed for economical purposes. The genus to which it belongs (*Artocarpus*, Gr., Bread-fruit) is distinguished by having the male flowers in catkins, with a 2-leaved perianth and one stamen; the female flowers naked; the fruit roundish, fleshy, and tuberculated. The B. T. is a rather slender tree, of 40—50 feet high, often rising almost half its height without a branch. It has large, pinnatifid leaves, frequently 12—18 inches long, dark green, and glossy. The fruit is generally oval, or nearly spherical, and about the size of a child's head. It is a *sorosis*, a compound or aggregate fruit formed from numerous flowers on a common axis, and is covered with a roughish rind, which is marked with small square or lozenge-shaped divisions, having each a small elevation in the center; is at first green; when imperfectly ripened, brown; and when fully ripe, assumes a rich yellow hue.

It is attached to the small branches of the tree by a short thick stalk, and hangs either singly or in clusters of two or three together. It contains a somewhat fibrous pulp, which, when ripe, becomes juicy and yellow, but has then a rotten taste. At an earlier stage, when the fruit is gathered for use, the pulp is white and mealy, and of a consistence resembling that of new bread. In a still less mature state, the fruit contains a tenacious white milk. The common practice in the South Sea Islands is to cut each fruit into three or four pieces, and take out the core; then to place heated stones in the bottom of a hole dug in the earth; to cover them with green leaves, and upon this to place a layer of the fruit, then stones, leaves, and fruit alternately, till the hole is nearly filled, when leaves and earth to the depth of several inches are spread over all. In rather more than half an hour, the bread-fruit is ready; 'the outsides are, in general, nicely browned, and the inner part presents a white or yellowish cellular pulpy substance, in appearance slightly resembling the crumb of a wheaten loaf.' It has little taste, but is frequently sweetish, and more resembles the plantain than bread made of wheat-flour. It is slightly astringent, and highly nutritious. Sometimes the inhabitants of a district join to make a prodigious oven—a pit 20 or 30 feet in circumference, the stones in which are heated by wood burned in it, and many hundred bread-fruits are thrown in, and cooked at once. Baked in this manner, bread-fruit will keep good for several weeks. Another mode of preserving it is by subjecting it in heaps to a slight degree of fermentation, and beating it into a kind of paste, which, although rather sour, is much used when fresh bread-fruit cannot be obtained. There are numerous varieties of the B. T. in the South Sea Islands, and they ripen at different seasons. The tree produces two, and sometimes three, crops a year. In the West Indies and South America, into which it has also been introduced, the bread-fruit has not come much into use as an ordinary article of food; but various preparations of it are reckoned delicacies.—The fibrous inner bark of young bread-fruit trees, beaten and prepared, is used for making a kind of cloth, which is much worn by the common people in the South Sea Islands, though inferior in softness and whiteness to that made from the paper mulberry (see Mulberry Paper).—There exudes from the bark of the B. T., when punctured, a thick mucilaginous fluid, which hardens by exposure to the air, and is used, when boiled with cocoa-nut oil, for making the seams of canoes, pails, &c., water-tight, and as bird-lime.—The timber is soft and light, of a rich yellow color, and assumes, when exposed to air, the appearance of mahogany. It is used for canoes, house-building, furniture, and many other purposes. It is durable when not exposed to the weather.—The Jack (q. v.) or Jaca (*A. integrifolia*), and the Dephal (*A. Lakoocha*), both large East Indian trees, belong to the same genus with the bread-fruit tree.

BREA'D-NUT, the fruit of *Brosimum alicastrum*, a tree of the natural order *Artocarpaceæ*, and therefore allied to the bread-fruit, a native of Jamaica. The genus *Brosimum* is distinguished by male and female flowers on separate trees, in globose catkins, with peltate (shield-like) scales for perianth, and the fruit a one-seeded drupe. The B. tree has ovate-lanceolate evergreen leaves; it abounds in a tenacious gummy milk. Its leaves and young shoots are much eaten by cattle but deleterious qualities are developed in them as they become old. The nuts, boiled or roasted, form an agreeable article of food, and are eaten instead of bread. Their taste resembles that of hazel-nuts.—To this genus the *Palo de Vaca*, or Cow Tree (q. v.), of Demerara is supposed also to belong.

BREA'D-ROOM. In the navy, the biscuits are called *bread*, and the place where they are stored is the bread-room; it is carefully constructed, warmed before being filled, and kept as much as possible free from damp.

BREA'D-ROOT. See Psoralea.

BREA'D-TREE. See Caffer Bread.

BREADTH, in art, is a term which, though often used in a very indefinite manner, is not without a definite meaning. It signifies that peculiar disposal of the background of a picture which, without sacrificing or even concealing details, gives to the whole unity and harmony of effect. With the older landscape-painters, it was a common fault to produce the effect of distance either by a certain trick of light and shadow, or by one uniform hazy color in which the individual objects were entirely lost to view, and *breadth became vacancy*. In this respect, their pictures contrast unfavorably with those of such modern painters as Turner, of whom Mr. Ruskin has very truly said that 'the conception of every individual inch of distance is absolutely clear and complete in the master's mind—a separate picture fully worked out; but yet, clearly and fully as the idea is formed, just so much of it is given, and no more, as nature would have allowed us to feel or see; just so much as would enable a spectator of experience and knowledge to understand almost every minute fragment of separate detail, but appears to the unpractised and careless eye just what a distance of nature's own would appear—an unintelligible mass. Not one line out of the millions there is without meaning, yet there is not one which is not affected and disguised by the dazzle and indecision of distance. No form is made out, and yet no form is unknown.'

On the subject of breadth Mr. Ruskin has, moreover, the fol-

owing very judicious remarks: 'It were to be wished that our writers on art would not dwell so frequently on the necessity of breadth, without explaining what it means, and that we had more constant reference made to the principle, which I can only remember having seen once clearly explained and insisted on—that breadth is not vacancy. Generalization is unity, not destruction of parts; and composition is not annihilation, but arrangement of materials. The breadth which unites the truths of nature with her harmonies is meritorious and beautiful, but the breadth which annihilates those truths by the million is not painting nature, but painting over her; and so the masses which result from right concords and relations of details are sublime and impressive, but the masses which result from the eclipse of details are contemptible and painful.'

BREAKERS, in maritime language, are the waves that break violently over rocks lying a short distance under the surface of the sea. They cover that particular part of the sea with a foam, and produce a hoarse and often terrible roaring. 'Breakers a-head' is one of the most alarming announcements made by the look-out men of a ship, seeing that the B. denote the existence of sunken rocks which may, perchance, pierce the hull of the vessel.

BREAKING BULK, in the Scotch law, signifies making use of an article supplied in bulk, or in quantity; by which act one is said to break bulk, and is in consequence, prevented from afterwards objecting to it, and returning it to the seller. See SALE OF GOODS.

BREAKING IN'CLO'SURES is an expression to be found in Scotch law-books, and means the destruction or invasion of planting and inclosures by persons or their cattle. The punishment for this offence is provided by several old Scotch statutes, the principal of which are two passed in 1661 and 1685. The penalities are pecuniary, with right to detain the cattle found trespassing, until such penalities, along with the damage and costs, are paid. See PLANTATION.

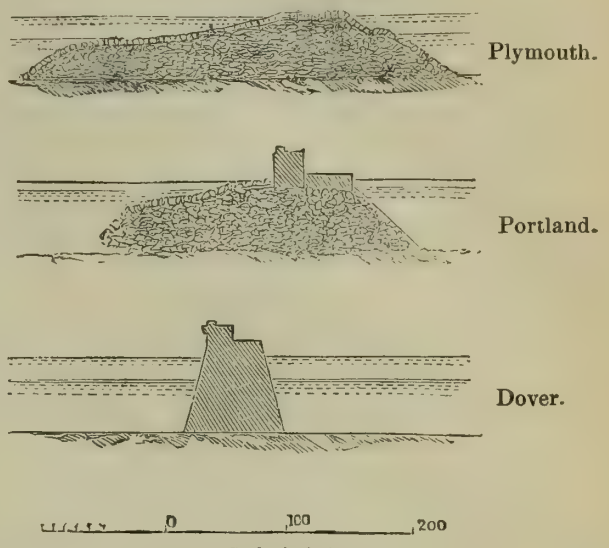
BREA'KWATER is a barrier intended for the protection of shipping in harbors or anchorages. It sometimes happens that, in front of a semicircular bay, a small island is so situated as to form a natural breakwater. This is to some extent the case with the Isle of Wight, which occupies such a position as to protect Portsmouth and Southampton from the south. In many other places, however, bays and harbors are without such screens. A pier may be so placed and constructed as to serve also the purpose of a B., but the term B. is generally confined to a structure used solely for protection, and not for berthage or traffic, and breakwaters are frequently insulated, so as to be cut off from any communication with the shore unless by water.

Plymouth B. is the best known of these engineering works. The sound or harbor, being open to the south, was so much exposed to storms that, early in the present century, it was determined to construct a B. across its mouth, with openings between it and the shore, on either side, for the ingress and egress of shipping. The works were commenced in 1812. The operations consisted in transporting along a tram-road large blocks of limestone got from a neighboring quarry, shipping them in vessels fitted with trap-doors, and by means of these depositing them in the shape of a huge mound in the required situation. As soon as the stones began to appear above water, a perceptible benefit resulted in the relative calmness of the sound during the prevalence of storms; but the structure was frequently very roughly handled by the waves, which altered and flattened its shape. A severe storm in November 1824 threw a great portion of the stones over into the sound. It was not until 1841 that the works were finally completed, by the deposition of more than 3,000,000 tons of stone, and the expenditure of nearly £1,500,000. The B. is nearly a mile long, the central portion is 1000 yards; and two wings, of 350 yards each, extend from the ends of this at a slight angle. The open channels at each end, between the B. and the shore, are each about half a mile wide, and their depth is respectively 40 and 22 feet, at low water. The B. is 133 yards wide at the base, and 15 at the top—the two sides being made very sloping for the security of the stones. The slopes and top are faced with masonry. The water-space protected by this B. comprises 1120 acres, and it is generally admitted that the money has been well spent on the work.

Holyhead B. is formed of stone quarried in Holyhead mountain, drawn along a tramway on a timber structure, and cast into the sea. It more resembles a pier than the B. at Plymouth, for it is attached at one end to the shore, and is intended to convert Holyhead Bay or roadstead into a harbor of refuge. The works consist of a mound of loose stones up to low-water, and ashlar upright walls with a parapet above that line, with a railway on the top for trains.

Portland B. is of very great value, in converting into a harbor of refuge the expanse of water between the Dorsetshire coast and the isle, or rather peninsula of Portland. An act of parliament was obtained in 1847, authorizing the works. The B., starting from the north-east point of the isle, stretches nearly due north for more than two miles, with one or two intervening openings for the ingress and egress of shipping. The works were conducted more easily than those of any other great B.; for the isle contains an abundance of stone easily quarried, and the steep shores afforded facility for transporting the stones by their own gravity to their destination. The work, finished in 1872, is for the most part a rough rubble stone-bank, the part next the island having, however, an ashlar superstructure and parapet; the depth is about 50 feet at low-water. From the nature of the operation, any part of the B. became useful as soon as constructed, increasing the safety of Portland Bay as a harbor of refuge.

BREAKWATERS.—SECTIONS.



Scale, in feet.

Dover B. progresses slowly, and has involved an enormous outlay. There is no stone near to form a mound, as in the other breakwaters spoken of, and, in consequence the work requires to be brought up in solid ashlar from the bottom by the diving-bell, with the interior formed of blocks of concrete. It has never been clearly stated whether the government regards this B. as a protection to a great naval station and fortified harbor, or as a chief feature as a harbor of refuge for commercial fleets. In 1844, a commission of inquiry recommended that £2,500,000 should be laid out in forming a harbor of refuge here. The works connected with it have not been finished, the great depth and frequent storms constituting terrible obstacles. The water is very deep—viz., 42 feet at low water; the accumulation of shingle very troublesome; and many years must elapse before it can be made evident whether the Dover B. is worth the national money expended upon it.

Alderney B. is a great work, consisting of ashlar walls and parapet, built on a stone mound up to low-water from a depth of 72 feet. Small breakwaters have been constructed at Cette near Marseille, at the mouth of the Delaware in the United States, and at Buffalo in Lake Erie; but they do not call for description.

Cherbourg B. is the greatest and the most costly ever constructed. Nearly 100 years ago, M. de Cessart proposed to the French government the formation of a B. at Cherbourg, to be commenced by the construction of a number of hollow cones formed of timber-framing, sunk in a line as close as they could be placed to each other, and then filled with stones. These cones, of which there were to be 64, each about 70 feet high, 150 feet in diameter at the base, and 60 feet at the top, were intended to form a nucleus to the stone breakwater, to prevent the stones, during its formation, being knocked about and too much spread out by the action of the waves.

In 1784 to 1788, 16 cones were constructed, and 13 of them sunk; but so great was the destruction which they underwent during stormy weather, that the government at length abandoned the plan, and carried on the stone breakwater without the aid of the cones. It was completed under Napoleon III. at a cost exceeding £2,500,000. The B. itself was finished in 1853, but since that year large fortifications have been built upon the upper works. The length is nearly 2¼ miles; the B. is 300 feet wide at the bottom, and 31 at the top. The chief mass consists of rubble or unshaped stones, thrown down from ships; but there is a larger ratio of wrought and finished masonry than in the Plymouth B., consisting of granite blocks imbedded in cement. The depth of water is about 60 feet at low-water spring-tides; and the B. rises to 12 feet above high-water level. The water-space included within and protected by the B., is about 2000 acres, but two-thirds of this has scarcely depth enough for the largest sized ships. The relation

which this B. bears to the vast military and naval arrangements of the place will be noticed under CHERBOURG.

Many substitutes have been proposed for solid breakwaters, such as floating breakwaters constructed of timber framework, open iron screens, &c., but none of them have been shown to be suitable for actual practice. Close timber-work, filled in with stones, is found to be quite efficacious; but on most of our coasts the timber is liable to be eaten by the marine worm, which is an almost insuperable objection to its being used under water.

BREAM, a name which is apt to occasion some confusion to beginners in ichthyology, being applied equally to certain fresh-water fishes of the family *Cyprinidæ* (q. v.), and to certain sea fishes of the families *Sparidæ* (q. v.) and *Chætodontidæ* (q. v.) or *Squamipennes*, among which the resemblance is a mere general one of outward form, the first of these families belonging to the order of *Malacopterous*, or soft-finned, the other two to that of *Acanthopterous*, or spiny-finned fishes

The breams of the family *Cyprinidæ* were included in the genus *Cyprinus* (see CARP) by the older naturalists, but are readily distinguished from that genus as now defined, and from other allied genera, by their deep and compressed form, by the great convexity of both the dorsal and the abdominal outline, by the want of spiny rays in the dorsal and anal fins, by the great length of the base of the anal fin, and by the want of cirri or barbules at the mouth. They form the genus *Abramis* of Cuvier.—The COMMON B., or CARP B. (*A. Brama*), is an inhabitant of many rivers and lakes of Europe, even as far north as Norway and Sweden, and of some of those of Britain and Ireland. It thrives best in still waters, and in some of the Irish lakes attains a large size; it has been known to reach 12 or even 14 pounds. The tail is very broad and much forked, the head small and acuminated, the eyes very large, the scales very small, the general color yellowish-brown, the cheeks and gill-covers silvery white.—The WHITE B., or BREAMFLAT (*A. Blicca*), differs from the Common B. in its silvery color, the smaller number of the rays in the pectoral and anal fins, and other particulars. It has never been taken of so large a size. It is found in many parts of the continent of Europe, and in some of the British lakes and rivers.—The POMERANIEN B. (*A. Buggenhagii*) differs much more widely from the Common B.; the body is much thicker in proportion to its depth, the scales larger, the base of the anal fin shorter, the tail less forked. This fish is known to occur in a few places of England and Ireland, and is said to abound in Pomerania.

Common Sea Bream (*Sparus centrodontus*).

The acanthopterous Breams, or SEA BREAMS, are mostly of the family *Sparidæ*, and nearly allied to the Gilthead (q. v.), in connection with which they may most properly be noticed. The Common Sea B., indeed, often receives the name of gilthead. Only one of the British sea fishes called B., *Brama Raii* already noticed (see BRAMA), belongs to the family *Chætodontidæ*.

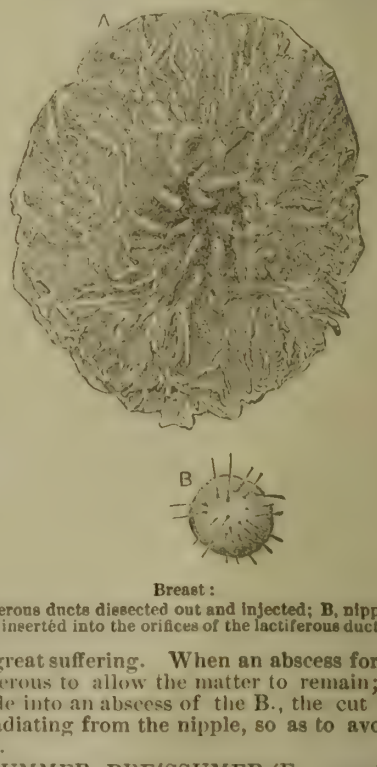
Angling for Bream.—Of the two kinds of B. known to anglers, the carp B. is much the best for sport. The flesh of the B. is not held in much estimation, though the carp B. is infinitely to be preferred of the two. B. are found in both ponds and rivers. They prefer deep, still holes, or quiet, well-sheltered eddies in the bends of rivers. Here the angler will find them in large numbers. They are rather capricious in feeding; at times they will not bite for weeks together. Being a sly, shy-biting fish, the tackle required for them must be fine. They may be taken by means of the ledger (q. v.) in rivers, where they should be fished for in the same way as directed for barbel, save that it will be found advisable to use another hook, which should be fastened on to the line about eight inches or a foot above the ledger lead, as B. often take their bait some inches off the bottom. The hooks should be No. 7. In float-fishing for B. in holes or eddies, a stout swan-quill float and half-a-dozen No. 1 shot below it, will be found sufficient for the purpose; and having ground-baited as directed for barbel, put on two small red worms for the angling bait, or about an inch of the tail of a bright, well-scoured lob-worm. The former is preferable. Two hooks, one to rest on the bottom, and one 6 or 8 inches off it, will be found useful, for sometimes one will be taken, and sometimes the other. The fish being tender-mouthed, should be played gently. After the first rush, a B. soon tires, for his form is not fitted or shaped for a prolonged resistance.

The B. has an unpleasant practice of boring downwards and rubbing the line with his tail, and the line often comes up covered with a thick slime from his body, for a foot or more above the hook. It is needless to remark that this must be cleared off before the tackle is again used. The rod should be a light cane-rod, moderately stiff, and some twelve or thirteen feet long for float-fishing for B. from a boat or punt. Of all baits, worm is decidedly the best. Some recommend bullock's blood and grains to ground bait with, but worms are found to answer all purposes. B. spawn about the end of May, choosing the most weedy spots for that purpose; and after scouring and cleansing in some gentle gravelly stream for a week or two, they return to the deep still holes again. A clay or sandy bottom is preferred to any other. The presence of B. may always be detected by their fondness for coming at times to the top of the water, or, as anglers term it, 'primeing.' Early in the morning, or late in the evening, the whereabouts of B. may always be discovered by their rising then. In Lough Erne the shoals are prodigious, and cause a ripple on the water like a stiff breeze of wind.

BREAMING, in nautical affairs, is a cleansing process which a ship undergoes after a voyage, or after lying for a long time in harbor. The ship's bottom, under such circumstances, often becomes covered with grass, ooze, shells, or sea-weed; and B. consists in the removal of these impurities. The ship is laid aground after the tide has ebbed, or is docked, or is careened (see CAREENING); furze and fagots are placed under it; fire is applied; the heat melts the pitch, &c., of the hull; and the pitch and filth can then be scraped and brushed off.

BREAST, THE FEMALE, or mammary gland, consists of a series of tubes, radiating from a common center, the nipple which is situated in an areola or dark-colored patch. On the surface of the latter are several (from 4 to 10) sebaceous glands, which secrete an unctuous fluid to protect the skin of the nipple, which is very thin, from the saliva of the sucking infant. The milk-*tubes* (15 to 18 in number) enlarge into *sinuses*, and pass each to a separate lobe or subdivision of the breast, where they divide into twigs and branches (the *lactiferous ducts*), which end in minute vesicles. The lobes are held together by fibrous tissue, and are well packed in fat, which increases sometimes to an enormous extent the apparent size of the organ.

The accompanying cut shows the structure of the gland; and with a little consideration, it will be readily understood how over-distension of these delicate tubes, from whatever cause, must be productive of great suffering. When an abscess forms in the B., it is very dangerous to allow the matter to remain; but when an opening is made into an abscess of the B., the cut must be made in some line radiating from the nipple, so as to avoid division of the milk-tubes.

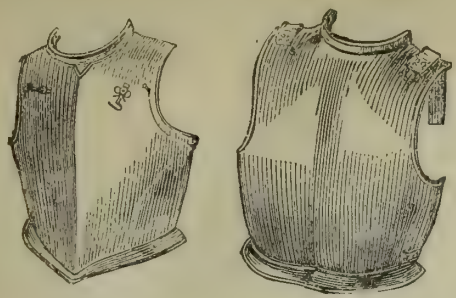


Breast:
A, lactiferous ducts dissected out and injected; B, nipple, with bristles inserted into the orifices of the lactiferous ducts.

BREA'ST-SUMMER, BRE'SSUMER (Fr. *sommier*, a lintel), a beam supporting the whole front of a building, in the same way in which a lintel supports the portion over an opening. They are seen in England and on the continent in old houses that are built partly of wood and partly of stone, brick, or mud.

BREA'STPLATE, in ancient armor, was a plate of iron, steel, or other metal, so fastened as to protect the chest or front of the wearer. The back-plate, in like manner, was worn to protect his

from attack from behind. In modern European armies, almost the only representative of the B. is the front half of the *cuirass*,



Breastplate. Backplate.

worn by the *cuirassiers* in certain foreign states, and by the household cavalry (Life-guards and Horse-guards) in England.

BREA'ST-WORK, in Fortification, is a hastily constructed earthwork; not so high as to need a *banquette* (q. v.) for the defenders to stand upon, but sufficient to afford shelter when they are standing on the level of the ground, and firing over the crest. The dry ditch or trench from which the earth has been taken to form the B., affords an additional defence. A B. is midway between a *parapet* and an *épaulement*, in size and importance.

BREATH AND BREATHING. See RESPIRATION.

BREATH, OFFENSIVE, may depend upon some cause limited to the mouth or nose, or it may arise from diseased conditions of the respiratory or digestive apparatus. If, from want of proper attention, the teeth have collected a quantity of putrescent particles around them, they must be well scrubbed with a brush and tepid water, with some powdered carbonate of magnesia mixed with it. A wash composed of a teaspoonful of tincture of myrrh in a pint of water is also very useful. Occasionally, the secretion from the tonsils (q. v.) is very offensive; and then a solution of nitrate of silver, 4 grains to 1 ounce of water, should be applied to them every morning, with a camel-hair brush, and small alterative doses of medicine administered.

Solutions of soda in water are also very useful. Should the fetid smell arise from a portion of dead bone, the latter must be removed whenever its becomes loose. Inhalations of steam from hot-water into which some creasote has been dropped, is much recommended for cases in which the cause resides in the nose and respiratory passages. When, however, it is caused by digestive derangements, the treatment should consist in purging, to empty the intestinal canal, followed by soda, to correct acidity and tonics, of which the bitter infusions and tinctures, and the dilute mineral acids, are among the best.

All medical treatment is unavailing to correct the foul odor which rises from the stomach of the habitual drunkard, or from the victim of gangrene or abscess in the lungs.

BRE'CCIA, a term adopted from the Italian to designate a mass composed of angular fragments of rock of the same or different kinds, cemented together by an enveloping paste, or by infiltrated iron or carbonate of lime.

BRECHE-DE-ROLAND, a defile of the Pyrenees between France and Spain, about 11 miles southwest of St. Jean de Luz, with an elevation of about 9500 feet above the sea. It is a difficult passage of from 200 to 300 feet in width, between precipitous rocks rising to a height of from 300 to 600 feet.

BRE'CHIN, a town of Forfarshire, on the left bank of the South Esk, 8 miles west of its junction with the sea at Montrose. Pop. (1881) 9031. It unites with Montrose, Arbroath, Forfar, and Bervie in returning one member to parliament. Spinning, bleaching, distilling, and brewing are carried on here, as also the manufacture of linens and sailcloth. B. was once a walled town, and contained an abby of Culdees, instituted, it would seem, about the end of the 10th century. David I. founded a cathedral and bishopric here in the 12th century. Part of the cathedral, built chiefly in the 13th, 14th, and 15th centuries, is now the parish church. Close to the church is a round tower, similar to the Irish ones and to the one at Abernethy, the only other example in Scotland. The tower is 85 feet high, 25 feet in diameter at the base, and 12½ feet at the top, and it is surmounted by a 15th c. spire of 25 feet. B. Castle, the ancient seat of the Maules (now of their representative the Earl of Dalhousie), was taken by Edward I. in 1303, after a siege of 20 days. B. was burned by Montrose in 1645; and near it, Huntly, on the part of James II., defeated the Crawfords in 1452. Gillies, the historian of Greece; Maitland, the topographer; and Dr. Guthrie, the famous Scotch preacher, were natives of Brechin.

BRE'CKNOCKSHIRE, or BRE'CON, an inland county of South Wales, to the south of Radnor, from which it is separated by the Wye. Length, about 35 miles; average breadth, 20. Area, 719 square miles, of which two-thirds are cultivated. B. is one of the most mountainous counties in South Wales, and has deep, beautiful, and fertile valleys. Two principal mountain-chains, the highest in South Wales, rising with Brecknock Peaks to a height of 2862 feet, intersect the country in the north and south, and occupy, with their offshoots, a great part of the surface. Old red sandstone occupies the south and middle of the country, and Silurian rocks the north. The chief rivers are the Wye, Usk, Yrfon, Elan, Claerwen, and Tawe. The climate is severe and rainy but healthy among the mountains, and in the valleys comparatively mild. The agriculture, though still defective, especially in the higher districts, was greatly improved by the Brecknockshire Agricultural Society, instituted in 1755. The chief crops are oats and barley, but much wheat is also grown in Talgarth and Crickhowell, the most fertile districts of the country. In the valleys in the east some hops are raised, and some orchards are seen. The native small black-cattle are reared in the hills, while in the lowlands the Hereford breed predominates. The mineral produce is small, consisting of iron, especially along the south border; coal and limestone are also found in the south and west. The Brecon canal connects the county with the Bristol Channel, and many railways have been constructed throughout the country. There are several small factories of woollens and worsted hosiery; also several important iron-works, but the ore is chiefly obtained from adjoining counties. B. returns one member to parliament. Pop. in 1871, 59,901; in 1881, 57,735. The chief towns are Brecon (the county town), Builth, Crickhowel, Hay, and Llanelly. There are many remains of British and Roman camps, Roman roads, cairns, cromlechs, mounds, and castles throughout the county. B. formed part of the territory of the Silures, who bravely withstood the Romans. The Normans, under Barnard Newmarch, wrested the county from the Welsh princes in 1092. Llewelyn, the last British prince of Wales, was killed in this county in 1282, and by his fall the native mountain-chiefs were entirely subdued. Half the people in B. still speak Welsh.

BRECON, BRECKNOCK, or ABERHONDDU, the capital of Brecknockshire, South Wales, is situated in an open valley in the middle of the county, at the confluence of the Usk, Honddu, and Tarell, 171 miles west-north-west of London. It lies in the midst of fine mountain scenery, and has beautiful public walks. South of B. lie the three mountain-peaks, the Brecon Beacons. Pop. (1881) 6372. It returns one member to parliament. Flannels, coarse woollens, and hats are manufactured. Barnard Newmarch, a relative of William the Conquerer, founded the town, and built a castle here in 1094. He also founded two priories here in the reign of Henry I. Henry VIII. turned one of the priories into a college, still existing; the other is now the parish church. B. was formerly surrounded by a wall having ten towers and five gates. Hugh Price, founder of Jesus College, Oxford, and Mrs. Siddons, the celebrated actress, were natives of Brecon.

BREDA' a town of North Brabant, Holland, situated at the confluence of the navigable rivers Merk and Aa, and containing (Dec. 31, 1879) 17,109 inhabitants. It formerly possessed the means of laying the surrounding country under water in the event of an attack, but the importance of the town, as a military position, has passed away, and in 1876 the fortifications were removed. It has a Gothic cathedral, with a lofty tower, and several interesting monuments; also an old castle built in 1350, which was for some time the residence of Charles II. of England, and is now a military academy. There are manufactures of carpets, linen, hats, soap, leather, &c., and dye-works, breweries, and rope-walks. It is celebrated as the place where, in 1566, the protest of the Dutch nobles, known as the 'Compromise of Breda,' against the measures of Philip II. of Spain in the Netherlands, was presented and rejected. During the subsequent centuries, it was the scene of much conflict and diplomatizing until 1813, when the French were finally driven out. B. is now a station of the railway net.

BRÉE, MATTHÆUS IGNAZIUS VAN, an excellent Flemish painter, born at Antwerp 22d February 1773, and educated partly there, and partly under Vincent in Paris. As early as 1798, he attracted attention by his 'Death of Cato,' and several other excellent pictures soon followed. A peculiar talent for rapid and vivid sketching enabled B. to execute for Napoleon, in a few hours, 'The Manœuvring of the Fleet before Antwerp on the Scheldt,' and, with equal celerity, Napoleon's 'Entrance into Amsterdam, at the Moment when the Magistrate presents him with the Keys of the City.'

In 1816, he painted the famous Leyden burgomaster, Van der Werff, in the act of addressing the famished and murmuring populace during the siege of 1576: 'Take my body, and share it among you.' This great work—now in the town-house of Leyden—is marked by a felicitous arrangement of the figures, and

by a bold and lively coloring, after the style of Rubens. Other celebrated pictures of B.'s are: 'Count Egmont receiving Spiritual Consolation before his Execution,' 'Reubens dictating his Dying Testament,' 'The Tomb of Nero at Rome, with a Group of Lazzaroni and Musicians.' B. died 15th December 1839. In the latter part of his life, he was Director of the Academy of Fine Arts at Antwerp.

BREE, PHILIPP JACOB VAN, brother of the preceding, born 1786, also acquired some reputation as a historical painter.

BREECH, of a gun, is the end furthest removed from the muzzle. It always contains a great mass of metal, to enable it to withstand the shock occasioned by the explosion of the gunpowder. For details, see CANNON, HOWITZER, &c.

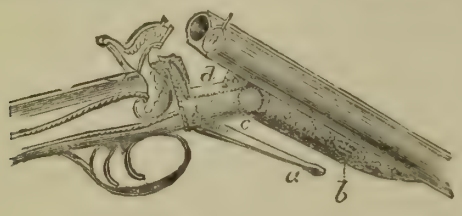
BREECHES BIBLE. See BIBLE.

BREECHING, of a naval gun or carronade, is a strong rope by which the recoil of the gun is checked at such a point that the muzzle is brought wholly within the port-hole, where the seamen can sponge and reload it.

BREECH-LOADING, in Artillery, relates to a mode of constructing large pieces of ordnance, and small-arms, or hand-fire-arms, the peculiar manner of charging which the term describes. This subject is now occupying much attention, and the patented inventions relating to it are very numerous. The Armstrong gun (see ARMSTRONG), among others, is a breech-loader; and so is the Whitworth gun. A considerable amount of additional mechanism is necessary for this purpose; seeing that the breech must be so far opened as to admit of the introduction of a ball or shell, and a cartridge, and then so firmly closed as to resist the immense pressure occasioned by the explosion. The objects sought to be attained by this change from the old system are many—quickness in loading, ease in cleaning after firing, accurate adjustment of the diameter of the ball to the caliber of the gun, facility in making the ball accommodate itself to the spiral rifle-grooves of the piece, &c.; but it is still a contested question, especially between the rival inventors of breech-loaders and muzzle-loaders, to what extent these objects are attained.

In relation to muskets and fowling-pieces, Mr. Greener, of Birmingham, who has written much on the subject, disputes the usefulness of B.; he denies that it is more safe, more accurate, or more forcible than muzzle-loading; while certain advantages which it may possess are, he thinks, counterbalanced by the greater cost of the weapon.

The annexed cut—for which, together with the description, we are indebted to Stonehenge's excellent work, *The Shot Gun and Sporting Rifle*—represents part of the mechanism in one of the many kinds of breech-loaders—viz., the Le Faucheaux or French



Breech-loading Gun (pin cartridge, 14 gauge).

crutch gun, invented about 20 years ago, and now largely made in England as well as in France: *a* is a lever which opens the mechanism, but which lies flat against the gun at other times; *d* is a notch which, when a hook is liberated from it, allows the barrels to be so adjusted as to be easily loaded at their breech end; *c* is a central pivot around which the movement is made; *b* is a slide that assists in the opening and closing. At 14 is a pin which, when struck by the hammer, transfers the blow to a cap inserted in the cartridge. The relative merits of breech and muzzle loading fowling-pieces were tested in 1859—60 by various trials, under the management of the editor of *The Field*, and resulted in favor of the breech-loaders. The demand for the latter has, in consequence, enormously increased.—This subject receives further notice in various parts of the Encyclopædia, in relation to certain kinds of ordnance and small-arms expressly constructed on the B. principle.

BREECH-LOADING ARMS AND NEEDLE-GUNS. To be loaded at the breech, and to be fired by the penetration of a needle into, or the impinging of a piston on, a detonating cap within the cartridge, are distinct attributes in a weapon; and although it is only within the last forty years that the system has been carried out with success, breech-loading arms have been tried, accepted, and abandoned without number during the last three centuries. Indeed, a sort of instinct dictates that loading at the breech is the preferable course; and all the earliest muskets were so made, the system being doubtless abandoned from the difficulty of accurately closing the breech, in those days of rough workmanship. The extraordinary efficacy of breech-loading arms for military purposes was brought prominently forward during the wars of the last few years, and notably in the Prussian campaigns of 1864 against Denmark, and of 1866 against Austria. The successes of the Prussian arms were attributed in no small degree to the rapidity with which their troops could fire as compared with the enemy. They had, in greater or less numbers, borne these same rifles since 1835, but these were the first opportunities of using them in warfare. To all the other powers, whose men still carried muzzle-loading rifles, and who had debated, without practical result, for years past the question of armament with breech-loaders, soldiers thus armed appeared irresistible. From July 1866 to the present moment, the hammer and the anvil have been busy night and day throughout the civilized world in making the weapons of death yet more deadly. Scarcely two countries seem to have adopted the same plan: each nation has elaborated a system from among its own inventors. Those possessing no great reserve of rifles have prepared new arms; but the majority of governments have been content, in the first instance, to convert their existing stock into breech-loaders of as good a construction as circumstances would permit. Thus, Britain, after offering a handsome prize for the best design, selected one said (subject to some controversy) to be the invention of the late Mr. Snider. As this weapon had ere long been produced to the number of a million, and as it quite confirmed the favorable auguries entertained of it by accuracy of fire, and by loading thrice to the muzzle-loader's once, much of the following article will be devoted to a consideration of it. At the same time, it is to be borne in mind that the British Government only regarded the Snider arm as a make-shift for the conversion of the enormous stock of Enfield rifles then in hand, reserving to itself the ultimate selection of a pattern on which to manufacture new weapons. It is not to be understood from what is said above that Britain adopted a breech-loading arm in a sort of panic *after* the battle of Sadowa. It was after the Danish campaign, on the 11th July 1864, that it was decided as an abstract question to arm the British infantry with breech-loaders; a portion of the cavalry having for a number of years previously been armed with Sharp and Westley Richards carbines, loading at the breech. The selection of an arm took longer; but by the beginning of 1865 it had been decided to convert our great stock of rifles on the 'Snider' system. In 1869 it was determined that new arms should be on the Martini-Henry system—i.e., with the Henry barrel, and the Martini breech-action. A description of this rifle will be given farther on.

Breech-loading.—The advantage of breech loading is obvious: to be able to insert the charge at the breech end instead of the muzzle, is to save time, and to avoid exposure to hostile fire during the operation of loading and ramming home, which involves considerable outstretching of the limbs. The great condition of success is, that the bullet shall be propelled with equal force and accuracy, and with equal safety to the rifleman, as from the muzzle-loader.

When a charge is ignited, the constituents of the gunpowder, assuming a gaseous condition under the heat engendered, expand into a volume of light gas many times greater in bulk than the powder before occupied. On the amount of this expansion, and its sudden action on the projectile, the force of the shot depends. Any joint in the breech-piece through which a portion of this gas can escape, without having imparted its thrust to the ball, tends, therefore, to lessen the range and penetration; while the shock of the explosion falling more severely on this than on any other part of the barrel, tends yet more to dislocate the breech-piece, and diminish the closeness of the joint's fit. In weapons which do not call for a long range, as revolver pistols, a perceptible interval is left between the chamber and barrel, through which much gas escapes; but in rifles, which have range and penetration as principal objects, there is a *primâ facie* ground for preferring a muzzle-loader. The gas, however, is far from pure, as generated in the barrel, for much water is produced and held in suspension, while there is also a solid residuum consisting of unburned materials of the powder. In the muzzle-loader, these clog (or, technically, foul), the barrel, filling the grooves, and rendering the ramming home of succeeding charges more and more difficult. The effect is, that a solid mass of unburned matter is gradually forced by ramming into the head of the barrel, destroying the accuracy and usefulness of the weapon. In the breech-loader, this solid deposit must be provided against both ways. The backward throw on firing (for, of course, the charge explodes with equal power in every direction) tends to force it into the mechanism of the joints, preventing their proper fit, and continually augmenting the escape of gas; and on the other hand, the deposit in front is most detrimental to accuracy of fire. This protection of the breech apparatus, the prevention of fouling, and the retaining and if possible improving the force and accuracy of fire, were the problems which inventors have had to solve.

A moderate escape of gas in front of the first position of the ball, is not found to be any material disadvantage. If, then, the

barrel could have an opening, as in fig. 1, at *a*, where the cartridge could be inserted, and then pushed backwards towards *b*, an escape of gas through the joints by which *a* might be subsequently closed would be comparatively immaterial; but this formation would be impracticable, because the explosion of each cartridge would drive

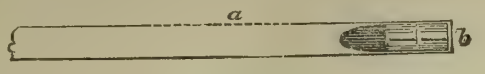


Fig. 1.

the fouling more and more towards *b*, till ultimately the chamber between *b* and *a* would be unable to contain the cartridge. It is clear, therefore, that the charge must be inserted either at the barrel's head *b* (in fig. 2), or, if the barrel be opened, in space close to that head, as *c*. In either of these cases, the breech at *b* must

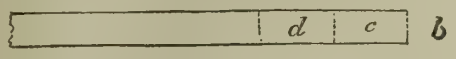


Fig. 2.

be solidly closed to resist the explosion. A third case, as in the Snider, is where the cartridge is inserted, as at *c*, and then pushed forward to the position *d*, the aperture *c* being closed by a solid breech-piece which completely fills that portion of the barrel, and forms, with the barrel's head, a massive foot to resist the backward pressure of the fired powder. No breech action can be made to fit so accurately as to prevent a backward escape of gas unless a properly constructed cartridge case is used. A perpendicular moving joint is found, in practice, to be the best adapted for preventing a serious escape of gas: such a joint is shown in fig. 3, and is naturally the most convenient in an arrangement like the Snider, where the breech-piece turns on a hinge. In the Prussian needle-gun, the end of the barrel is the frustum of a cone, which fits into a corresponding cavity in the fore-end of the breech-piece *a*, as in fig. 4; but in practice this joint is not sufficiently tight to prevent an escape of gas from the self-consuming cartridge used with this gun, which becomes inconveniently great after long use of the weapon, and it is only available when the breech-piece is pushed up from the rear. In the Snider and several other breech-loading weapons, the cartridge is made itself to close hermetically the aperture between the barrel and the fore-end of the breech-piece. This is effected by the expansion of the cartridge case *d*, fig. 5, which being composed of metal, or a combination of metal and paper, is driven out by the force of the explosion till it completely fills the chamber *b*, and prevents any escape backwards be-

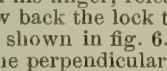


Fig. 3.

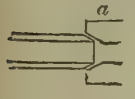


Fig. 4.

Fig. 5.

tween the sides of the case and the chamber. The cartridge *d* has a portion of its case at the base flattened out into a rim which fits into a corresponding recess, *a*, in the end of the barrel; and to prevent expansion backwards, which would fracture the cartridge case and injure the breech or the firer, the breech-piece, *c*, is made to fit as closely as possible against this base. This rim is seen on the Snider cartridge at fig. 9.

The remainder of the article will be devoted to a description of the three most prominent breech-loaders—(1) the Prussian Zündnadelgewehr; (2) the British Snider; and (3) the Martini-Henry.

The Prussian gun, although it may be said to be now obsolete (having been superseded by the Mauser, a bolt gun on much the same principle, but using a metallic cartridge case), was first in the field. As regards its breech apparatus and needle-lock it consists of three eccentric hollow cylinders, with a solid cylindrical bolt inside the last (see figs. 6, 7). The rear end of the barrel is firmly screwed into the head of the chamber, *a*, which is fixed to the stock of the piece, and is open at the rear end. The upper half of the cylinder is cut away at the front-end for rather more than the length of the cartridge; this constitues the opening in which the musketeer inserts the cartridge. From the rear of this opening to the back, a groove is cut, sufficiently wide to allow the square pillar of the breech-handle, *c*, to pass along it. In the middle of this groove is a right-angled shunt, offering a stop to the breech-handle when drawn backwards, unless it be likewise turned downwards, when it may be passed completely out at the rear-end.

Next within the chamber is the breech-piece *d*, which to admit the cartridge, is drawn back for a sufficient distance by the breech-handle along the groove. When the cartridge is deposited in the recess in the chamber, this breech-piece is closed against the heel of the barrel by moving up the handle to the front-end of the groove, and then turning it down to prevent it from being driven back on the explosion of the charge; representing indeed, the resistance offered by the heel of an ordinary muzzle-loading barrel. Firmly screwed within the breech-piece, at a short distance from its front, is a solid block of metal, *f*, on which impinges the first force of the explosion. Projecting from this block to the base of the cartridge, is a strong *tige*, or pillar, *g*, around which a space containing air is left. Through this pillar is the channel for the needle to work. Fitting within the rear-end of the breech-piece is a smaller cylinder *h*, constituting the lock of the gun. It slides within the breech-piece, and is retained from falling out backwards by the spring *i*, which catches in a notch at the end of *d*. Along the bottom of this cylinder, is a groove to admit the passage of the trigger *k*; and at the back is a short upright handle, by means of which the weapon is cocked. Lastly, within the lock is a bolt *l*, pressed forward by a spiral spring, and having the needle, *m*, rigidly fastened to its front end.

Having now described the several parts of the rifle, it is easy to follow it from the moment of a shot being fired until the next is ready for discharge. The soldier first presses down the spring *i* with his finger, releasing the catch below it, and enabling him to draw back the lock to the next catch on the spring, into the position shown in fig. 6. Having done so, he raises the breech-handle to the perpendicular, and passes it along the groove to open the breech. This done he places the cartridge in the opening thus made in the chamber, and again moving up the breech-piece to close the breech, the tige in it pushes the cartridge forward into the barrel, and the rifle is at once at 'half-cock,' as in fig. 6; for in drawing back the lock, the front point of the spring *i* forced the bolt *l* (including the needle *m*) with it, and the projection *n*, on it having passed over the head of the trigger *k*, is caught by the latter in a way which can only be released by the falling of the trigger. It will be observed that at half-cock the needle is ready to penetrate the cartridge, but that the spiral spring is loose and without power. To 'full-cock,' no more is necessary than to push *h* back to its original position. It cannot take the bolt *l* with it, as the trigger retains it to the rear. The position (fig. 7) is now obtained, in which the bolt, *l*, projects at the back, and the spiral spring is compressed into a state of passive strength. All that is now needed to fire the gun is to press upon the trigger, until the point *o* bears, when the bolt *l*, being released by the depression of *k*, the spiral spring asserts its power, and drives the needle into the heart of the cartridge, the parts all resuming their origiual positions. At first sight, one cannot help exclaiming: 'What a complicated apparatus with the four cylinders and the springs!' but, in reality, it is as simple as almost any other gun, for the whole mechanism of the lock (q. v.) is dispensed with. If it be desired to take the needle-gun to pieces, press the trigger till the point *p*, bears. If the breach-handle be then in the hinder part of its groove, the breech-piece with its contents will slip ont of the chamber.

Pressing down, next, the spring *i*, until the second catch is

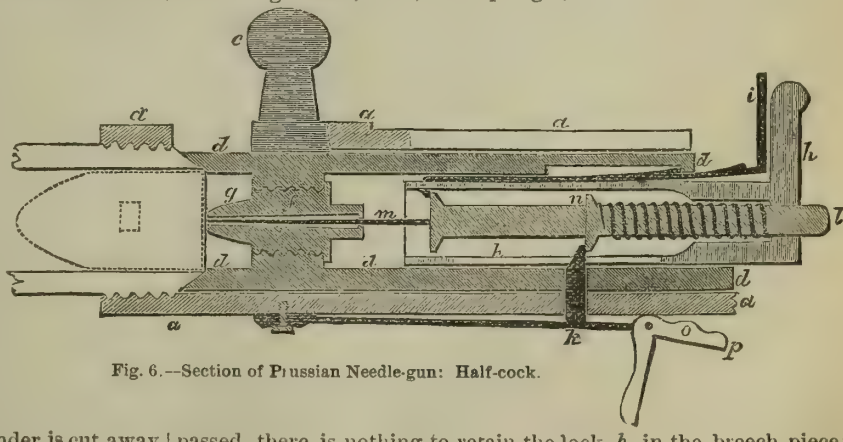


Fig. 6.—Section of Prussian Needle-gun: Half-cock.

passed, there is nothing to retain the lock, *h*, in the breech-piece; and the lock being free, the needle, with its attached bolt and spring, falls readily out of its fore-end. The gun is thus taken to pieces in a few seconds, and as many suffice to put it again in fighting order. The most delicate portions are the needle and the spiral spring; but in case of accident to these, there is a spare one

in a small cavity opening by a spring in the butt-end of the stock. The worst feature about this celebrated gun is its weight, 12 lbs., or 33 per cent. heavier than the Enfield or Snider rifles.

The converted Enfield or 'Snider' rifle was selected in 1865—1866 by the British government from the specimens submitted at an open competition of inventors. It is an extremely simple weapon, and though by no means free from faults, has given very satisfactory results up to this time. The ordinary Enfield barrel is shortened by about two and a half inches, and the heel of the remainder is screwed in to a strong shoe, *a* (fig. 8), with which is connected by a powerful hinge, *b*, the solid breech-piece, *c*, which, when shut, completely closes the breech. Through this passes the piston or striker from *d* to *e*; the normal position of the piston is maintained by a spiral spring within the nipple (which screws into the upper side of *c*), and is such that the piston does not project at *e*, while it does project at *d*. Given the breech open as in fig. 8, the cartridge is inserted and pushed forward into the barrel, where its metal rim fills the groove left around the barrel's heel. The breech-piece, *c*, is closed down, the hammer, *i*, drawn to full-cock, and the piece is ready for discharge. The breech-piece is securely locked by the spring bolt, which enters a recess in the false breech at *g*, and can only be withdrawn on the lever thumb-piece, *h*, being pressed by the thumb in the act of again lifting the breech-block. On the trigger being pulled the hammer falls, drives in the piston at *d*, and out against the detonating cap of the cartridge, with a sharp blow at *e*, firing the charge.

The hammer is drawn back to half-cock, the piston flies up to its former position; the breech-piece, *c*, is thrown back, and slid on its hinge *b*, along the pin *k*, until the part *b* touches the part *l*, a process during which a small catch, *m*, hooks back into the breech, by its projecting rim, the empty cartridge-case. The canting of the rifle to one side now throws this out, a spring within the hinge moves the breech-piece to its former place, and the gun is ready for another charge.

The cost of altering an 'Enfield' to a 'Snider' varied from 15*s*. to 20*s*. During the transition period, upwards of a million were converted in this way, besides a large number of new arms made for our own government; but conversion and manufacture are now suspended both in the government factories and by the large small-arms companies. The government factories were capable of converting 1100 rifles daily.

At first, the firing of the Snider was inferior to the old Enfield; but, by alterations in the bullet, effected by Colonel Boxer, in the direction of decreasing the specific gravity at the apex by the insertion of a wooden plug (which is now, however, dispensed with, and the point of the bullet spun over the mouth of the cavity), this condition has been reversed, and the Snider now fires 30 per cent. better than the old Enfield. Of course, these changes add to the cost of the cartridge, which has, however, these great perfections—first, that it is nearly impervious to wet; and second, that fire can scarcely be communicated to it otherwise than through the detonating cap. A single cartridge has been fired within a barrel of loose cartridges without exploding any of the others.

Adverting to the Snider cartridge, fig. 5, the whole is enclosed in a roll of thin brass foil, outside which is a covering of paper, and having for its base an iron disc, in front of which is a double cup of thin brass, while a round of millboard or pulp encircles the chamber containing the percussion cap, which communicates with the powder. Between the powder and ball is a layer of wool.

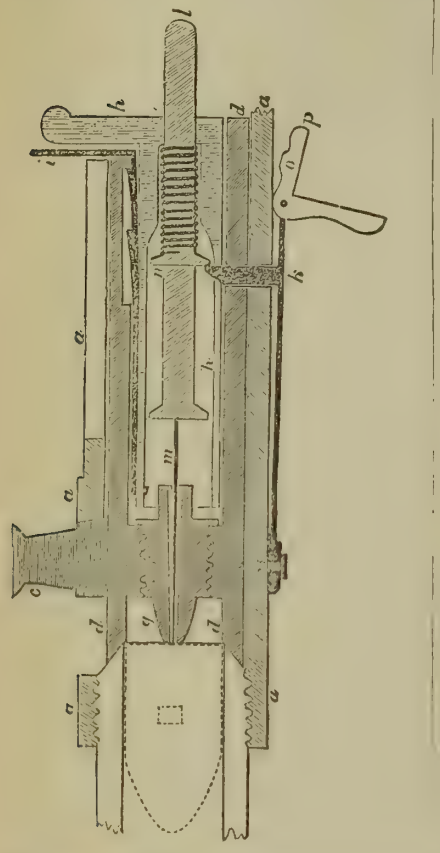


Fig. 7.—Section of Prussian Needle-gun—Full-cock.

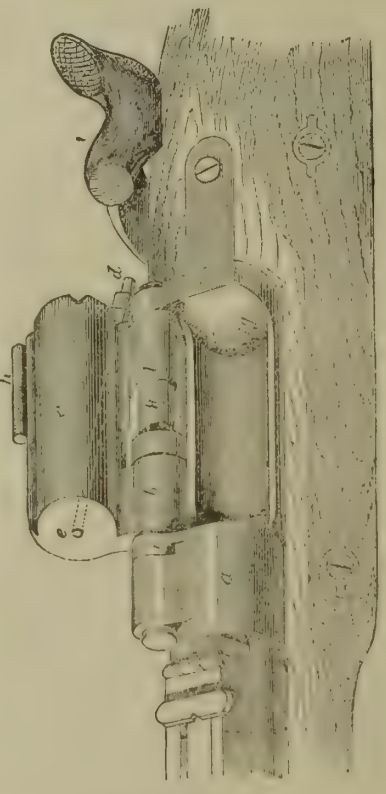


Fig. 8.—Snider—Open.

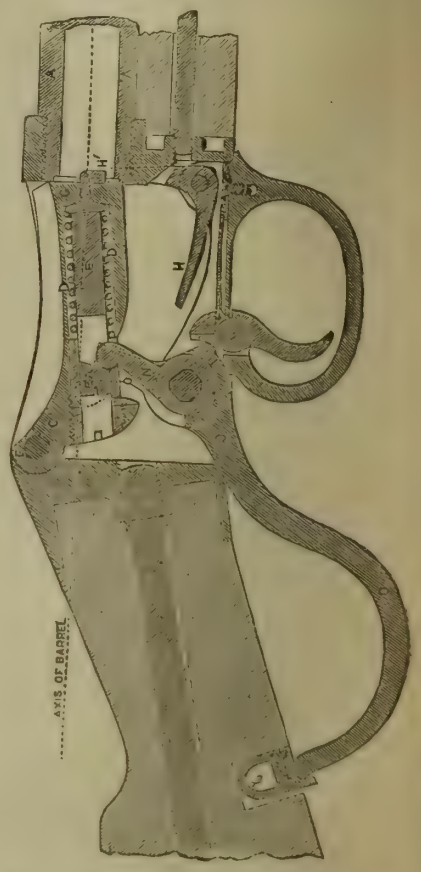


Fig. 10.—Section of Martini Breech Action—Closed.

The ball has, as explained above, the point spun over a cavity in its front, and a conical hollow is made at the base; into the wider part of this is dropped the wooden plug, while on the circumference of the bullet, and outside this conical hole, are four small cannelures or cuts in the lead. When the powder explodes, the wooden plug is driven forwards to the head of the hollow, driving the base of the bullet outwards till the lead completely fills the grooves of the rifle—a process aided by the comparatively less resistance at the cannelures.

These cannelures are also receptacles for a wax lubrication which prevents fouling, interposing always a film of wax between the bullet and the barrel. The charge and bullet are held together by the copper sheathing being pressed into the cannelures. Returning to the percussion-cap, we should find, if it were enlarged, an apparatus—as in fig. 9—where the cap is a thin copper cylinder open at front and closed at the rear end, where there is contained a deposit of detonating powder, *c*, of great sensitiveness. A brass bead, *b*, called the 'anvil,' is contained within the cap, the sharp point being next the detonating powder, and its broader end resting at the bottom of the cap-chamber on each side of the hole *d*. The cap itself fits tightly into the chamber, leaving no opening for the escape of gas backwards from the explosion, and is fired by the external blow of the piston or striker, which drives the base of the cap down upon the point of the an-

Fig. 9.—Snider Cap.

vil, by which means the detonating powder is exploded, and the flash, passing down the sides of the anvil, communicates through the opening, *d*, with the powder in the cartridge. The weight of the bullet is 480 grains; of the powder, 70 grains; the cost being about £3 per thousand.

From this description, it is evident that the Snider cartridge is a complicated arrangement; but it is not much more so than that of the Zündnadelgewehr, though vastly more efficient.

In comparing the Snider and the late Prussian gun, the former had certainly the greater simplicity; while its smaller weight (9 lbs. to 12 lbs.) was an immeasurable advantage. Of the two it is probably the less likely to get out of order. In the Prussian arm,

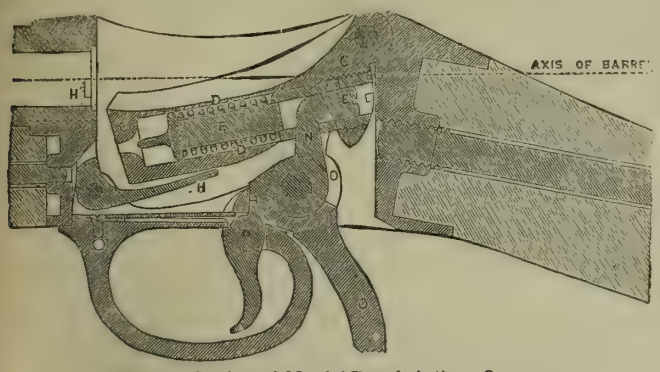


Fig. 11.—Section of Martini Breech Action—Open.

the needle, by its own mechanism, fired the charge; while in the Snider, it is a mere medium for conveying the blow of the hammer.

The breech-action of the Martini-Henry rifle, which came to be adopted as the pattern for new rifles for the British army, will be understood from figs. 10 and 11. There have been improvements of various kinds made upon it since it was first introduced, but the main principles are unaltered.

The principle of the action consists in closing the breech by a falling block, C, working in a mortised breech body, and hinged on a pin, F, at the back end, and falling in front sufficiently when open to clear the opening of the barrel; the top of the breech-block forms an inclined groove, along which the cartridge is slipped into the barrel A. The ordinary gun lock is replaced by a direct acting striker E, impelled by a spiral spring, D, both being contained within the breech-block. The act of opening the lever, O, draws down the breech-block, simultaneously drawing back the striker, and compressing the spiral spring; at the same time the toe of the cranked extractor, H, is struck by the breech-block, thus throwing its upper claws, which encircle the base of the cartridge-case, backward, and jerking out the used case. On a fresh cartridge being inserted, the lever, O, is drawn back and fixed to the stock by the spring Y. This closes the breech, but the spiral spring is kept compressed, and the striker at the full-cock position, by the tumbler, N, into the bent of which the point of the trigger and the tumbler-rest entered when the breech was opened. The trigger being pulled, the tumbler, N, is let loose, and the spiral spring discharges the pointed end of the striker, E, on to the cap in the rear-end of the cartridge, which is thus fired.

Fig. 12 represents, in section, the Boxer-Henry cartridge for Martini-Henry rifle.

The following table shows the breech-loading rifles in use in 1883 by the principal powers:

Country.	*System adopted.*	*Bore.*	*Weight of Rifle.*	*Weight of Bullet*	*Weight of Powder.*
		Inch.	*Lbs.*	*Grains.*	*Grains.*
Austria	Werndl	.450	9.88	318	65
Belgium	Albini-Braendlin	.433	10.14	386	77
Denmark	Remington	.450	9.08	370	66
England and Turkey	Snider	.577	9.05	480	70
	Martini-Henry	.450	8.75	480	85
France	Gras	.433	8.93	386	75
Germany	Mauser	.433	10.75	385	74
Holland	Beaumont	.433	9.59	336	66
Italy	Vetterli *	.412	6.61	308	58
Russia	Berdan	.420	8.48	370	78
Sweden	Remington	.480	9.55	370	66
United States	Springfield	.450	9.13	370	78

* Switzerland has also adopted the Vetterli, but in the form of a *repeating*-arm.

Of all the above-named systems, the Martini-Henry fires the most powerful cartridge, and in consequence possesses the advantage at long ranges. In addition to what are known as breech-loaders proper, there are repeating-arms, one of which, the Spencer Magazine Rifle, may be taken as a type of those arms

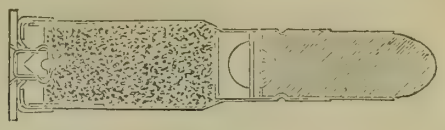


Fig. 12.

carrying, in a tube in the stock, a series of cartridges, which by a simple action, pass into the barrel for discharge. As the gun can ordinarily be loaded at the breech without drawing on the magazine, it is doubtless that this reserve would be a powerful means of defence in a moment of danger, as in receiving an attack; but among its drawbacks are weakening of the stock, serious increase of weight, and complexity and delicacy—objections in the rough usage of active service. Another type of these weapons are fitted with *attachable* magazines, which are carried on the shoulder when not in use. No nation, except Switzerland, had in 1883 decided upon a Magazine Breech-loader wherewith to arm the *whole* of their military forces. See RIFLED ARMS.

The various forms of breech-loading arms used for sport—both shot-guns and rifles—may be shortly described as follows: *For loading*, the barrels (generally double) fall forward on a hinge when a bolt is moved by a lever working horizontally either in front of the trigger, or on top of the 'head' between the hammers. The former is the Lefaucheux system, the latter the Westley-Richards, both having many modifications. *For firing*, the front part of the barrels is raised up, and the open ends of the chambers containing the cartridges are closed by being brought in close contact with the face of the iron block, or 'head,' which receives the recoil, the lever instantly locking the barrels in position by a snap action.

BREED, in domestic animals, a variety, or often merely a race distinguished by the possession of particular qualities, but not differing from the ordinary type of the species so as to constitute what naturalists usually designate a variety. The peculiarities of breeds in animals find an exact counterpart in the cultivated plants, the value of particular kinds often depending, in a great measure, upon characters scarcely capable of being defined in the language of scientific description, but to the production and perpetuation of which the attention of the cultivator cannot be too earnestly directed. These, also, in plants, as in animals, have of themselves little permanence, and the preservation or perpetuation of them depends upon the same assiduous attention and high cultivation from which, more frequently than from any mere accidental circumstances, they have originated. Thus it happens that the most improved varieties of garden-plants usually degenerate even under ordinary horticultural treatment, and the choice pansies of the florist lose their characteristic excellences if a place is simply assigned to them in a common flower-border. The improvements which cultivation has effected in the productions of the fruit, flower, and kitchen garden do not, however, possess an economic importance to be compared with that of the similar improvements in the cereals and other plants cultivated on the most extensive scale, or in the breeds of some of the most valuable domestic animals. To the breeding of these, great attention has of late been paid—probably more since the beginning of the 19th c. than in all the previous history of the world—and with results the magnitude of which may in some measure be estimated from the statement made on very competent authority, that in the second thirty years of this century the weight of mutton produced was about doubled in proportion to the number of sheep kept. To the improvement of the B. of horses, attention has been paid for a much longer time than to that of oxen and sheep; and to this must, in a great measure, be ascribed the different excellences of some of the well-known breeds employed for very different purposes. The use of the horse in war, and for purposes of pomp and luxury, appears to have been the reason of the higher degree of attention thus paid to it, even from ancient times. The Arabs have long been particularly careful of the B. of their horses, and diligently preserve a record of their pedigree.

What is called *blood* in horses, however, only fits them in a higher degree for certain purposes; and with regard to this as to other animals, the judgment of the breeder must be exercised, as the perpetuation, increase, or combination of particular qualities may be the object which he has in view. Fleetness and strength are important qualities in horses, the extremes of which never coexist in the same animal, but of which a certain combination is for some purposes very desirable; and either of these may be displayed in a great degree without much *bottom*, or power of enduring continued severe exertion—a quality of very high value. The properties most desired in sheep and oxen are very different from those most highly esteemed in the horse—the fleece and the

flesh being chiefly regarded in sheep, the flesh and the milk in oxen. Sometimes a perpetuation of good qualities is the great object of the breeder, and a combination of them in the highest possible degree is aimed at; sometimes, the production of the largest possible quantity of beef or mutton in the shortest time being almost exclusively designed, the breeder neglects considerations which would be of importance if his stock could not be improved by animals obtained from other quarters. Extraordinary differences are certainly found to exist among animals of the same species in the readiness with which they convert food into flesh and fat, and in the age at which they are fit for the hands of the butcher. One effect of the attention bestowed of late upon the breeding of stock, has been to supply the market, to a great extent, with the flesh of younger animals than could previously be sent to it—a change evidently tending not only to the benefit of the farmer, but to the increase of the national wealth; because that land, even without increased produce or grass, sends a greater amount of beef and mutton to market within the same term of years. Those sheep and oxen which exhibit in the highest degree the qualities just referred to, are also characterized by shortness of legs, smallness of bones, smallness of head, and fineness of skin; qualities the very opposite of those which would fit the animal for a wild state and an independent existence.

Some of the most important breeds of domestic animals will be mentioned under their proper heads. It remains for us only to allude here to the rules and physiological principles of breeding; but the latter, in so far as application of them has yet been found practicable, are only the best known principles of physiology (q.v.). In a great measure, however, the rules which guide the breeding of stock have been learned by experience, and are rather to be regarded as contributions to science than as deductions from it. The probable relative influence of the male and female parent upon their progeny, is a point unquestionably of the greatest importance, but concerning which widely different opinions have been maintained; and another much controverted and important point is, the propriety of *breeding in and in*. Practically, the rule is always observed by those who seek the improvement of a *breed*, of selecting the very finest animals possible, both male and female; although a great improvement of the existing stock on a farm is often effected in the most advantageous manner by the mere introduction of males of better quality. The dangers of breeding *in and in* are very generally acknowledged, even whilst it is contended that they may very much be obviated by careful rejection of every faulty animal, and that in this way the utmost advantage may be taken of the very highest improvements; but it is likewise very generally admitted that, if equally improved individuals can be obtained not so nearly related, it is better to seek the perpetuation of the B. by their means. It is a rule also of much practical importance, that an improvement of B. is to be attained not by a *cross* between animals of very different breeds, as between a dray-horse and a race-horse, but only between those which are comparatively similar. The result of the intermixture of very dissimilar breeds is never in any respect satisfactory.

BREE'DÉ, a river in Cape Colony, flowing chiefly through the district of Zwellendam, which contains Cape Agulhas, the most southerly point ef Africa. It rises in the Warm-Bokkeveld, a mountain-basin about lat. 33° 10' S., and long. 19° 30' E., running first to the west, and afterwerds to the south-east; and it enters St. Sebastian's Bay or Port Beaufort, from which, upwards, it is navigable to a distance of 40 miles. Its exports are wool, aloes, skins, feathers, grain, butter, cattle, mules, &c.

BREEZE. See WIND.

BRE'GENZ, a frontier town of Austria, capital of the district of Vorarlberg, is situated at the mouth of the small river Bregenz, which here flows into the Lake of Constance, between the Swiss and Bavarian territories, about 80 miles west-north-west of Innsprück. From the ruins of the castle of Hohenbregenz, on a hill near the town, a very beautiful prospect is obtained of the lake and its surrounding vineyards, &c. B. is one of the oldest towns, and was formerly one of the chief fortified places in the southern part of Germany. The inhabitants (1880) 4736 in number, are engaged in agriculture, horticulture, and cattle-keeping. Cotton-spinning and weaving are also carried on; and articles of wood, gold, and iron, are manufactured. Its position secures B. a large transit-trade in the produce of the district. In the neighborhood lies the mountain-path, the *Bregenzer-Klause*, formerly a strong military position between Swabia and the Tyrol. During the Thirty Years' War, the Swedes, in 1646, stormed and captured the fortress of B., and destroyed the works in the pass.

BRE'HON LAWS (in Irish, *Dlighidh Breitheamhuin*—that is, 'judges' laws'), the name usually given to the system of jurisprudence which prevailed among the native Irish from an early period till towards the middle of the 17th century. The *breitheamhuin* (pronounced *brei-hoo-in*, or *brehon*), from whom the laws had their name, were hereditary judges, who administered justice among the members of their tribe, seated in the open air, upon a few sods, on a hill or rising ground. The poet Spenser, in his *View of the State of Ireland*, written in 1596, describes the B. L. as 'a rule of right unwritten, but delivered by tradition from one to another, in which oftentimes there appeareth great share of equity, in determining the right between party and party, but in many things repugning quite both to God's law and man's: as, for example, in the case of murder, the brehon—that is, their judge—will compound between the murderer and the friends of the party murdered, which prosecute the action, that the malefactor shall give unto them, or to the child or wife of him that is slain, a recompense, which they call an *eric;* by which vile law of theirs many murders amongst them are made up and smothered; and this judge being, as he is called the lord's brehon, adjudgeth for the most part a better share unto his lord, that is, the lord of the soil, or head of the sept, and also, unto himself for his judgment, a greater portion than unto the plaintiffs or parties grieved.'

Spenser was ignorant that pecuniary compensation for manslaughter had obtained in the ancient laws, as well of England as of most European nations. He was mistaken, too, in believing that the B. L. was an unwritten code. Many manuscript collections of the B. L. still exist in public and private libraries in Ireland, England, and Belgium. These manuscripts are regarded as varying in date from the early part of the 14th to the close of the 16th century. For the laws themselves, a much higher antiquity is claimed. On this point, we must be content to quote what has been said on the part of the very few persons who have had an opportunity of making themselves acquainted with the existing collections of the brehon laws. 'So far as we have external evidence to guide us,' say Dr. J. H. Todd and Dr. C. Graves, two eminent Irish antiquarians, 'there is no reason to suspect that the brehon laws have undergone any material change since the time of Cormac Mac Cuilleanain, king and bishop of Cashel, who died 908 A.D. He was a man of great learning and energy, who certainly promoted the execution of considerable literary works, and under whose influence it is not improbable that a systematic compilation of the laws may have been effected. Of this, however, we have no distinct record. On the other hand, we find scattered through all parts of the laws allusions to a general revision of them made in the 5th c., at the instance of St. Patrick, who, in conjunction with certain kings and learned men, is said to have expunged from them all those institutions which savored of paganism, and to have framed the code called the Seanchus Mor. These same documents assert the existence of still more ancient written laws, the greater part of which are ascribed to Cormac Mac Art, monarch of Ireland, in the middle of the 3d century. However slow we may be to acquiesce in statements of this kind, which contradict what we have learned concerning the progress of legislation in the remaining parts of Western Europe, we may readily admit that the subject-matter of many of the laws demonstrates their great antiquity, as it indicates the primitive nature of the society in which they prevailed. In spite of the attempts to efface it, traces of heathenism are still discernible in many parts of them.

'They enumerate various ordeals of a pagan character, which are expressly termed *magical*, and specify the occasions on which a resort to them was prescribed. There are also provisions in the laws of marriage which prove that Christianity could have exercised but a feeble influence at the time when they were enacted. The language in which the brehon laws are written is a convincing proof of their antiquity. They are not composed in a peculiar dialect as many writers have maintained; but if their style differs from that of the vernacular Irish of the present day, as Anglo-Saxon does from modern English, this dissimilarity is to be ascribed mainly to the effects of time, by which the orthography and grammatical forms of the language have been modified, and legal terms and phrases of constant recurrence have become obsolete.' The world of letters will be able, in no long time, to judge for itself on the opinions thus expressed. It is now upwards of twenty years since the publication of the B. L., at the charge of the Irish government, was strongly urged by such men as Guizot, Grimm, and Ranke abroad, and Hallam, Macaulay and Earl Stanhope at home. A commission was accordingly appointed by the Earl of Eglinton in 1852, 'to direct, superintend, and carry into effect the transcription and translation of the ancient laws of Ireland, and the preparation of the same for publication.' The commissioners intrusted the transcription and translation of the B. L. to the two most eminent of Irish scholars—the late Dr. John O'Donovan, professor of Celtic in Queen's College at Belfast; and the late Eugene O'Curry, professor of Irish archæology in the Roman Catholic university of Ireland. These gentlemen have finished their task, the editorship of the work was intrusted to Mr. W. J. Hancock, late professor of political economy in Trinity College, Dublin, and the Rev. Thaddeus O'Mahony, professor of Irish in the university of Dublin. The publication it is reckoned will extend to about eight volumes, of about 550 pages each. Three of these have already appeared—the last in 1873—under title

of *Ancient Laws and Institutes of Ireland*. Along with the Irish text, an English Translation is given, accompanied with preliminary dissertations, glossaries, and indexes, and they give a vivid and characteristic picture of the polity and social life of a Celtic people. A fac-simile reprint of the B. L. has recently been published in 17 volumes by the B. L. Commission.

BREISA'CH, Alt, a very old town of the grand duchy of Baden, situated on an isolated basalt hill on the right side of the Rhine, about 12 miles west of Freiburg. As early as the time of Julius Cæsar, *Mons Brisiacus* was known as a strong military position, and was taken by Ariovistus when he invaded Gaul. Being regarded as the key to the west of Germany, it was a prominent scene of action during the Thirty Years' War, at the conclusion of which it was ceded to the French. During the next century, it frequently changed masters, now belonging to France, and now to Austria. The French destroyed its fortifications in 1744, and during the war of the Revolution in 1793, part of the town was burned by them. In 1806, the French handed it over to the House of Baden. The minster of St. Stephen is a venerable structure in good preservation, and contains several old monuments. Pop. (1880) 3258.

BREI'TENFELD, a village and manor of Saxony, about 5 miles north of Leipsic. It is historically remarkable for three battles, fought on a plain in its neighborhood. The first of these, between the Swedes and the Imperialists, which was fought on the 7th September 1631, was of the highest importance to Europe, as it secured the permanency of Protestantism and the freedom of Germany. Tilly's pride had reached its highest point after the fall of Magdeburg, which took place on the 10th of May 1631; and in the early part of September of the same year, he advanced against the Saxons, with an army of about 40,000 men, for the purpose of forcing the elector, John George I. (who would not submit to the edict of restitution, and was treating with the Swedish king, Gustavus Adolphus), into an alliance with the emperor. No other way remained than for the elector to join the Swedish king, who had just entered Pomerania. Gustavus Adolphus, joined by the Saxons, advanced towards Leipsic, where Tilly lay, who advanced into the plain of Breitenfeld. The imperial forces were completely defeated, and their three most distinguished generals, Tilly, Pappenheim, and Fürstenberg, wounded. The second battle which B. witnessed again resulted in the triumph of Swedish valor: it took place on the 23d of October 1642, between the Swedes, headed by Torstenson, one of the pupils of Gustavus, who had invested Leipsic, and the Archduke Leopold, with General Piccolomini, who were advancing from Dresden to its relief. The Swedes gained a complete victory over the Imperialists, who fled into Bohemia, leaving behind them 46 cannon, 121 flags, 69 standards, and the whole of their baggage. The third battle of which B. was the scene, was fought on the 16th of October 1813, and was part of the great contest known as the battle of Leipsic.

BRE'MEN, one of the three free cities of Germany, is situated on the Weser, about 50 miles from its mouth. Pop. (1880) 112,158, nearly all Protestants. B. is divided into the old and the New Town —the former on the right, the latter on the left side of the river, which is spanned by four bridges. The ramparts and bastions round the old town have been levelled and formed into public promenades, which are laid out with excellent taste. Among the principal buildings, the Cathedral (built about 1160), the Gothic Town-hall (begun about 1405), with its famous wine-cellar, said to contain hock of the vintage of 1624, the Exchange, the Museum, the Post-office, and the Observatory of Dr. Olbers, from which he discovered the planets Pallas and Vesta, are remarkakle. The position of B. makes it the emporium of Brunswick, Hesse, and other countries through which the Weser flows. Besides its excellent water-communication, it is connected by railways with the whole of Western and Central Germany. B. is an exceedingly thriving place, its trade having more than doubled within the last ten years. Large vessels stop at Bremerhaven, where there is a spacious harbor constructed, about 38 miles below B., with which it is connected by electric telegraph. Vessels not drawing more than 7 feet of water can come up to the town itself. B. carries on an extensive commerce with the United States of America, the West Indies, Africa, the East Indies, China and Australia. Its great foreign trade, however, is with the United States, from which alone, in 1880, it imported produce of the estimated value of £9,000,000, exporting in return goods to the value of £4,800,000. With the exception of Hamburg, no continental port ships so many emigrants to the United States as B., through its main port at Bremerhaven. The total number of vessels arriving at B. in 1880 was about 2500, with a tonnage of above 8,000,000 tons; the tonnage cleared was rather smaller. The number of ships belonging to the port in 1880 was 320, with a burden of 261,357 tons. In 1880, the value of the imports amounted to £27,920,000, exports to £25,565,000; whereas in the year 1858, the imports were valued at only £8,237,000, and the exports at about £8,000,000. The chief imports are tobacco, coffee, sugar, cotton, rice, skins, dyewoods, wines, timber, hemp, &c.

The exports consist of woollen goods, linens, glass, rags, wool, hemp, hides, oil-cake, wooden-toys, &c. Large quantities of tobacco are re-exported. B. has manufactures of woollens and cottons, cigars, paper and starch, and extensive ship-building yards, breweries, distilleries, and sugar-refineries. The cigar and sugar manufactures have of late declined, the former on account of the increase of duty. In 1872, it is said that 2500 hands were engaged in making cigars. It has steam-communication with New York, and Hull, Havana, the north coast of South America, &c.

B. first became of historical note in the 8th c., when it was erected into a bishopric by Charlemagne. It soon attained considerable commercial importance, and became one of the principal cities of the Hanseatic League (q. v.). Having frequently suffered at the hands of the French, it was, in 1810, incorporated with that empire; but it recovered its independence in 1813, and by the Congress of Vienna was admitted, in 1815, as one of the Hanse towns, into the Germanic confederation. In 1867, it became a member of the North German confederation, and now it forms part of the German empire. The area of its territory is about 100 square miles; pop., including the town of B. (1880) 156,723. The government is intrusted to a senate of 18 members, two of whom are chosen burgomasters, and to a municipal council of 150 burgesses.

Bremerhaven, a port on the Weser, near 10 miles from its mouth, was founded by Bremen in 1827, on ground acquired from Hanover, and soon became a thriving place. It has extensive docks and quays, and may be regarded as the seaport of Bremen. Pop. in 1875, 12,501.

BREMER, Fredrika, the well-known Swedish novelist, was born near Abo, in Finland, 17th August 1801; but when she was only three years old, her father removed to Sweden. As a child of eight, she had already begun to write verses; and the works of German poets, Schiller more especially, exercised a most powerful influence over her youthful imagination. Her original novels first made their appearance under the general title *Tekningar ur Hvardagslifvet*, at Stockholm, in 1835.

It was not, however, till 1842 that the English public hailed with delight the appearance, in an English dress, of *The Neighbors*, perhaps the most universally popular of all Fredrika B.'s charming pictures of domestic life in Sweden. Encouraged by its enthusiastic reception, Mrs. Howitt subsequently published translations of *The Diary*, *The H. Family*, *The President's Daughters*, *Brothers and Sisters*, *Life in Dalecarlia*, and *The Midnight Sun*. In 1849, Miss B. visited the United States, and there spent two years, passing some time in England on her return. In her *Homes of the New World*, published simultaneously in England, America, and Sweden, in 1853, she not only presents us with exquisite descriptions of scenery, and vivid pictures of social life, but with sound and comprehensive views on political and moral subjects. Returning to her home in Sweden, to find a beloved sister dead, Miss B. devoted her talents and energies to the carrying out of certain philanthropic objects, in which she had throughout life felt deep interest, more especially the education of the poorest classes. As a writer of fiction, she is distinguished for feminine delicacy, shrewd sense, humor, deep knowledge of human nature, and a graphic and forcible style. Her works have been translated into almost all the languages of Europe. She died in 1865. Her Life and unpublished writings were issued by her sister in 1868.

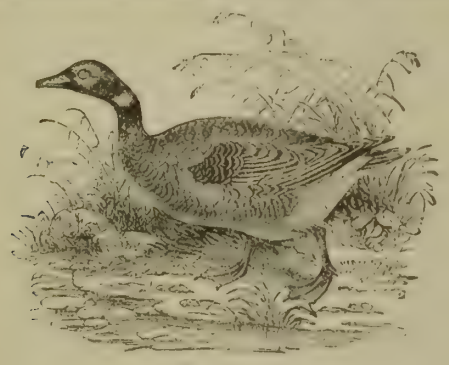
BRE'NNER PASS, a pass in the main chain of the Alps, on the road between Innsbruck (q. v.) on the north and Botzen (q. v.) on the south, connecting the south of Germany with Venice and the north-east of Italy. The B. P. is the lowest which crosses the main chain of the Alps, the summit being only 4775 feet above the level of the sea. Lofty mountains rise above it to the further height of more than 7500 feet, yet the scenery of the pass is less sublime and less interesting than that of any other of the great passes of the Alps. It is open at all seasons of the year. At the summit of the pass is the village of Brenner, a resting-place for travelers, with a pop. of about 400. The climate here is so severe that corn seldom ripens. Here the traveler finds in close contiguity the Eisach, a small stream, which, after growing to be a considerable river, joins the Adige, and the Sill, a tributary of the Inn; the one stream flowing to the Gulf of Venice, and the other into the Black Sea. On 18th August 1867, a railway through the B. P. was opened, and thus a complete line of railway communication was established between Germany and Innsbruck to Botzen, in a direct line is only 52 miles, but by the windings of the road or of the railway, it is much increased.

BRENNUS, the name, or rather the title of several Gallic princes, is probably a Latinized form of the Kymric word *Brenhin*, which signifies a king. The most famous B. was that leader of the Gauls who, in 390 B.C., crossed the Apennines, and hurrying through the country of the Sabines, at the head of 70,000 men, encountered and overthrew on the banks of the Allia (q. v.) the Roman army.

Had the barbarians immediately followed up their advantage, Rome might have been obliterated from the earth; but instead of doing so, they abandoned themselves to drunken delights on the battle-field, and gave the Romans time to fortify the Capitol, whither were removed all the treasures and holy things of the city. When B. entered the gates, he found that all the inhabitants had fled, with the exception of the women, children, and old men, the last of whom, with pathetic heroism, had resolved not to survive the destruction of their homes, and so, the chief among them, clothed in their robes of sacerdotal or consular dignity, and sitting in the curule chairs, waited the approach of their enemies, and received their death in majestic silence. B., having plundered the city, now besieged the Capitol for six months. During the beleaguerment occurred the famous night-attack, which would have been successful had not the cackling of the geese, kept in Juno's temple, awakened the garrison. At length, however, the Romans were compelled to enter into negotiations with the besiegers. They offered 1000 lbs. of gold for their ransom, which was agreed to. According to Polybius, B. and his Gauls returned home in safety with their booty; but the rather mythical Roman traditions affirm that, just as the Gauls were leaving the city, Camillus, who had been recalled from banishment, and appointed dictator, appeared at the head of an army, attacked them, and, in two bloody battles, slew the whole of the barbarians to a man.

Another B., who occupies a conspicuous place in history, was that Gallic chief who invaded Greece, 279 B.C., at the head of 150,000 foot and 61,000 horse. After desolating Macedonia, B. forced his way through Thessaly to Thermopylæ. The Grecian army fled at his approach. B. now rushed on with a division of his great host to Delphi, which he had resolved to plunder; but the Delphians, having taken up a very advantageous position on some rocks, resisted his further progress. Assisted by the terrors of an earthquake and a terrible storm, besides, according to reverential tradition, by the supernatural help of Apollo, they utterly routed the Gauls, who fled in dismay. B. was taken a prisoner, and drank himself to death in despair.

BRENT GOOSE, or BRENT BARNACLE. This bird has been already noticed under BARNACLE (q. v.). We add here a few sentences from Colonel Hawker's *Instructions to Young Sportsmen*, which we borrow from Yarrell's *British Birds*. They refer to wild-fowl shooting on the coasts of Dorsetshire and Hampshire. 'Towards November or December, we have the Brent Geese, which are always wild unless in very hard weather. In calm



Brent Goose.

weather, these geese have the cunning, in general, to leave the mud as soon as the tide flows high enough to bear an enemy; and then they go off to sea, and feed on the drifting weeds. To kill Brent Geese by day, get out of sight in a small punt, at low water, and keep as near as possible to the edge of the sea. You will then hear them coming like a pack of hounds in full cry, and they will repeatedly pass within fair shot, provided you are well concealed, and the weather is windy to make them fly low. Before you fire at them, spring suddenly up, and these awkward birds will be in such a fright as to hover together and present a mark like a barn-door.'—The extensive muddy and sandy flats between Holy Island and the coast of Northumberland are a great winter resort of this species. It is also particularly abundant on muddy and sandy flats in Cromarty Bay. The markets, both of London and Edinburgh, are well supplied with it during winter. The B. G. is known in some parts of England as the Black Goose; it is considered the most delicate for table of all its tribe, and is perhaps as much sought after as any. The B. G. differs in its habits from the common gray lag and several other species, inasmuch as it never feeds on fresh-water herbage, its tastes being exclusively salinous. B. G. may be distinguished, when on the wing, by their black bodies and white tails. Folkhard, in his excellent work *The Wild Fowler*, gives much interesting information regarding this bird.

BRE'NTA (*Medoacus Major*), a river of North Italy, rises from two small lakes in the Tyrol; flows first in a southern, then in an eastern course through the Venetian territory; passes the towns Cismona and Bassano; receives an arm of the Bacchiglione below Padua, where it becomes navigable; and falls into the Gulf of Venice, at the haven of Brondolo. The ancient bed of the B. was, some centuries ago, altered by the Venetians, who feared that their lagoons might be choked with sand by its floods. Afterwards, the old bed of the river was made use of as a canal—the *Naviglio di Brenta Magra*, which forms the chief communication by water between Venice and Padua; while the B. is but little used for navigation.

BRENTA'NO, CLEMENS, known as a novelist and dramatic poet, and as the brother of Goethe's 'Bettina,' was born at Frankfort-on-the-Maine, 1777. He studied at Jena, and afterwards resided successively at Frankfort, Heidelberg, Vienna, and Berlin. In 1818, through a morbid discontent with himself and his fellow-men, he retired to the cloister at Dülmen, in Münster. Latterly, he resided at Regensburg, Munich, and Frankfort-on-the-Maine, where he led the life of a recluse, and gained a considerable reputation on account of his sarcastic wit. He died at Aschaffenburg, on the 28th of June 1842. In his earliest poems the peculiarities of the 'romantic school' of his time are carried to excess. His dramatic productions, such as *The Merry Musicians, a Musical Drama* (Frankfort, 1803), in which there are some gems of lyric poetry, *Ponce de Leon* (Göttingen, 1804), &c., are characterized by great dramatic power, amusing though rather far-fetched wit, and a wonderful flow of humor. Perhaps his most successful piece as a drama is *The Founding of Prague* (Pesth, 1816). B. was most successful in his smaller novels, particularly in the *History of Caspar the Brave and the Fair Anneri* (2d edit. Berlin, 1831), which German critics call a '*chef-d'œuvre* in miniature.' His last work, the legend of *Gokel, Hinkel, and Gakeleia* (Frankfort, 1838), was intended as a satire upon the times in which he lived. He has received the grateful acknowledgment of his countrymen for his renovation of the good old history of George Wickram of Kolmar, which he published under the title of *The Thread of Gold* (*Der Goldfaden*, Heidelb. 1809).

BRE'NTFORD, the county town of Middlesex, on both sides of the Brent, at its confluence with the Thames, 7 miles west-south-west of London, and where the Thames is crossed by a bridge leading to the Kew. It consists chiefly of one long irregular street. Pop. (1881) 11,808. It has large gin-distilleries, a soap-work, and the works of the west London Water Company. There are many market-gardens in the vicinity. Here Ironside defeated the Danes in 1016, after expelling them from London; in 1558, six martyrs were burned at the stake; and in 1642, the Royalists under Rupert defeated the Parliamentarians under Colonel Hollis.

BRE'SCIA, a city of Italy, capital of the province of the same name, in Lombardy, about 60 miles east-north-east of Milan. It is romantically situated on the rivers Mella and Garza, in a wide fertile plain, at the base of several hills. The railway from Milan to Venice passes through Brescia. The city is for the most part regularly built, and, besides two cathedrals, the old and the new, it has numerous ancient churches, adorned with pictures and frescoes, including many by masters of the Venetian school. Several interesting antiquities have been discovered. It has a valuable public library, the *Biblioteca Quiriniana*, founded and nobly endowed about 1750, by Cardinal Quirini, a munificent encourager of literature. It contains upwards of 30,000 volumes, with many rare manuscripts. The population in 1881 was 43,354. B. has manufactures of woollen, silk, leather paper, &c., and its wine is of good quality. The old name of B. was *Brixia*, and its inhabitants were allied with the Romans when Hannibal crossed the Alps. It was captured by the Huns during their migrations, and afterwards passed through the hands of the Longobards, Charlemagne, the Franks, and the Germans. It was taken by the French under Gaston de Foix, in 1512, when it is stated that more than 40,000 of the inhabitants were massacred. The city never fully recovered from the effects of that inhuman sack and pillage. In March, 1849, B., as the only important town opposed to Austrian rule in Lombardy, was besieged by Haynau, and forced to capitulate.

BRE'SLAU, the capital of the province of Silesia, Prussia, is situated at the confluence of the Ohlau and Oder. Next to Berlin, it is the most populous city in Prussia; its pop. was 207,997 in 1870; and in 1880, 272,390, more than the half of whom are Protestants. The Oder divides it into two parts, which are connected by numerous handsome bridges. The fortifications have been converted into beautiful promenades, and the ditch has been transformed into an ornamental sheet of water. The streets of the new portion of B. are spacious and regular, and the houses stately and handsome, affording a pleasant contrast to the sombre, massive structures of the old town. Educational institutions are numerous, including a university founded by the Emperor Leo-

pold I. in 1702, and now accommodating from 900 to 1000 students. The library contains 300,000 volumes. B. has many churches, the most remarkable being the Protestant church dedicated to St. Elizabeth, with a steeple 364 feet in height (the highest in Prussia), and a splendid organ. The position of B., in the center of the manufacturing districts of the province, secures it a large trade, which its railway connection with all the important cities on every side, in addition to the facilities of communication which the Oder affords, enables it to turn to the best account. It has manufactures of linen, woollens, cotton, silks, lace, jewelry, machines, earthenware, soap, allum, starch &c., and upwards of 100 distilleries; and a trade in corn, coal, metals, timber, hemp, and flax. B. is a city of Slavonic origin, and was for many centuries occupied alternately by the Poles and the Bohemians. It afterwards passed to Austria, from which it was taken by Frederick II. of Prussia, in 1741. Six years afterwards, it was captured by the Austrians, after a bloody battle, but retaken by Frederick in about a month. From that time until 1814, when its fortifications were completely demolished, it was frequently besieged.

BRE'SSAY, one of the Shetland Isles, east of the Mainland, and separated from Lerwick by Bressay Sound. It is 6 miles long and two broad, and is composed of Devonian rocks. It supplied Lerwick with peat, until the proprietor, fearing that the peat might be exhausted, stopped exportation; and it continues to supply the Shetland Isles with slates. Pop. (1881) 847, chiefly fishermen. Bressay Sound is one of the finest natural harbors in the world, and is a rendezvous for herring-boats, and for all whalers and other vessels proceeding north. East of B , and separated from it by a narrow and dangerous sound, is a rocky isle, called Noss, 6 miles in circuit, girt on all sides by perpendicular cliffs, and rising abruptly from the sea to the height of nearly 600 feet, with a flattish top. A detached rock, or holm, on the S.E. side of the Noss, used to be communicated with by means of a cradle or wooden chair run on strong ropes, stretched across a yawning gulf, and admitting a man with a sheep to be drawn over at a time.

BREST, a strongly fortified city, in the department of Finistère, France, and one of the chief naval stations of the republic, is situated in lat. 48° 24′ N., and long. 4° 29′ W., on the north side of the Bay or Road of Brest, which forms one of the finest harbors in the world. The only entrance to the bay is by a narrow channel called *Le Goulet*, which is scarcely a mile wide, and is strongly defended by batteries ; the difficulty and danger of access to hostile ships being increased by certain rocks in the center of the channel. A new floating dock, quays, and pier were completed in 1876 at a cost or 22,500,000 francs. The small river Penfel flows through the town, which is, on the whole, irregularly built on an uneven site, and has steep, narrow, dark, and very dirty streets. In some parts, communication between the lower and upper parts of the town can be effected only by stairs. The new quarter, the parade, and the quays, are more cleanly. B. has extensive ship-building yards, rope-walks, store-houses, &c. ; its industry, indeed is confined entirely to the equipment of the navy in its various branches. It has telegraphic communication with America by a submarine cable. The Bagnes (q. v.) or hulks no longer exists, the prisoners having been removed to the penal colony of Cayenne. Pop. (1881), exclusive of garrison, 64,599. B. is a very ancient place, but it was not of much importance until the 17th century. Its splendid position made it an object of contention to French, English, and Spaniards. In 1631, Cardinal Richelieu resolved to make it a naval station, and commenced the fortifications, which were completed by Vauban, but since have been greatly extended. In 1694, the English under Lord Berkeley were repulsed here with great loss. In 1794, the French fleet, under Admiral Villaret-Joyeuse, was defeated off B. by the English fleet under Admiral Howe.

BRETAGNE, or BRI'TTANY (*Britannia Minor*), a peninsula in the north-west of France, formerly a province, and now divided into the departments of Finistère, Côtes-du-Nord, Morbihan, Loire-Inférieure, and Ille-et-Vilaine, is surrounded by the sea on the N., W., and S. W. Though the height of the mountains is nowhere considerable, their structure gives to the peninsula a wild and savage aspect. Clay-slate forms the center of the country, and masses of granite rise in the north and the south.

The climate is often foggy, and subject to violent storms of wind. Large tracts of land lie uncultivated; but in the well-watered valleys, vegetation is luxuriant. In ancient times, B., under the name of Armorica, was the central seat of the confederated Armorican tribes, who were of Celtic and Kymric origin. Traces of them still remain in the old Kymric dialect of the three most westerly departments, and in the numerous so-called Druidical monuments. The name *Armorica* was changed for that of B., in consequence of the numerous immigrations from Great Britain in the 5th and 6th centuries. The peculiar, shut-in situation, and the characteristics of soil and climate in B., seem to have had a powerful effect on the character of its people. The Breton has generally a tinge of melancholy in his disposition; but often conceals, under a dull and indifferent exterior, a lively imagination and strong feelings. 'The tenacity with which the Breton clings to the habits and belief of his forefathers, is apparent by his retention of the Celtic language almost universally in Basse B., and by his quaint costume, which in many districts is that of the 16th century.' The greater number of the people are found to be ignorant and coarse in their manners, and their agriculture is of a very rude character, by no means calculated to develop the natural resources of the country. Until within recent years, B. had escaped the observation of tourists; but it has now been found out, and seems likely to be considerably run upon, as well as to have a pretty extensive literature of its own. It will be some time yet before it is exhausted, and apart from the beauty of its scenery, it possesses great interest, as the only place where men can be seen living and acting much as our forefathers did three centuries ago. Under the Romans, the country, after 58 B.C., was made the *Provincia Lugdunensis Tertia;* but its subjugation was hardly more than nominal, and it was entirely liberated in the 4th c., when it was divided into several allied republican states, which, afterwards, were changed into petty monarchies. B. became subject to the Franks in the reigns of Charlemagne, and was handed over by Charles the Simple to the Northmen in 912. After some fierce struggles, the Bretons appear to have at length acknowledged the suzerainty of the Norman dukes. Geoffroi, Count of Rennes, was the first to assume the title of Duke of Bretagne in 992. The duchy of B. was incorporated with France in 1532, by Francis I., to whom it had come by marriage, and subsequently shared in the general fortunes of the empire, but retained a local parliament until the outbreak of the Revolution. During the Revolution, B., which was intensely loyal, was the arena of sanguinary conflicts and especially of the movements of the Chouans (q. v.), who re appeared as recently as 1832. Daru, *Histoire de B.* (Par. 1826)' Roujoux, *Histoire des Rois et des Ducs de B.* (Par. 1829); Courson *La B. du 5e au 12e Siècle* (1863); Le Saint, *La B. Ancienne et Moderne* (1873); De Kerorguen, *Recherches sur les Etats de B.* (1875).

BRETIGNY, a village of France, in the department of the Eure et-Loir, about six miles south-east of Chartres, on the railway between Paris and Orleans. B. is celebrated as the place where, in 1360, Edward III. concluded a peace with France, by which John II. of France was released from his captivity in England, on agreeing to pay 3 million crowns for his ransom, England renouncing her pretensions to Normandy, Anjou, Maine, and Touraine, and being confirmed in her possession of Gascony, Guienne, and several other parts in France recently acquired by conquest.

BRETON DE LOS HERREROS, Don Manuel, the most popular of modern Spanish poets, was born 19th December 1800, at Quel, in the province of Logroño; received his earliest education in Madrid; and served as a volunteer in the army from 1814 to 1822. Subsequently, he held several situations under government, but always lost them on account of his expression of liberal opinion. As early as his 17th year he wrote a comedy, entitled *A la Vejes Viruelas*, which, in 1824, was brought upon the stage with great success. Henceforward he furnished theatrical managers with more than 150 pieces, partly original, partly adaptations from the older Spanish classics, and partly translations from the Italian and French, most of which have been highly popular. In addition to these, B. published *Poesías Sueltas* (Madrid, 1831, and Paris, 1840); several volumes of satirical verse; a long humorous poem, called *La Desvergüenza, Poema Jócoserio* (Madrid, 1858), &c. All B.'s poems are remarkable for their singularly sweet, yet powerful diction, and for the harmony of the versification. His peculiar sphere is the comic and the satirical, in which the Spanish or national qualities of his genius find their freest expression, and in which also he displays most ease and self-reliance. B. superintended the issue of a collected edition of his poetical works in 1850—1852 (5 vols., Madrid). He died at Madrid in November 1873.

BRETSCHNEIDER, Heinrich Gottfried, a man remarkable for his unsettled life, eccentric habits, and satirical writings, was born at Gera, March 6, 1739. He was first sent for education to the Institute of Herrnhuters at Elbersdorf, and afterwards to the Gymnasium at Gera. He became captain of horse in a Prussian volunteer corps, in which service he was made prisoner, and retained in a French fortification till 1763. In 1775, B. visited England, France, and Holland; and in 1778 was nominated librarian to the university of Ofen, where he was persecuted by the Jesuits, whose hatred he had excited. This circumstance brought him under the notice of Joseph II., who, in 1782, appointed him one of the inspectors of studies. He died 1st November 1810. B. was the author of tales, poems, and satires. The latter are attacks upon every kind of injustice and falsehood. In his 'Almanac of the Saints (*Almanach der Heiligen*) for the year 1788, with Copperplates and Music, printed at Rome, with the permission of the Principals,' the priesthood is severely attacked, and the legends of the monks ridiculed. Like Nicolai, B. was very bitter against the 'Werther' mania which was so prevalent in his time.

BRETSCHNEIDER, KARL GOTTLIEB, a distinguished German theologian, born 11th February 1776, at Gersdorf, in Saxony, studied theology at Leipsic, was appointed pastor at Schneeberg in 1807, general superintendent at Gotha in 1816, and in 1840 obtained the dignity of councillor of the Upper Consistory. He died 22d January 1848. B. has acquired a reputation for sober, reflective, rationalistic thought. The character of his intellect rendered him unable to enter into the profound speculations of men like Schleiermacher and Schelling; but nevertheless by his diligence, clear, incisive understanding, and strength of character, he has secured a permanent place in the history of German theology. His most important work in dogmatics is the *Manual of the Evangelical Lutheran Church* (2 vols., Leip. 1814—1818). In 1824, B. published *Lexicon Manuale Græco-Latinum in Libros Novi Testamenti* (2 vols., Leip. 1824). In 1832, appeared *Der Simonismus und das Christenthum;* in 1835, *Die Theologie und die Revolution*. B. also published many sermons, which have been well received, and in other departments of theology and literature he is considered to have done important service.

BRE'TTEN, a town of Baden, about 13 miles east of Carlsruhe, chiefly noteworthy as the birthplace of Melanchthon. The house in which he was born is pointed out to travelers. Pop. (1880) 4034.

BRETTS AND SCOTS, THE LAWS OF THE (Lat. *Leges inter Brettos et Scotos*, Old Fr. *Lusage de Scotis et de Bretis*), the name given, in the 13th c., to a code of laws in use among the Celtic tribes in Scotland. The 'Scots' were the Celtic people dwelling in the western and more mountainous districts north of the Forth and the Clyde, who, when it became necessary to distinguish them from the Teutonic inhabitants of the low country, received the names of 'the Wild Scots,' 'the Irishry of Scotland,' and, more recently, 'the Scotch Highlanders.' The 'Bretts' were the remains of the British or Welsh people, who were at one time the sole or chief inhabitants of the region now divided into the shires of Dumbarton, Renfrew, Ayr, Lanark, Peebles, Selkirk, Roxburgh, Dumfries, and Cumberland. This province was for some centuries an independent kingdom, known by the name of 'Cambria" 'Cumbria,' 'Strathclyde,' and 'Strathclyde and Reged.' It became, about the middle of the 10th c., a tributary principality held of the king of the English, by the heir of the king of the Scots. It so continued till after the beginning of the 12th c., when Cumberland having been incorporated with England, the gradual absorption of the rest of the territory into the dominions of the king of the Scots seems to have been imperceptibly completed. The last 'Prince of Cumbria' named in record was the brother and heir of King Alexander I. of Scotland, 'the Earl David,' as he was called, who, on his brother's death in 1124, himself became king of the Scots. No more is heard of Cumbria as a principality; but 'the Welsh' continue to be named among its inhabitants, in the charters of King David's grandsons—King Malcolm the Maiden (1153—1165), and King William the Lion (1165—1214). And they seem to have retained more or less of their ancient Celtic laws until after the beginning of the 14th century. It was not until the year 1305 that an ordinance of King Edward I. of England, who appeared then to have reduced all Scotland to his subjection, decreed 'that the usages of the Scots and the Bretts be abolished, and no more used.' It is unknown how far this prohibition took effect.

Of the code which it proscribed, only a fragment has been preserved. It was first printed by Sir John Skene, in his *Regiam Majestatem* (Edin. 1609). But by far the best edition is that of Mr. Thomas Thomson and Mr. Cosmo Innes, in the *Acts of the Parliaments of Scotland*, vol. i., pp. 299—301 (Edin. 1844), where the laws are given in three languages—Latin, French, and English. The French version, which is the oldest, is printed from a manuscript of about 1270, formerly in the public library at Bern, in Switzerland, now in the Register House at Edinburgh. The fragments of the 'laws of the Bretts and Scots' thus published, is of much the same nature as the ancient laws of the Anglo-Saxons, the Welsh, the Irish, and other nations of Western Europe. It fixes the *cro*, or price at which every man was valued, according to his degree, from the king down to the churl, and which, if he were slain, was to be paid to his kindred by the homicide or his kindred. The cro of the king was 1000 cows; of the king's son, or of an earl, 150 cows; of an earl's son or of a thane, 100 cows; of a thane's son, 66⅔ cows; of the nephew of a thane, or of an ogthiern, 44 cows and 21⅓ pence; and of a villain or churl, 16 cows —all persons of lower birth than a thane's nephew, or an ogthiern, being accounted villains or churls. The cro of the married woman was less by a third than the cro of her husband. The cro of the unmarried woman was as much as the cro of her brther. Other chapters fix every man's *kelchyn* or *gelchach*, *gallnes*, and *enauch*—Celtic terms not yet satisfactorily interpreted, but apparently equivalent to the *fyhtwite*, *mund*, and *manbot* of the Anglo-Saxons, as the *cro* of the Bretts and Scots appears to answer to the *wergild* of the English. A chapter 'of blood-drawing'—corresponding with the *blodwite* of the Anglo-Saxons—fixes the fine to be paid for a blow to the effusion of blood, according to the degree of the person wounded and the place of the wound.

BREUGHEL, the name of a famous family of Dutch painters.—PETER B., the head of the family, was born in the village of Breughel, near Breda, in 1510 (or, as others say, 1530), and died at Brussels in 1570 or 1590. He was a scholar of Peter Koeck van Aelst, traveled through Italy and France, and on his return, fixed his residence at Antwerp. He painted chiefly the pleasures of rustic life, for which he himself had a great relish, and which he transferred to his canvas with a clear insight and vivid coloring, though unnecessarily exceeding at times the coarseness of his subject.

He also executed several historical pieces, such as his 'Building of the Tower of Babel,' now preserved in the gallery at Vienna. —His son, PETER B., distinguished by the strange title 'Hellish Breughel'—because he loved to paint scenes in which the leading characters were devils, hags, robbers, &c.—was born about 1569, and died 1625. His paintings of 'Orpheus' and the 'Temptation of St. Antony' are the most remarkable of his pieces.—JAN B., brother of the preceding, and on account of the splendid apparel which he wore when he became rich, usually called Velvet B., was born 1568 or 1575, and died 1625 or 1640. He was an industrious painter, distinguished for his landscapes and for his minute finish of small figures. In concert with Rubens, who supplied the two chief figures, he painted 'Adam and Eve in Paradise,' and 'Vertumnus and Bellona.' These, with the 'Four Elements,' are his chief works.—Other members of the same family were known as painters: AMBROSE B., director of the Academy of Painting, Antwerp, between the years 1635 and 1670; ABRAHAM B., a painter of fruits, flowers, and birds, lived long in Rome and Naples, where he died in 1690; JAN BAPTIST B., born in Rome, died 1700; and finally, CASPAR B., both of whom were flower-painters.

BREVE. See ANT-CATCHER.

BREVE, a note in music, which, in the old notation of Guido d'Arezzo, had the value of two whole bars. The note for a whole bar in modern notation is called semibreve, and has the value of four crotchets. In triple time, the B. contained three semibreves. The B. is now only used in *a la capella* movements, psalm-tunes, and fugues, or at the close of a composition.

BREVE, or BRIEVE, in the practice of the Scotch law, is a writ issuing from Chancery in the name of the crown, to a judge, ordering him to try by jury the points or questions stated in the breve. In ancient times, these writs appear to have been the foundation of almost all civil actions in Sctoland; but they are now only used in the following cases: 1. B. of Inquest, now, however, superseded by a petition of service, according to the 10 and 11 Vict. c. 47. The object of the proceeding is judicially to ascertain the heir of a deceased person. 2. B. of Tutory, the purpose of which is the appointment, as guardian to a pupil, of the nearest agnate or person most nearly related through the father. 3. Breves of Idiotry and Furiosity, by which the mental condition of a party may be determined for the appointment, in case of ascertained insanity, of a guardian or curator.

In the B. of idiotry, the direction is to inquire whether the person is of unsound mind, furious, and naturally an idiot. In the breve of furiosity, it is, whether he be of unsound mind, prodigal, and furious. 4. B. of Terce. The object of this writ is to 'cognosce the widow to her terce'—that is, to enable her to recover her terce or dower. It is issued to the sheriff of the county, and the jury under his presidency are directed to inquire whether the claimant was the lawful wife of the deceased, and whether the husband died infeft in the lands from which the terce is claimed. The verdict of the jury gives the widow her terce, and the judge then 'kens' her to it. See TERCE, and KENNING TO THE TERCE. 5. B. of Division amongst heirs-portioners. By means of this B., an heir-portioner—that is, one of two or more sisters succeeding in equal portions to a landed estate—may have her share of the lands separated or set apart by a judge, who appoints an inquest, or jury of fifteen persons, to measure the land, and make a division; the jury report to the judge; and lots being cast for the different shares, the judge decides accordingly. This form is, however, now seldom used, an arbitration being more generally resorted to. See INHERITANCE, SUCCESSION, HEIRS-PORTIONERS.

BREVE'T (Fr. a writ or warrant), in the British army, is a promotion of officers, now strictly limited in its application, but before 1854 a recognized, though occasional mode of conferring a large measure of general promotion throughout the army. It took place under various circumstances. If no special cause interfered, a general promotion by B. used in former times to be made once in about six years; but in more recent years it was limited to very special occasions, as a coronation, the birth of an heir to the throne, the termination of some great war, &c., and was limited to officers who had some particular claim to promotion. The

officers so promoted obtained an increase of rank, and in some cases pay, even if they had never served in the field.

A B. was determined on by the cabinet, and carried out by the commander-in-chiefs. The officers expected it, as one of the implied conditions on entering the service, and it had formed part of the British military system ever since the time of James II.; but it was unsatisfactory, because the flow of promotion caused by it was arbitrary, uncertain, and much liable to abuse. There were brevets, arising out of the various circumstances above indicated, in 1837, 1838, 1841, 1846, 1851, and 1854. On these occasions, lieutenant-generals, major-generals, colonels, lieutenant-colonels, majors, and captains received a promotion of one grade in rank. On one of these occasions, 200 colonels were at once made major-generals. The higher the rank, the higher the pay, as a general rule; and therefore the cost to the nation is always increased for a time after each brevet. Thus the B. of 1837 occasioned an annual increase of £11,000; that of 1838, £7000; of 1841, £15,000; of 1846, £21,000, &c.; but it must not be forgotten that death and sales had in the intervals cleared off perhaps an equal number of officers at the higher rates of pay. In 1854, the new major-generals alone involved an additional charge of £18,000 a year.

The above description applied before 1854. In that year, general brevets were abolished—a fixed establishment of general officers being substituted. The only brevets now are obtained by service of five years as lieutenant-colonel (making the officer brevet-colonel, without increase of pay); by distinguished service in the field, applicable to lieutenant-colonels, majors, and captains (carrying the substantive pay of the higher rank, except in the case of the lieutenant-colonel); and by succession, when a death occurs among the establishment of general officers. In this last case there is no brevet promotion to the rank of colonel, but the senior major in the whole army and marines becomes a brevet-lieutenant-colonel without increase of pay, and the senior captain a brevet-major with 2*s.* a day extra. Officers become major-generals, in accordance with their seniority as brevet-colonels, and it will be seen, from the above description, that the brevet rank of colonel which is the stepping-stone to major-general, is obtainable *by service only*.

Other matters having reference to this subject will be found treated under the article COMMISSIONS, ARMY.

As brevet-rank was neither purchasable nor saleable, the abolition of the purchase-system made no alteration.

There is no B. promotion in the navy.

BRE'VIARY. By this title we are to understand an *abbreviation*, as well as an amended arrangement of the more ancient offices used at the Seven Canonical Hours, which are Matins, Prime, Tierce, Sext, Nones, Vespers, and Compline. See CANONICAL HOURS. The books in which these offices were contained were formerly distinct—viz., 1. The *Psalter*, which included the Psalms of David according to St. Jerome's Galbian version, the Te Deum, the Athanasian Creed, &c.; 2. The Bible; 3. The *Antiphonarium*, containing the anthems and responsories; 4. The *Hymnarium*; 5. The *Collectarium*, or the collects to be said at the end of the services; 6. The *Homilarium*, *Passionarium*, and *Martyrologium*, containing the comments of the Fathers upon the gospel of the day, and accounts of the martyrdoms of the saints for each distinct festival. Out of all these separate books, the B. was compiled, about the 11th c., by Pope Gregory VII., as is supposed; the lessons, anthems, hymns, and responsories for the different days of the year being all arranged, in their proper places, in the same volume with the psalter, prayers, &c. In later times, the B. was divided into two parts, one for each half of the year, as was the case with those of Salisbury, York, and Hereford, used in England; and afterwards into four parts, so as to be more portable, whence it was also called *Portiforium*. It may perhaps be necessary to inform our Protestant readers, that the B. is an entirely distinct book from the Missal (q. v.), the latter containing the proper offices for the services of the sacrifice of the mass.

The last settlement of the B. was under the pontificate of Pius V., and his bull of 1568 is that by which the present daily office of the Roman Church is authorized. This edition was compiled by the College of Sacred Rites at Rome, in conformity with the decrees of the Council of Trent, because of the variety of *Uses*, as they were called, which at that time existed in different dioceses. The bull of Pius V. abolished the use of all breviaries, except such as could prove a prescription of 200 years. This exception would have extended to the breviaries of Salisbury and York, if the Church of England had not already thrown off Rome's supremacy, and compiled a new Book of Common Prayer for herself. After this, in 1602, Clement VIII. had a standard edition printed at the Vatican, to which all future editions were to conform; and again, in 1631, Urban VIII. caused the metres of the hymns and the Latinity or the whole to be carefully revised.

It is perhaps hardly necessary to state that the B. is in Latin, portions of it being sometimes translated for the use of the unlearned. It is necessarily a very bulky volume, when complete; and although some of the legends of the saints and martyrs may be of doubtful authenticity, yet it is a mine of interesting and devotional reading. Its general contents may be judged of from what has been already stated as to the sources from which they were drawn, every saint in the calender having his proper service for the different canonical hours. The festivals of the Roman Church have their services, according to their importance, duplex, semi-duplex, or simplex—i. e., double, semi-double, or simple: these, again, are further distinguished, so that there are no less than 9 classes of services—the Ferial or ordinary week-day, the simple, the day with an octave, the semi-double, the Dominical, or Sunday, the double, greater double, double of the second class, double of the first class. Indeed, so elaborate and perplexing are the rubrical directions, that it is impossible to form any idea of them without consulting the B. itself, and there are probably but few of the priests who are thoroughly conversant with their own ritual.

The B. contains, besides an office for the dead and other smaller offices, three kinds of office in honor of the blessed Virgin Mary—viz., 1. The full office, said on such festivals as the Purification, Annunciation Immaculate Conception, Assumption, &c., 2. The office of the Virgin Mary on Saturdays; 3. What is called the 'little office,' or the Hours of the Virgin. This last was in use as early as the 7th c., and was enjoined by the Council of Claremont, 1096, to be said by the clergy daily, and by the laity on Saturdays, but the bull of Pius V. removed this obligation except as to clergy in choirs. The Roman Church enjoins under pain of excommunication, all 'religious' persons—i. e., all persons, male or female, who have taken vows in any religious order—to repeat, either in public or private, the services of the canonical hours as contained in the breviary. For the influence of the old breviaries on the English Common Prayer-book (q. v.), consult Palmer's *Antiquities of the English Ritual*, and Maskell's *Monumenta Ritulia*. The matins or morning-prayer of the English Prayer-book is an abridgment, with many omissions and additions, of the matins, lauds, and prime of the B., whilst the office of even-song, or evening-prayer, is in like manner an abridgment of the ancient vespers and compline.

BREVIPE'NNES (Lat. short-winged), in Ornithology, according to the system of Cuvier, that tribe of the order *Grallatores* (q. v.) in which the ostrich, cassowary, rhea or nandou, emu, and apteryx are comprised, and also the extinct dodo.—See these articles. The B. are characterized by a shortness of wing which incapacitates them for flight, but use their wings to aid them in running, which they do with great rapidity. Their *sternum* (breast-bone) has no ridge or keel. They constitute the family *Struthionidæ* of many ornithologists, and are by some placed among Gallinaceous (q. v.) Birds, to which they are allied by the form of their bill and their choice of food. They are, however, very different from all other birds, and whether ranked among Grallatores or Gallinaceous Birds, do not seem to form a natural part of the order. The gigantic *Dinornis* (q. v.) and other fossil birds of great interest exhibit the characters of the *Brevipennes*.

Gigantic birds, of which the footsteps appear imprinted on sandstones in the valley of the Connecticut and elsewhere, seem also to have belonged to this tribe. No remains or traces of such birds are, however, found nearly so ancient as many remains of quadrupeds. But to whatever geological period the commencement of their existence is to be referred, a peculiar interest is attached to them, because its close may be regarded as probably near. There is no tribe of birds that more generally shuns man, or disappears before the increase of population and the progress of colonization. The cassowary and the emu are rapidly becoming rare. The ostrich, the rhea, the apteryx, the notornis, &c., are only found in deserts or other deep solitudes.

BREWING. For the process of B. see BEER. The legal requirements for the B. of beer for sale will be found in many acts of parliament, from the 12 Chas. II. c. 24 to 43, and 44 Vict. c. 20., changes being of late frequent. By this latter act, the tax on malt was repealed and the duty placed on beer. This came into force on 1st October 1880; after which date, malt, and the sugar used in making beer, were exempt from duty. The duties of Excise upon licenses to be taken out annually by brewers brewing beer for sale are: £1 on a license by a brewer of beer for sale; and 6*s.* on a license taken out by any other brewer.

There is a penalty of £100 for brewing beer without a license. In respect of brewers other than brewers for sale, if the annual value of the house occupied by him does not exceed £10, the beer brewed by him is not liable to duty; he must brew only for his own domestic use, or for his farm-laborers in the course of labor, in his own premises or in premises lent gratuitously to him, under a penalty of £10. The duty on beer brewed in the United Kingdom is now calculated according to the specific gravity of the worts thereof; upon every 36 gallons of worts of a specific gravity of 1057°, the fee is 6*s.* 3*d.*, and so on in proportion to

quantity and gravity. There is a drawback of 6*s.* 3*d.* on every 36 gallons of beer of the specific gravity of 1055° which shall be exported or shipped for use as ships stores. The licenses to be taken out by beer dealers are of course distinct. Beer dealers, wholesale, not brewers, pay annually £3, 6*s.* 1½*d.*; retailers of beer to be consumed on the premises, £3, 10*s.*; retailers of beer not to be consumed on the premises, £1, 5*s.* See BEER, BEER ACTS.

Anciently, in Scotland, the privilege of B. was given by a license from the superior or lord, in whose deed or gift of charter to his vassals there was generally a clause *cum brueriis*. But these forms have long been dispensed with. It appears, however, that a person with a right of barony may prevent a feuar, that is, a tenant of property within the barony, or a stranger, from importing and vending ale within the baronial limits without his license.

BREWSTER, SIR DAVID, an eminent natural philosopher and eloquent writer, was born at Jedburgh, December 11, 1781. He was educated for the Church of Scotland at the university of Edinburgh, where he highly distinguished himself. In 1808, he undertook the editorship of the *Edinburgh Enclycopædia*, to which he contributed many important scientific articles. Previous to this, he had entered deeply on the study of optics, with which his name is now enduringly associated. The beautiful phisophical toy, called the kaleidoscope, was invented by him in 1816. In 1819, in conjunction with Professor Jameson, he established the *Edinburgh Philosophical Journal;* and in 1831 he was one of the chief originators of the British Association for the advancement of Science. The honors conferred on this distinguished man make up a long catalogue.

In 1815, he obtained the Copley medal of the Royal Society for one of his optical discoveries, and soon after was elected a Fellow; in 1816, he received half the physical prize bestowed by the French institute for two of the most important scientific discoveries made in Europe during the two preceding years; in 1819, the Royal Society awarded him the Rumford gold and silver medals, for his discoveries on the polarization of light; in 1825, he became corresponding member of the Institute of France; in 1832, he was knighted, and had a pension conferred upon him; in 1838, he was chosen Principal of the united colleges of St. Leonard and St. Salvador, St. Andrews; in 1849, on the death of Berzelius, in the preceding year, he was elected one of the eight Foreign Associates of the French Institute, the highest scientific distinction in Europe. Sir David was also a member of the Imperial and Royal Academies of St. Petersburg, Berlin, Copenhagen, and Stockholm; presided over the British Association, and in 1851, over the Peace Congress held in London. In 1859, on the death of Dr. John Lee, he was chosen Principal of the Edinburgh University. His principal work is his *Life of Newton*, first published in 1828, in the Family Library, and issued in a totally new and greatly enlarged form in 1855. Among his other works are his interesting *Letters on Natural Magic*, addressed to Sir Walter Scott, also published in the Family Library; *More Worlds than One* (1854); his treatises on the Kaleidoscope and on Optics (Cabinet Cyclopædia); his *Martyrs of Science;* and his treatises in the *Encyclopædia Britannica* on Electricity, Magnetism, Optics, the Stereoscope, &c. Among other periodicals to which he contributed largely are the *Edinburgh* and *North British Reviews*. He died Feb. 1868. See *Home Life of B.* by his daughter, Mrs. Gordon (1869).

BREZO'WA, a market-town of Hungary, in the county of Neutra, on a river of the same name, about 19 miles north-west of Leopoldstadt. It has a Roman Catholic church and a Protestant church, tanneries, and distilleries. Pop. (1869) 5886.

BRIAN BOROIMHE (pron. *boru'*), a famous king of Ireland, ascended the throne of both Munsters—answering to the present counties of Tipperary and Clare—in 978. Some time afterwards, he deposed O'Maelachaghlin, and became supreme ruler of Ireland. The surname, Boroimhe, signifying tax, was given him in consequence of the tribute in kind he levied from the various provinces. King Brian supported a rude but princely state at his chief castle at Kincora, a place in the neighborhood of the modern town of Killaloe, and he had also seats at Tara and Cashel. The vigor of his reign brought prosperity to his country. He defeated the Danes in upwards of 20 pitched battles, restricting their influence to the four cities of Dublin, Wexford, Waterford, and Limerick alone. In the battle of Clontarf (1014), in which he was killed, he gained a signal victory over a united army of revolted natives and Danes, the power of the latter receiving a shock from which it never recovered.

BRIANÇON (ancient *Brigantium*), a town of the department of the Hautes-Alpes, France, on the right bank of the Durance, about 35 miles north-east of Gap. It is the highest town in the French empire, being situated at an elevation of nearly 4300 feet above the sea-level. As the principal arsenal and depôt of the French Alps, B. is very strongly fortified, while several forts guard the approaches, and every height in the vicinity is a point of defence. It is considered impregnable. Troops can readily be marched from it on to the passes of the Simplon, St. Bernard, Mont Cenis, and the Col de Tende. Mont Genèvre affords a practicable passage into Italy from the town itself. B. has some manufactures of cotton-goods, hosiery, cutlery, crayons, &c. Pop. (1876) exclusive of garrison, 2321.

BRIA'NSK, a town of Russia, in the government of Orel, 70 miles west of the city of that name. It is situated on the right bank of the Desna, is surrounded with earthen ramparts, and has a considerable trade in grain, hemp, wax, linen, cables, cordage, iron, &c., with Kherson, Odessa, and other ports on the Black Sea. B. has a cannon-foundry and 13 churches. Pop. (1880) 14,650.

BRIARE, a town in the department of Loiret, France, situated on the right bank of the Loire, at the point where the Canal de Briare enters that river, about 43 miles south-east of Orleans. The canal, which unites the Loire and the Seine, is remarkable as the first that was constructed in France, having been begun by Sully, and finished in 1642. B. has a considerable trade in wine, wood, and charcoal. It is supposed to occupy the site of the ancient *Brivodurum*. Pop. (1876) 3970.

BRI'BERY. The corrupt practices known by the term B. might well form the theme of an extended essay. Here we can point only to a few of the more conspicuous features of this grave social disorder, and chiefly as concerns B. at elections.

Election B., a well-known form of corruption, may be called the canker and disgrace of constitutional government. Individuals, with little to recommend them but wealth, and it may be some local distinction, wishing to be elected representatives in the legislature, do not scruple, through various devices, to buy the votes of the meaner order of electors by bribes. B. at elections is perhaps more openly and audaciously practised in various parts of the United States than it is in England; nor are base influences of this kind unknown in connection with the more meagre constitutional forms of some continental states. But in the eye of the world, England had the unenviable notoriety of being the country in which B. was reduced to a regular and continuous, though covert, system. It had been demonstrated by parliamentary inquiry, that masses of the population in certain towns—more particularly the class called freemen—look upon the franchise as a privilege which, for personal benefit, entitles them to enact so much money for their votes. Public considerations had no weight with them whatever. It seemed to them to be alike their duty and their interest to sell their votes to the highest bidder. The Earl of Dundonald mentions in his *Autobiography*, that when, as Lord Cochrane, he offered himself as a candidate for Honiton, he was barefacedly told by one of the electors, 'that he always voted for Mister Most;' and not choosing to bribe, he lost his election. The amount of bribe ordinarily paid at elections in this venal class of boroughs, varied from £1 to £10, according to circumstances; as high a sum as £20, and even £50, had been known to be given in the extremities of a contest. For these corrupting and disgraceful practices, the law threatens certain penalties; but to avoid incurring these, as well as for the sake of decency, the candidates employed a mean class of agents, or were in some obscure way assisted by confederates, of whose proceedings it was difficult to substantiate any guilty knowledge on their part. The agents more immediately concerned did the business of bribing in private, sometimes in darkened apartments, where no one could be seen.

Formerly, the treating of voters in taverns was added to other varieties of corruption, and the demoralization that ensued on occasions of this kind amounted almost to a universal saturnalia. The law having interposed to check this gross form of B., the evil had latterly subsided into a commonplace routine of secret money-dealings. Of course, by this illegal expenditure, along with the necessary outlays which the law allows, the cost of an election was in many cases enormous. Few seats of English borough members cost less than £1800; but double and triple this sum was a common outlay. It is a well-known fact, that for certain boroughs any man—no matter what be his political opinions or private character—might be returned by advancing £4000, and asking no questions as to what was done with it. As the B. was on both sides, it may be safely averred that the money spent at some contested elections amounted to £10,000. As regards elections for counties, the influences brought to bear are ordinarily of a different kind; but though morally wrong, they do not come within the scope of the present article. The Scotch have some reason to boast that their country is comparatively exempt from this social disorder. To avert every form of corrupt influence, the Ballot (q. v.) was long vehemently urged; and an act to secure the use of the ballot in parliamentary and municipal elections throughout Great Britain and Ireland was finally passed in July 1872. So far bribery seems to have been almost unaffected by the Ballot Act. The improved mode of trying election petitions by judges has worked well. A new Corrupt Practices Act was passed in 1879; and a more stringent bill was introduced in 1882. Severe sentences of imprisonment were passed on several persons of good standing, found guilty of bribery in 1880

–31; and several cities were deprived of electoral privileges in 1882 for corruptness. See CORRUPT PRACTICES ACT, and PARLIAMENT.

BRIBERY IN MUNICIPAL ELECTIONS. By the Corrupt Practices (Municipal Elections) Act, 1872, the offence of B. is put on the same footing as in parliamentiary elections. The guilty person is for ever disabled from voting at other municipal elections, and also from holding any office or franchise in the borough. See MUNICIPALITY.

BRIBERY OF CUSTOM-HOUSE AND EXCISE OFFICERS. By the Customs Consolidation Act, the 16 and 17 Vict. c. 107, s. 262, every person who shall give or offer any bribe, or make any collusive agreement with any officer of Customs or Excise, or other person employed for the prevention of smuggling, in order to induce him to neglect his duty, shall forfeit the sum of £200. A former act, passed in 1827, the 7 and 8 Geo. IV. c. 53, s. 12, still in force, specially enacts in the case of the Excise, that persons in such service taking money or reward, or entering into any collusive agreement contrary to their duty, shall for every such offence forfeit the sum of £500, and be incapable of serving the crown in any office or employment; and any person giving or offering money or reward to Excise officers, in order to corrupt and prevail upon them, shall forfeit the like sum of £500, but simply and without any further penalty of disqualification.

BRIBERY OF JUDGES. This offence in the old Scotch law was called BARRATRY (q. v.).

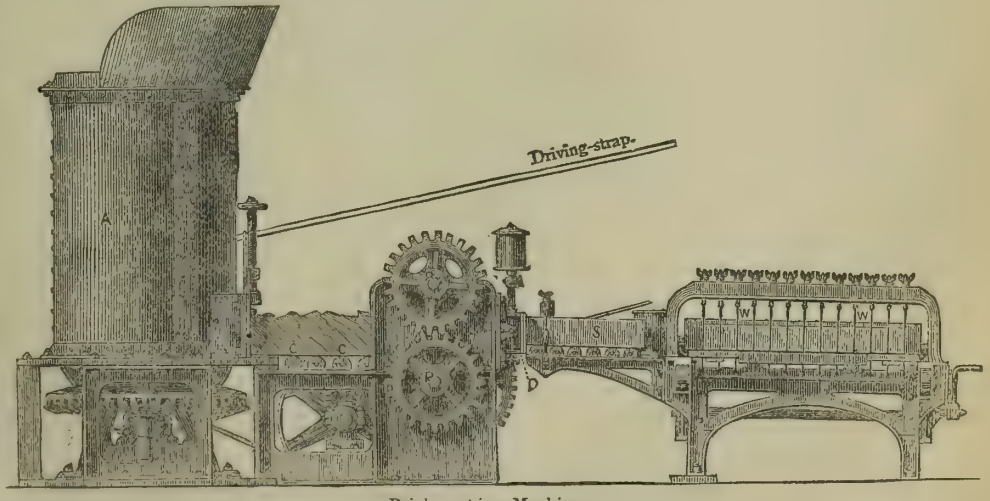
BRICK. The earliest examples of this branch of the ceramic art were doubtless the sun-dried bricks of Egypt, Assyria, and Babylonia. Remarkable to say, many of these, which, in a northern climate, the frosts of a single winter would destroy, have been preserved for some 3000 years by the dry, warm atmosphere of those countries. Sun-baked bricks of ancient date are also found in the mud walls of old towns in India. Kiln-baked bricks must have been the products of a later time; but they are found in all the chief ruins of ancient Babylonia, where they were often used to face or bind together walls of sun-dried bricks, and occasionally they were even ornamented with enamelled colors. Burnt bricks were employed in the foundations of the Tower of Babel (Gen. xi. 3). These ancient bricks, whether baked by the sun or by fire, were all made of clay mixed with grass or straw. The ancient Greeks, probably owing to their possessing plenty of stone, cared little for building with burned clay; but most of the great ruins in Rome are built of brick, and the Romans appear to have introduced the art into England. Interesting historical information has been obtained from the impressions on Roman, and especially on Babylonian bricks. In many instances, the Roman bricks found in England have been removed from their original position, and employed in the construction of buildings of later date. The earliest instance in which bricks of the modern or Flemish make occur in England, is Little Wenham Hall, in Suffolk, 1260.

Manufacture of Bricks.—Clay suitable for the manufacture of common bricks is an abundant substance, but there is a great difference in the nature and quality of the clays found in various localities. The basis of clay consists of hydrated silicate of alumina, with a varying proportion of other mineral matters, chiefly free silica (sand), iron, lime, magnesia, and potash. Great advantage is derived from digging clay in autumn, and exposing it all winter to the disintegrating action of frost. This is not always attended to, but when neglected, the bricks made from it are apt to be unsound and faulty in shape. The next process is that of tempering or mixing the clay into a homogeneous paste, which is sometimes done by the spade, but more commonly in the pug-mill or by crushing between a pair of rollers; often, indeed, both are employed. In making bricks by the old hand process, the shape is given by a mould either entirely of wood, or of wood faced with metal, and without top orbottom. This admits of the clay being pressed into it by a tool called a plane, which is also used to produce an even surface on the upper and lower beds of the brick, by working off the superfluous clay. Sand is used to part the wet clay from the mould and the table on which it rests.

Although hand-made bricks are still very common, yet machinery is now always employed when large quantities are required. Brick-making machines are of two leading kinds; one class of them being constructed to work the clay in a wet plastic state, the other class requiring it to be in a semi-dry condition. Of the two sorts, the wet-clay machines are the simpler, cheaper, and can be worked by less-skilled workmen. On the other hand, the dry-clay machines, which make the bricks by forcing the clay into moulds by strong pressnre, shorten the process, as no time is required for drying them. The bricks so made, too, are not only of a more perfect shape, but they can be moulded into any form, and may even be made highly ornamental at a very slight additional cost.

As might be expected, both the dry and the wet-clay machines of different makers vary considerably in their details. Since we have not room for two figures, we give one, which will convey a good idea of the general plan on which most of the wet-clay machines work. The machine is driven by steam, and the clay is fed by a hopper into the pug-mill A, on the central shaft of which strong pugging blades are placed in a spiral manner. These prepare and force the clay out at the bottom, whence it passes over the carrying rollers, C, to the pressing rollers, PP, which force it through a die at D, in a rectangular stream, S, so exactly shaped to the required size that nothing more is necessary than to cut it into single bricks by the wires, W. These are set in a rocking frame, which can be so adjusted as to cut the bricks on the square or at an angle; the one plan being adopted when the clay is at rest, the other while it is in motion. The figure shows what is called a single-ended machine. When double-ended, the clay is forced out at opposite sides of the pugging cylinder, and there is then, of course, a cutting-table at either side, instead of only one, as shown in our cut. Some of these machines are provided with a pair of powerful crushing rollers, which reduce any hard lumps or stones before the clay enters the pug-mill. One of the best known wet-clay machines is that made by Clayton, Son & Co., London. When of a size which can be worked by a steam-engine of 16-horse power, it produces from 20,000 to 30,000 bricks per day, and its price in 1871 was £330. The one shown in our figure is Murray's patent. Drain tiles are made by the same kind of machinery, with a peculiarly constructed die, so as to make the clay into a hollow tube; so also are hollow bricks, with again an alteration in the shape of the die. Hollow bricks having less body than those which are solid, are more easily, and usually more thoroughly fired. On account of this, as well as by reason of their admitting of a current of air through them, they form, as a rule, dryer walls.

The green bricks, after being carefully dried, either in the sun or by artificial heat, are usually baked in a kiln with a suitable arrangement of fires and flues. Kilns are of many forms, and the time required for firing in them varies from 40 to 60 hours for common red and white bricks, while for some fire-bricks 150 hours are necessary. Where kilns are not used, bricks are burnt in clamps, the clay requiring to be mixed up, in the process of tempering, with a quantity of ground coal sufficient to burn them. A good test of the character of a clay is obtained by the result of firing. The average contraction in the kiln for prepared clays is 7½ per cent. If a brick contracts much more than this, the clay is too fusible; if less, then it is likely to be of an open porous body, which retains its shape well during the firing process.



Brick-making Machine.

All brick clays contain iron, and the color of a burned brick almost entirely depends on the amount of it which is present; thus clays containing less than 1 or 1½ per cent. of iron, change in the kiln to various shades of cream color and buff, whilst those containing more than 2 per cent., range in color from yellowish-fawn to dark red. Blue bricks are made from the same clay as the red

by controlling in a peculiar way the supply of air in firing, and by carrying the heat slightly further. It is asserted by some that the red is changed to the black oxide of iron in the process.

Fire-bricks are made from clay as free as possible from oxide of iron and alkaline substances, so that there may be no tendency to fuse in the kiln, however high the heat. Fire-clays are abundant in the coal-measures, some of fine quality being found about Newcastle and Glasgow, but the most celebrated is that of Stourbridge, which is exported to all parts of the world. See FIRE-CLAY.

Much attention has been paid of late years to the manufacture of fine bricks and terra cotta, which is only another name for ornamental bricks of various shapes, or architectural enrichments of the same material. The effect of some of the public buildings recently erected in London and elsewhere, in which terra cotta has been used, is really beautiful. Although it cannot be said to equal sandstone in appearance, it has yet the advantage of giving a much greater variety of color, and is infinitely better and more enduring than a facing of stucco or cement.

The duties formerly levied on bricks were wholly repealed in 1850.

BRI'CKLAYING, BRI'CKWORK. The material of which a town is built depends mainly on the geology of the surrounding district. In a mountainous country like Scotland, cities of stone, such as Edinburgh, Glasgow, and Abderdeen naturally abound; while London, and most of the great towns of England, situated in alluvial valleys and plains, are built of bricks derived from the alluvial clay beneath and around them. In Holland, where the whole country is but the delta of the Rhine, and no stone is to be found, brick is universal, even to the paving of the streets.

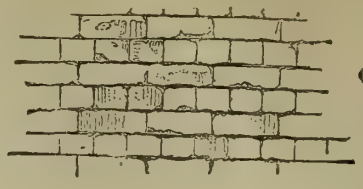
The standard size of English bricks being 9 inches by 4½, the thickness of walls is regulated thereby. They are either half-brick, 1 brick, 1½, 2, 3, or 4 bricks in thickness. In moderate-sized modern English houses, the inside partition-walls are usually half-brick, the outer walls, 1 or 1½. In larger houses of superior construction, a thickness of two or three bricks is sometimes used. This latter thickness is seldom exceeded, except in large public works. Modern brick-houses are, for the most part, far less substantial than those erected by our forefathers. Building leases being usually granted for ninety-nine years, at the expiration of which term, the whole property reverts to the freeholder, the object of the builder is merely to make a house that shall stand for that period, and not to expend any money for the sake of further stability. Garden-walls are commonly built but half-brick in thickness; these, however, are strengthened by 9-inch piers at intervals of 10 or 12 feet. In laying the foundations of walls, the first courses should be thicker than the intended superstructure, and the projections thus formed, usually of quarter brick on each side, are called 'set-offs.' Before laying walls of houses, trenches are dug, and the foundation tried with a crowbar or rammer. If it is found to be loose, and the looseness due to superficial soil, this is removed, and its place supplied with fragments of stone and old broken bricks, which are closely rammed together. In some cases, inverted arches of brick are built for foundation, or a stratum of concrete laid down. See CONCRETE.

Mortar composed of lime and sand is the common cement for brickwork. It should be equally and carefully applied; and the bricks wetted, in order that the mortar may adhere more firmly, by being absorbed into their pores. The force with which good mortar is capable of adhering to bricks is very remarkable. It is found to be the greatest in old structures that have been exposed to the continuous action of water. Such B. is said to be 'water-bound' by workmen, and can scarcely be separated without breaking the bricks.

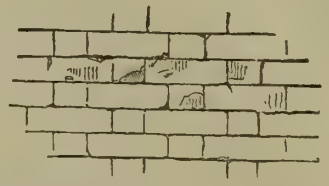
A fundamental principle to be rigidly observed in laying all kinds of brick is, that *no two contiguous perpendicular joints shall fall immediately below each other*, or, to use the bricklayer's phrase, the work must 'break bond.' The mode of arrangement of the bricks to effect this is called the *bond;* a layer or stratum of bricks is called *a course*. Bricks laid with their lengths in the direction of the course, and their sides to the wall face, are called *stretchers;* those laid across the line of the course, with their ends forming the wall-face, *headers;* a layer of headers, a *heading course;* of stretchers, a *stretching course*.

The two kinds of bond almost exclusively used in England are the English and Flemish bond. English bond consists of alternate stretching and heading courses; Flemish bond, of a stretcher and head laid alternately in each course (see figures). English bond, is the strongest; Flemish bond, the more ornamental; and they are used accordingly. There are two other kinks of bond occasionally used—*herring* bond, and *garden-wall* bond. The former is applied to form the core of thick walls, where Flemish bond is used for the facing. A course of bricks is laid obliquely at an angle of 45° to the face of the wall; then above it, another course at the same angle, but inclined in the opposite direction, so that the joints may cross the first.

This is considered to add to the strength of Flemish bond, but is objectionable on account of the triangular interstices necessarily left between the oblique bricks and the bricks of the facing. Garden-wall bond is only used for 9-inch walls, and formed by laying three stretchers and one header, and so on in each course. In order to strengthen Flemish bond, bands of hoop-iron are sometimes laid flatwise between the courses. This 'hoop-iron bond' has superseded the old practice of using bond-timbers, which were inserted the whole length of the wall. The hoop-iron should be slightly rusted, to secure the complete adhesion of the mortar.



Old English Bond.



Flemish Bond.

In constructing arches of brickwork, much care and skill are required. A wooden centring is always used; and when very rude work only is required, common bricks are laid upon the centring, and the gaping interstices at the upper end filled with rough brick wedges. For better work, each brick has to be properly bevelled, according to the curve. When semicircular arches are made, all the bricks require an equal bevel, and therefore bricks moulded uniformly to the required angle may be used; but for other curves and for flat arches, each brick has to be separately shaped by the bricklayer. In order to do this, a drawing of the required arch is made of the full size on a board; the bricks are laid upon this side by side, and shaped to the lines of the drawing; they are then transferred to their corresponding place in the structure. The bricks are first rudely shaped by the *brick-axe*, then finished on the *rubbing-stone*, a piece of rough grained stone about 20 inches in diameter. In all kinds of B., the walls should be built up level throughout, in order that the *settlement* may be equal. An unequal settlement may produce a rupture of the wall.

B. is measured by the rod or by thousand. A rod contains 272 square feet of standard thickness—that is, 1½ brick. This is equal to 306 cubic feet, and will on an average, require 4500 bricks, allowing for waste. The weight of a rod of B. containing 4500 bricks, 27 bushels of lime, and 3 single loads of sand, is about 13 tons. The bricklayer is always attended by a laborer or hodman, who carries his bricks and mortar in a 'hod'—a triangular wooden box, open at the top and one end, and supported on a round leg, by which the hodman holds it on his shoulder. A bricklayer's wages are considerably higher than those of the hodman. The laborers are generally Irishmen.

The surface of brickwork is sometimes ornamented by *pointing*. This is done by raking out the mortar of the joints to a small depth, and filling up again with blue mortar, and marking the courses with the edge of the trowel. This is called *flat-joint* pointing. When the courses are marked by a neatly pared raised line of white plaster of about half an inch in thickness, laid upon the blue mortar, it is called *tuck* or *tuck-joint* pointing. Colored bricks, as a means of external ornament, have been extensively and most effectively used in North Italy and Germany. The works of Mr. Ruskin, Mr. Gally Knight, Webb's *Continental Ecclesiology*, Street's *Brick and Marble of the Middle Ages*, and Ferguson's *Hand-book of Architecture*, may be consulted for illustrated examples of these.

Chromatic brickwork is now becoming very extensively used in England, especially by architects who are endeavoring to revive the style of architecture called by themselves English Gothic, and by some others Venetian Gothic, in which the pointed arch formed of colored bricks, forms one of the prominent features. These architects maintain that, as they are compelled to construct with B., it is more honest to use bricks ornamentally, than by means of stucco to obtain an external imitation of stone; and as B. admits of but little ornamentation in relief, they use variation of color, of which B. is peculiarly susceptible, and thus produce a sort of architectural mosaic. The eloquent and popular advocacy of these views by Mr. Ruskin, and the skill and enthusiasm with which many young and rising architects are carrying them out, seem likely to bring about a great development, almost amounting to a revolution in English domestic and ecclesiastical architecture.

BRICOLLE. See BALLISTA.

BRIDE, BRIDAL. The word Bride (the radical signification of which is thought by some to be 'appropriated,' 'owned') is common to all the Gothic languages, and also to Welsh (Ger. *braut*, Welsh *priod*), and signifies betrothed or newly married. Alone, the word denotes the newly married woman; with the addition of the syllable *groom* (a corruption of *guma* = Lat. *homo*, a man), it denotes the newly married man (Ang. Sax., *brydguma*, Ger. *brautigam*). In Welsh, *priod-fab* (betrothed youth) is bridegroom, and *priod-ferch* (betrothed maid) is bride. Bride is the root of a variety of terms connected with marriage, as Bride-favors, Bride-cake, &c. Bridal is for *Bride-ale* (Ang. Sax. *bryd-eale*) the marriage-feast. Bride-maids, or attendants on brides, appear to have been in use among the Anglo-Saxons, and are mentioned in the early accounts of marriage-ceremonies. A part of their duty consisted in dressing and undressing the bride. Bridemaids, as mere ceremonious attendants at marriages, are still in use in England. The husband has an analogous body of attendants, called bridegroom-men; but they have disappeared in modern usage, and their only representative is one confidential friend in attendance. In Scotland, this personage is called the best man. One of his duties is to pull off the bridegroom's right-hand glove, while one of the bridemaids does the same service for the bride, when the pair are requested to join hands.

BRIDE-FAVORS are small knots of white ribbons, which are pinned to the breasts of all who are in attendance at weddings, nor are even the post-boys and their horses' heads left undecorated with these gay trappings. The origin of the bride-favor is said to be the true-lovers'-knot—something symbolical of the union of hearts and hands on the occasion. In various old plays and poems there are allusions to bride-favors or ribbons, as that in Herrick's *Hesperides:*

> What posies for our wedding-rings,
> What gloves we'll give and ribbonings.

The BRIDE-CAKE is also symbolical in its origin. 'The ceremony used at the solemnization of marriage among the Romans was called *confarreation*, in token of a most firm conjunction between the man and wife, with a cake of wheat or barley.'

This, Blount tells us, is still retained in part with us, by that which is called the bride-cake used at weddings.'—Brand's *Popular Antiquities*. The old English and also Scottish custom of breaking a cake over the head of the bride on entering her new dwelling, perhaps points to a usage of the most remote antiquity —the sprinkling with wheat as a token of plenty. In modern times, the bride-cake is a stately piece of confectionery, consisting of a rich cake as a basis, on which is reared a castellated structure, with various fanciful devices, the whole being covered with a preparation of white sugar. This fabric is cut up and given in pieces to the guests, as part of the wedding jovialty.

BRI'DEWELL, a well between Fleet Street and the Thames, dedicated to St. Bride, which has given its name to a palace, parish, and house of correction. A palace, described as 'a stately and beautiful house,' was built here, in 1522, by Henry VIII., for the reception and accommodation of the Emperor Charles V. and his retinue; and King Henry himself also often lodged here, as, for instance, in 1525, when a parliament was held in Blackfriars; and in 1529, the same regal personage and his queen, Catharine, lived in the B. while the question of their marriage was argued. In 1553, Edward VI. gave it over to the city of London, to be used as a work-house for the poor, and a house of correction 'for the strumpet and idle person, for the rioter that consumeth all, and for the vagabond that will abide in no place.' Queen Mary having confirmed the gift, it was formally taken possession of in 1555 by the lord mayor and corporation. The B. was afterwards used for other persons than the class above named, and at last became a place of punishment, as it now is. As a house of correction, it is not under the sheriff's charge, but is governed by a keeper wholly independent of that officer.

By the 15 and 16 Vict. c. 70, a new House of Correction is established for the city of London. See CORRECTION, HOUSE OF.

BRIDGE (Ang.-Sax. *brycg;* Dutch, *brug*; Ger. *brücke*) is a structure for carrying a road over a stream, river, ravine, low ground, or other impediment to its course. A bridge for carrying a canal or other water-course, is called an Aqueduct (q. v.); one for carrying a railway is sometimes called by the recently coined, though not very correct, word *Viaduct* (q. v.). Bridges are formed of stone, brick, cast-iron, or timber-arches; of timber beams or framework, supported on piles or on masonry; of iron rods or chains, in which case they are called suspension-bridges; of lattice-work; or of cast or wrought-iron girders. Sometimes a combination of beams and suspension-rods is used. Of late years, the plan of tubular or hollow wrought-iron girders has been frequently and successfully employed, the first great emample being the Britannia Bridge (q. v.).

Bridges are either fixed or movable. Of movable bridges there are various kinds. *Flying-bridges* and *floating-bridges* are, in fact, mere ferry-boats (see FERRY) with gangways attached, and other provisions for safe and ready transport, and which are drawn across the stream by ropes. *Draw-bridges* and *swing-bridges* are constructed in two parts, that turn on pivots—in the former, the parts are lifted vertically; in the other, they are moved round horizontally. A *sliding-bridge* runs backward and forward on wheels or rollers. Another kind is much in use in low districts like Norfolk, where the water flows lazily, and almost on the land-level. These are sometimes called pontoon-bridges, from the movable roadway being balanced at a small height above the water-level on a pivot working in a large pontoon or hollow cylinder sunk in the bed of the river—the ends of the roadway of the B., when laid across the river, resting freely on piers on either side. There are several such bridges in use over the Ouse. The pivot is set in the center of the stream, and, when necessary, the B. is turned round on it by machinery, till it lies parallel to the banks, and permits the passage of barges on either side. In a flat district, these bridges are exceedingly appropriate. See also BRIDGE, MILITARY.

Convenience must have led men in a very rude state of society to form bridges, in order to the easier communication between districts separated by rivers. On most streams there occur fords, but often these are not found where they would be most desirable. The most rudimentary form of a B. may be assumed to be a series

Ponte de Rotto.

of stepping-stones, such as are yet almost everywhere to be found on river-courses at some point. Large stones deposted in the streams at the shallows or fords, would first give a chance to a passenger of getting across dry shod; by and by, where one or two stones were wanting to complete the steps in the passage, they would be supplied. Next, it would naturally occur, to give greater security to the passage, by laying planks or trees across the stepping-stones, so as to avoid the risks attending stepping or leaping from one to the other. In the arrangement of planks resting thus on stones, we have the first advance in the art of B.-building, the suggestion at once both of piers and roadways; and beyond this stage, the art would appear not to have advanced for a very long period. From the Greeks, we have accounts of bridges built by Semiramis, Darius, Xerxes, and Pyrrhus; and in Egypt necessity early compelled the formation of bridges in connection with the canals constructed for the purpose of irrigation. But all these would appear to have been rudimentary in form, and to have consisted simply of piers with the intervals between them spanned by beams of timber or large flat stones. Sometimes boats moored in the stream served the purpose of piers, as was the case with the famous B. of Xerxes across the Hellespont. Bridges of boats are in use to this day. The principle of the arch was long known before it was applied to the art of B.-building. See ARCH. That application we owe to the Romans; whose first great work in which the arch was employed, the Cloaca Maxima (q. v.), is referrible to the time of the Tarquins. The Ponte de Rotto, or Senators' B. (127 B.C.), erected by Caius Flavius, appears to have been the first instance of its application to bridges. In the course of the great engineering undertakings of the Roman empire under Augustus Cæsar for the formation of roads and supply of water to Rome, its application became general; and afterwards the empire having extended its bounds, the necessity for ready communication between its provinces, led to the erection of numerous splendid bridges therein, many of which, indeed, surpassed in their greatness those of Rome itself.

But although the Romans have unquestionably the merit of having originated the art of B.-building proper in Europe, it seems doubtful whether the principle of the arch was not applied by eastern nations to B.-building, long before the dawn of the greatness of the Roman empire. The Chinese are said to have been before the West in this as in other arts, though the antiquity of some of the bridges on which this assertion is rested may well be doubted, considering the uncertainty which pervades the chronology of that extraordinary people.

It is impossible here to trace in detail the progress of the art. For a long time after the decay of the Roman empire, it made no progress. It revived in the 11th c., but again languished to the beginning of the 18th, when the formation of the corps of the Ponts et Chaussées in France favored its further growth. Henceforth, many splendid bridges were erected both in Britain and the continent. In 1775, Mr. Pritchard of Shrewsbury, introducing the use of cast iron in the erection of bridges, originated a valuable style of construction. The genius and works of Telford bring us to the present time. Within half a century, the use of steam, the development of the canal system, and the necessity especially for

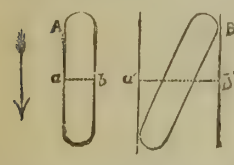
railway-bridges, with the immense amount of capital at the disposal of engineers for purposes of B.-building, have caused a rapid evolution of all the principles and possible modes of the art. Among the new forms called forth within the century by the increasing demand for facilities of communication, are the suspension B., the wrought-iron girder and tubular bridges, and the lattice-bridges. Several of the new bridges over the Thames are models of engineering skill and taste. The Menai and Britannia bridges were regarded, when erected, as perfect marvels. In America, the B. of Trenton, over the Delaware, the great Portage viaduct, and the Niagara suspension B., and the great bridge, opened in 1883, connecting New York and Brooklyn, are equal to any similar works in the world. The highest bridge in the world is one at Gorabit, Cantal, France, which is 1880 feet long and 413 high. The variety of complex structures of wood and of iron that now span streams and hollows is endless.

For some of the more important forms, see FRAME, LATTICE, TUBULAR, and SUSPENSION BRIDGES. What follows here, relates chiefly to arched or masonic bridges, and is confined to the more general and obvious conditions which such bridges must fulfil, avoiding the mecanical theory of their stability as too abstruse for popular exposition.

An arched B. rests between masses of masonry on opposite sides of a river, called its *abutments* (q. v.). The intermediate points of support of the arches are the piers (q. v.), which are rarely built so strong as to be able of themselves to resist the lateral thrust of the arches resting on them, if the thrust of one arch did not counteract that of another. The arch itself is the curved constuction between adjacent piers. The chief terms used in speaking of the arch itself are explained under ARCH. It addition, may be noticed the *spandril*, the name given to the filling in above the extrados to the roadway. The *chord* or *span* is the distance between the piers; while the *rise* of the arch is the perpendicular distance between the level of the springing and the horizontal through the key.

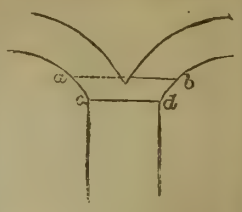
When a B. has to be erected, the question of what form it should be falls to be settled by a variety of considerations. Regard to appearance affects the question, but the material points are its sufficiency for the purposes for which it is intended, and its security and durability. The nature of the embankments and of the soil in the water-bed, together with the nature of the water-shed, or country drained by the stream, may make it necessary that the B. should not be an arched bridge at all, but a suspension or tubular bridge. But if it is to be an arched B., then the most important questions respect the number of its piers and the form of its arches. If vessels must be free to pass under it, the arches must be lofty, and the abutments high; so also must they be if the river is exposed to sudden elevations of its level by floods.

Formerly, a prejudice existed against laying a B. across a stream at any other angle than at right angles to its course. The reason was, that, the theory of the skewed arch (q. v) being unknown, the obliquity of the B. to the water-course involved a corresponding obliquity of its piers to the water, which greatly increased the risk of the B. suffering from floods. That the pressure of the current on piers increases with their obliquity to its course, may be seen at once from the annexed figures, which represent the same section of a pier set first, as in A, dead up and down the stream, and next, as in B, obliquely to it. The mass of water which strikes B is equal in breadth to *a'b'*, the distance between lines through the extremities of B, parallel to the stream; while the mass which strikes A is in breadth only equal to *ab*, the thickness of the pier. But the skewed arch allows a B to be thrown at any angle across a river, with its piers all parallel to the stream; and many an awkward turn in our public roads would have been spared us, had the skewed arch only been earlier known.



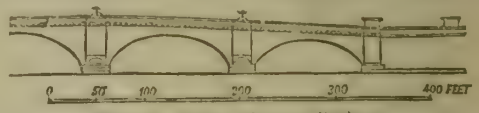
After making allowance for the requirements of position and traffic, the form next must be considered, more particularly in relation to the stream. The stream principally affects the form, through prescribing the number of piers. Each pier takes up so much of the water-course, and thus narrows the effective passage of the water. The immediate consequence of narrowing the channel is to increase the velocity of the stream. As the velocity of the stream increases, it tends more and more to carry off the soil in the neighborhood of the piers, and finally, by deepening its course, to undermine them.

From this consideration, the effect of too many piers will be obvious; but indeed this is not matter of speculation, for many bridges—among others, a B. of Smeaton's at Hexham—have been destroyed from this cause, thus falling from the very overabundance of support! To know how many piers may with safety be used, the volume of water that flows through the channel, both ordinarily and in winter floods, must be ascertained, which can be done very nearly by calculating the mean of many soundings taken at different states of the river, and at a succession of points across its bed. There is another way in which the stream affects the form. If it is liable to floods, care must be taken to make the piers so high as to elevate the spring of the arches above the highest level attainable by the water. The annexed figure sufficiently shows how greatly the pressure of the water on the B. increases whenever it reaches above the pier-head—the breadth above the springing, as at *abcd*, greatly exceeding the breadth of the pier itself. In connection with this part of the subject, it must be remembered, too, that floods are apt to carry down trees and other floating masses, which, if the arches do not afford them passage, become powerful levers for the destruction of the bridge.



The form of the B. being determined on, the remaining questions relate to its stability. This depends on the strength of the abutments and piers, and the balanced equilibrium of the arches. The importance of securing proper foundations for the abutments and piers cannot be overestimated, and very frequently their foundations, owing to the nature of the soil, have to be artificially constructed. See PILES, COFFER-DAM, and CONCRETE. In considering the stability of the B., the first thing is to ascertain the forces which will act to destroy it. This is ascertained by calculating the extreme passing load, and also the weight of the structure above the arches, and of the arches themselves. A scientific and skilled engineer is then able to judge what amount of strain or destructive pressure will be exercised by these weights on the several parts of the structure, and thus to adapt the strength at every point to the strain. As to the passing load, it is usual to calculate on 240 lbs. per foot, superficial, of the whole area in ordinary bridges, and on 960 lbs. in railway bridges. The weight of the superstructure and arches is a question for practical measurement. As to the remaining pressure—viz., that of the stream—it must be ascertained for the highest floods. It is calculated from knowing the mean velocity of the stream, and the amount of surface exposed to it. The surface velocity is readily observed by means of floats; and when this is under 10 feet per second, the mean velocity is found to be about one-fifth less. The stress of the stream on the bridge is diminished by the expedient known as a cut-water, which is an angular projection from the pier, as shown in the annexed figure. The best form for a cut-water has practically been ascertained to be an equilateral prism, presenting an angle of 60° to the water-course. In all bridges, these are to be found on the sides of the piers presented to the stream; and in tidal rivers, they are built on the lower side as well.

After the conditions already mentioned are satisfied, taste has more to do with the form of arches than anything else. The forms in use are the old semicircular, the elliptical—usually got at by putting together several circular arches of different radii—and the segmental arch. The semicircular arch was almost exclusively used in the more ancient bridges. This arch is the most solid and most easily constructed, as all the voussoirs may be worked from the same mould. It requires, however, high banking, as its height is equal half its breadth; and where the water level greatly changes, it is particularly unsuitable, from the great height necessary to be given to the piers, to carry the intrados out of water-reach. The elliptical arch and the segmental of 60° are, besides, far more pleasing in appearance.



Elliptica. Arches.—London Bridge.

In possible extent of span, the masonic bridge is far exceeded by suspension and girder bridges. At Chester there is a stone arch with a span of 200 feet; in the Britannia Tubular Bridge the span is 460 feet; in the suspension-bridge over the Menai Strait, 600 feet; and in the suspension-bridge at Freiburg, Switzerland, 870 feet. The railway bridge, of iron girders, across the Tay near Dundee, was 3450 yards in length, and 90 feet above high-water. Great part of it was thrown down in 1879; but steps were taken to have it rebuilt at a lower elevation. See TUBULAR BRIDGE and SUSPENSION BRIDGES.

The principal objection to the wooden B. is its liability to decay, besides which it is liable to warping. The latter objection applies also to iron bridges; but in their case, the contractions and expansions from heat and cold may be compensated for, as in the compensation-balance of a watch.

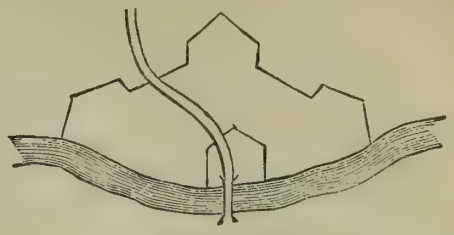
Public bridges are maintainable at the expense of the counties in

which they are situated; but in many cities and boroughs, the inhabitants have acquired by prescription a liability for this expense, and by the 13 and 14 Vict. c. 64, the management and control of such bridges is given to the council of the city or borough. If part of a public bridge be within one county or other place on which the liability rests, and the other part of the bridge be within another, each party or body shall repair that part of the bridge which is within its own boundaries. Besides the bridge itself, the county liable is bound by the 22 Henry VIII. c. 5, to repair 300 feet from the road either way from the bridge. And such is still the state of the law as to all bridges built prior to the passing of the Highway Act, 5 and 6 Will. IV. c. 50. But by that act it is provided that, in the case of all bridges thereafter to be built, the repair of the road itself passing over or adjoining to a bridge, shall be done by the parish, or other parties, bound to the general repair of the highway of which it forms a portion—the county being still subject, however, to its former obligation as regards 'the walls banks, or fences of the raised causeways, and raised approaches to any bridge, or the land arches thereof.' See Stephen's *Com.*, vol. iii. p. 234. The neglect to make such repairs is treated in law-books as a kind of negative offence; but there are positive offences against bridges, which in the statutes are called nuisances, as to which, see the 43 Geo. III. c. 59. An act to amend the law in regard to the maintenance and management of roads and bridges in Scotland was passed in 1878, entitled, 'Roads and Bidges Act.' Private bridges are those erected and maintained under contracts authorized by private acts of parliament. See ROAD; see also BRIDGE in AM. SUPP.

BRIDGE-BUILDING BROTHERHOODS (Fr. *Frères pontifes;* Lat. *Fratres pontifices*) were religious societies that originated in the south of France in the latter half of the 12th century. Their purpose was to establish hospices at the most frequented fords of large rivers, to keep up ferries, and to build bridges. The church during the middle ages regarded the making of streets and bridges as meritorious religious service. Whether or not the herdsman Benezet, subsequently canonized, was the fouder or only a member of this fraternity, is as uncertain as the tradition which attributes to him the completion of the bridge over the Rhone at Avignon in 1180. The fraternity was sanctioned by Pope Clemens III. in 1189; its internal organization was similar to that of the knightly orders, and the members wore as their badge or insignia a pick-hammer on the breast. In France, they labored very actively, but were gradually absorbed into the order of St. John. Similar associations sprang up in other lands, but under different names.

BRIDGE, MILITARY, is a temporary construction, to facilitate the passage of rivers by troops, cannon, and military wagons. The most efficient are described under PONTOON; but there are many other kinds. A *bridge of boats* is formed by small craft, especially cargo-boats, collected from various places up and down the river; trestles are placed in them to bring their tops to one common level; the boats are anchored across the river and baulks of timber, resting on the trestles, form a continuous road from boat to boat across the whole breadth of the river; the boats ought to be of such size that when fully laden, the gunwales or upper edges shall not be less than one foot above the water. *Rope-bridges* are sometimes but not frequently used by military engineers. A *boat-and-rope bridge* consists of cables resting on boats, and supporting a platform or road of stout timber. A *cask-bridge* consists of a series of timber-rafts resting on casks; the casks are grouped together in quadrangular masses; at certain intervals, timbers are laid upon them to form rafts, and several such rafts form a bridge; it is an inferior kind of pontoon bridge. A *trestle-bridge* is sometimes made for crossing a small stream in a hilly country; it consists of trestles hastily made up in any rough materials that may be at hand, with planking or fascines to form a flooring, cables to keep the trestles in a straight line, and heavy stones to prevent them from floating. *Raft-bridges*, consisting of planks lashed together, are easily made of any rough materials that may be found on the spot; but they have little buoyancy, and are not very manageable. A *swing-flying bridge* consists of a bridge of boats, of which one end is moored in the center of the river, and the other end left loose; this loose end is brought to the proper side of the river, the boats are laden, and they make a semicircular sweep across the river by means of rudders and oars, until the loose end of the bridge reaches the other bank. A *trail-flying bridge* is a boat or raft, or a string of boats or rafts, which is drawn across a river by ropes, in a line marked out and limited by other ropes.

BRIDGE-HEAD, or TETE-DU-PONT, in Military Engineering, is a fortified post intended to defend the passage of a river over a bridge. It is a field-work, open at the gorge or in the rear, and having its two flanks on the banks of the river. The most favorable position is at a re-entering sinuosity of the river, where the guns can work better with the supporting batteries opposite. Bridge-heads are usually temporary works, hastily constructed. Their most frequent use is to aid a retiring army to cross the river in good order, and to check an enemy pressing upon it. Openings are left to allow the retiring army, with guns and carriages, to file



Bridge-head Defence Work.

through without confusion; and parapets are so disposed as to flank and defend these openings.

BRIDGE OF ALLAN. See ALLAN.

BRIDGEMAN, LAURA. This famous blind mute was born in Hanover, New Hampshire, United States, on the 21st December 1829. She was a bright, intelligent child, but at two years of age was seized with a violent fever, which utterly destroyed both sight and hearing. For a time this so shattered her system, that there seemed no hope of recovery; but she rallied, and soon learned to find her way about the house and neighborhood, and even learned to sew and to knit a little. A strong passion for imitation began to develop itself, and by assiduously cultivating this power, she was at last enabled to emerge out of her life of unbroken darkness and silence, and take her place among the educated people of the day. In 1839, Dr. Howe of Boston undertook her care and education at the Deaf and Dumb School. The first attempt was to give her a knowledge of arbitrary signs, by which she could interchange thoughts with others.

Then she learned to read embossed letters by the touch; next, embossed words were attached to different articles, and she learned to associate each word with its corresponding object. A pat on the head told her when she was right in her spelling-lesson. Thus far, however, the work was only an exercise of imitation and memory, roused into exertion by the motive of love of approbation, but seemingly without intellectual perceptian of the relation between words and things. It was like teaching a clever dog a variety of tricks. But at last the truth flashed upon her, that by this means she could communicate to others a sign of what was passing in her own mind. Her whole being seemed changed. The next step was to procure a set of metal types, with the letters cast at the ends, and a board with square holes for their insertion, so as to be read by the finger. In six months, she could write down the name of most common objects, and in two years had made great bodily and mental improvement. She grew happier, and enjoyed play like other children, amusing herself with imaginary dialogues, spelling old and new words, and with her left hand slapping the fingers of her right, if they spelled a word wrong; or giving herself a pat of approval, as the teacher did, when correct. Her touch grew in accuracy as its power increased; she learned to know people almost instantly by the touch alone. In a year or two more, she was able to receive lessons in geography, algerbra, and history. She received and answered letters from all parts of the world, and was always employed, and therefore always happy. Her brain seems to have been unduly excited for a blind person; she not only held imaginary dialogues with herself, but dreamed incessantly by night; and during these dreams, while asleep, talked much on her fingers. She learned to write a fair, legible, square hand, and to read with great dexerity, and at last, even to think deeply, and to reason with good sense and discrimination.

Keen, sensitive, and lively, in various occupation, her days now pass rapidly and pleasantly, mainly owing to the unremitting skill and kindness of Dr. Howe. She was saved by him from a life of hopeless, helpless darkness; educated and trained to take her part in the world; and now, as a teacher of the blind and deaf and dumb, is conferring on them the blessings she has herself received. She is probably among the most skilful of Blind teachers.

BRI'DGENORTH, a town of Salop or Shropshire, on both sides of the Severn, 20 miles south-east of Shrewsbury. It consists of an upper and lower town, connected by a bridge over the Severn. The larger part of the town is on the right bank, and is built on a sandstone rock, rising sixty feet above the river. Pop. (1880) of parl. bor. 7216, sending one member to parliament. The navigation of the Severn formerly employed many of the inhabitants, but the traffic has been greatly injured by the introduction of railways. The town, which was at one time called *Bruges* or *Brug*, is said to be of Saxon origin. In the beginning of the 12th c., the Earl of Shrewsbury defended the town unsuccessfully against Henry I. It was besieged in the same century by Henry II.; and during the civil wars it resisted the Parliamentary forces

for three weeks. A great portion of the town was on this occasion destroyed by fire. It has carpet and worsted manufactories. Bishop Percy was born here.

BRI'DGEPORT, a seaport of Connecticut, U. S., at the mouth of the Pequannock, which empties itself into an inlet of Long Island Sound. It is in lat. 41° 11′ N., and long. 73° 12′ W., being 178 miles to the south-west of Boston, and 58 to the north-east of New York. Pop. at the census of 1870, 18,869; in 1880, 29,148. B. is connected by railways both with the interior and with the other places generally on the seaboard. Though the harbor does not admit large ships, having only 13 feet on the bar at high-water, yet B. has a considerable coasting-trade, and a number of vessels engaged in the whale-fishery. Its manufactures are extensive, particularly of carriages, harness, fire-arms, and sewing-machines.

BRIDGET, St. (or, more properly, *Birgit* or *Brigitte*), a famous Roman Catholic saint, was born in Sweden about the year 1302. Her father was a prince of the blood-royal of Sweden. When only sixteen she married Ulf Gudmarson, Prince of Nericia, a stripling of eighteen by whom she had eight children, the youngest of whom, named Catherine, born in 1336, died in 1381, became *par excellence* the female saint of Sweden. Her husband and she now solemnly vowed to spend the remainder of their lives in a state of continence, and, to obtain strength to carry out their severe resolution, made a pilgrimage to the shrine of St. Jago de Compostella in Spain. On their return, Ulf died in 1344, and B. founded about the same time the monastery of Wadstena in East Gothland. Sixty nuns and twenty-five monks were its first inmates. They received the rule of St. Augustine, to which St. B. herself added a few particulars. They constituted a new order, sometimes called the order of St. B., sometimes the order of St. Salvator, or the Holy Saviour, which flourished in Sweden until the Reformation, when it was suppressed, but it still possesses some establishments in Italy, Portugal, and elsewhere. Subsequently St. B. went to Rome, where she founded a hospice for pilgrims and Swedish students, which was reorganized by Leo X. After having made a pilgrimage to Palestine, she died at Rome on her return 23d July 1373. Her bones were carried to Wadstena, and she herself was canonized in 1391 by Pope Boniface IX. Her festival is on the 8th of October. The *Revelationes St. Brigittæ*, written by her confessors, was keenly attacked by the celebrated Gerson, but obtained the approval of the Council of Basel, and has passed through many editions. Besides the *Revelationes*, there have been attributed to this saint a sermon on the Virgin, and five discourses on the passion of Jesus Christ, preceded by an introduction which was condemned by the congregation of the *Index*.

Not to be confounded with this Swedish saint is another St. Bridget, or St. Bride, as she is more commonly called, a native of Ireland, who flourished in the end of the 5th and beginning of the 6th c., and was renowned for her beauty. To escape the temptations to which this dangerous gift exposed her, as well as the offers of marriage with which she was annoyed, she prayed God to make her ugly. Her prayer was granted; and she retired from the world, founded the monastery of Kildare, and devoted herself to the education of young girls. Her day falls on the 1st of February. She was regarded as one of the three great saints of Ireland, the others being St. Patrick and St. Columba. She was held in great reverence in Scotland, and was regarded by the Douglases as their tutelary saint.

BRI'DGETON, a port of entry in New Jersey, U. S., about 40 miles south of Philadelphia. It occupies both banks of the Cohansey Creek, about 20 miles above its entrance into Delaware Bay, its two divisions being connected by a wooden drawbridge. The town contains a public library, two newspaper-offices, an iron foundry, a rolling-mill, a nail-factory, a woollen-factory, and a glass-work. It likewise owns upwards of 15,000 tons of shipping. Pop. (1870) 6820; (1880) 8729.

BRI'DGETOWN, the capital of Barbadoes (q. v.), is situated on the west coast of the island along the north side of Carlisle Bay, which forms its roadstead, in lat. 13° 4′ N., and long. 59° 37′ W. Pop. 21,384. It was founded about the middle of the 17th c., taking the name Indian Bridge, and later its present appellation, from a rude aboriginal structure which spanned a neighboring creek. The present city, however, is only 100 years old, the former having been almost destroyed by fire in May 1766. In 1831, a part of B. was destroyed by a hurricane, and in 1845 it again suffered severely from fire. It is the residence of the bishop of Barbadoes and of the Governor-general of the Windward Islands. Except Broad Street, the thoroughfares are irregular, and the shops or general stores, having no windows in front, look heavy and unattractive. There is a considerable trade.

BRI'DGEWATER, a town and port of Somersetshire, on both sides of the Parret (which is here spanned by an iron bridge), 6 miles in a direct line, and 12 by the river, from the Bristol Channel, and 30 miles south-west of Bristol. It stands on the border of a marshy plain which lies between the Mendip and Quantock Hills, but the country around is well wooded. It is chiefly built of brick. St. Mary's Church has a remarkably slender and lofty spire. The Parret admits vessels of 200 tons up to the town; it rises 36 feet at spring-tides, and is subject to a bore or perpendicular advancing wave, 6 or 8 feet high, often causing much annoyance to shipping. Pop. in 1881, 12,024. B. formerly returned two members to parliament, but was disfranchised in 1870. Bath or scouring bricks, peculiar to B., are made here of a mixture of sand and clay found in the river. Admiral Blake was a native of this town, which suffered severely in the civil wars, when it was besieged by Fairfax, and ultimately forced to surrender, the castle being dismantled by the conqueror. The unfortunate Duke of Monmouth was proclaimed king by the corporation of B., before the battle of Sedgemoor, which occurred in 1685, 5 miles south-east of B., and in which he was defeated by the royal army. In 1880, 143 vessels, of 9099 tons, belonged to the port; and in the same year the number of vessels that cleared the port was 4227, with an aggregate burden of 237,395 tons.

BRIDGEWATER, Francis Egerton, Duke of, styled the 'Father of British Inland Navigation,' youngest son of Scroop, fourth Earl and first Duke of B., was born in 1736, and succeeded his elder brother, second duke, in 1748. In 1758—1760, he obtained acts of parliament for making a navigable canal from Worsley to Salford, Lancashire, and carrying it over the Mersey and Irwell Navigation at Barton by an aqueduct 39 feet above the surface of the water, and 200 yards long, thus forming a communication between his coal-mines at Worsley and Manchester, on one level. In this great undertaking he was aided by the skill of James Brindley (q. v.), the celebrated engineer, and expended large sums of money.

He was also a liberal promoter of the Grand Trunk Navigation; and the impulse he thus gave to the internal navigation of England, led to the extension of the canal-system througout the kingdom. In politics, though he took no active part, B. was a friend to the Pitt administration, and a contributor to the Loyalty Loan of no less than £100,000. He died unmarried, March 8, 1803, and with his death the dukedom became extinct. Before he began to realize profits from his great work, B. lived in privacy, and restricted himself to the simplest fare; and after his death his great wealth was distributed among collateral branches of his family. A monument was erected to his memory in Manchester.

BRIDGEWATER, Francis Henry Egerton, Earl of, son of John Egerton, Bishop of Durham, grandnephew of the first Duke of B., succeeded his brother as eighth earl, October 21, 1823. Educated for the church, he had previously been prebendary of Durham. He died unmarried, in February 1829, and the title became extinct. By his last will, dated February 25, 1825, he left £8000, invested in the public funds, to be paid to the author of the best treatise 'On the Power, Wisdom, and Goodness of God, as manifested in the Creation,' illustrating such work by such arguments as the variety and formation of God's creatures in the animal, vegetable, and mineral kingdoms, the effect of digestion, the construction of the hand of man, and by discoveries, ancient and modern, in arts, sciences, and the whole extent of literature. The then president of the Royal Society of London, Davies Gilbert, to whom the selection of the author was left, with the advice of the Archbishop of Canterbury, the Bishop of London, and a noble friend of the deceased earl, judiciously resolved, that instead of being given to one man for one work, the money should be allotted to eight different persons for eight separate treatises, though all connected with the same primary theme (see next article). B. also left upwards of £12,000 to the British Museum, the interest to be employed in the purchase and care of MSS. for the public use.

BRIDGEWATER TREATISES, eight celebrated works 'On the Power, Wisdom, and Goodness of God, by eight of the most eminent authors in their respective departments, published under a bequest of the last Earl of Bridgewater (q. v.), whereby each received £1000, with the copyright of his own treatise. They are: 1. *The Adaptation of External Nature to the Moral and Intellectual Constitution of Man*, by Thomas Chalmers, D.D. (Lond. 1833, 2 vols. 8vo). 2. *Chemistry, Meteorology, and the Function of Digestion, considered with Reference to Natural Theology*, by William Prout, M.D. (Lond. 1834, 8vo). 3. *On the History, Habits, and Instincts of Animals*, by the Rev. William Kirby (Lond. 1835, 2 vols. 8vo). 4. *On Geology and Mineralogy*, by the Rev. Dr. Buckland (Lond. 1837, 2 vols. 8vo). 5. *The Hand, its Mechanism and Vital Endowments, as evincing Design*, by Sir Charles Bell (Lond. 1837, 8vo). 6. *The Adaptation of External Nature to the Physical Condition of Man*, by John Kidd, M.D. (Lond. 1837, 8vo). 7. *Astronomy and General Physics, considered with Reference to Natural Theology*, by the Rev. William Whewell (Lond. 1839, 8vo). 8. *Animal and Vegetable Physiology, considered with Reference to Natural Theology*, by Peter Mark Roget, M.D. (Lond. 1840, 2 vols. 8vo). All these works have since been republished by Bohn.

BRI'DLINGTON, or BU'RLINGTON, a sea-coast town in the East Riding of Yorkshire (including Bridlington Quay, a port and bathing-place about 1 mile to the south-east), 6 miles west of Flamborough Head, and 40 miles east-north-east of York. B. is situated on a gentle slope in a recess of a beautiful bay. The country is hilly to the north, but subsides to the south into a flat alluvial and fertile tract called Holderness. It has the aspect of an old town with narrow irregular streets. Pop. in 1881, 8363. It has a considerable trade in corn, and also some soap-boiling and bone-grinding works. B. is supposed to have been the site of a Roman station.

The Danes had strongholds in this vicinity for nearly 300 years, and many engagements between them and the Saxons and Normans occurred here. Great numbers of ancient tumuli or barrows still exist. An Augustine priory of immense wealth, and which subsisted for 400 years, was founded here by a grand-nephew of the Conqueror, and obtained many privileges from Henry I., and also from King John. Some parts of it yet remain. In 1643, Henrietta, queen of Charles I., landed here with arms and ammunition from Holland bought with the crown-jewels. Bridlington Quay has a chalybeate mineral spring, as well as an intermitting one of pure water. B. is noted for its chalk-flint fossils. In the lacustrine deposits near B. were found, some years ago, the bones of a large extinct elk, with branching horns, measuring 11 feet from tip to tip.

BRI'DPORT, a town in Dorsetshire, in a vale at the confluence of the Asker and the Birt, or Brit, or Bride, 16 miles west-north-west of Dorchester, and 2 miles from the English Channel. It stands on an eminence surrounded by hills, and consists chiefly of three spacious and airy streets. Pop. (1871) 7670; (1881) 6790. The registered electors numbered (1881) 1070. They return one member to parliament. The chief manufactures are twine, shoe-thread, cordage, fishing-nets, and sail-cloth; and ship-building is carried on to some extent. The vicinity is celebrated for its cheese and butter. B. was a considerable town before the Norman Conquest, and had a mint for coining silver. In 1873 there entered into this port 69 vessels whose tonnage was reckoned 6386; and there cleared it 36 vessels of collectively 3526 tons. On the coast near, are sandy cliffs, 200 feet high, abounding in fossils.

BRIEF, or BREVE, PAPAL (Lat. *brevis*, short), a word which, in the corrupt Latinity of the early ages, was made to signify a short letter written to one or more persons (hence the German *brief*, a letter). It is now used to denote certain pontificial writings, which, however, do not receive their name from the brevity of the composition, but from the smallness of the caligraphy.

The papal B. differs from the papal bull (q. v.) in several points. It gives decisions on matters of inferior importance, such as discipline, dispensations, release from vows, indulgences, &c., which do not necessarily require the deliberations of a conclave of cardinals. Still, it is not to be confounded with the *motus proprii*, or private epistle of the pope as an individual, as its contents are always of an official character. His holiness speaks, as it were, with a kind of familiar parental authority, and the B. is consequently superscribed *papa*, while the person to whom it is addressed is termed *dilecte fili* (beloved son). It is signed not by the pope, but by the *Segretario de' Brevi*, an officer of the papal chancery, with red wax, and only with the pope's private seal, the fisherman's ring; hence it concludes *Datum Romæ sub annulo piscatoris* (Given at Rome under the ring of the fisherman). Like the bull, it is written on parchment, with this difference, that the bull is written on the rough side, and in ancient Gothic characters, while the brief is written on the smooth side, and in modern Roman characters.

BRIEF, in the practice of the English bar, is the name given to the written instructions on which barristers advocate causes in courts of justice. It is called a B. because it is, or ought to be, an abbreviated statement of the pleadings, proofs, and affidavits at law, or of the bill, answer, and other proceedings in equity, with a concise narrative of the facts and merits of the plaintiff's case, or the defendant's defence. But it is also used in forensic business generally, being applied, not only in the courts of law and equity, but also in all other tribunals, whether inferior or superior, original or appellate. In Scotland, the corresponding term is *Memorial*. The skill of the attorney or solicitor is shown in the preparation of this important document, which should be characterized by arrangement and compression, without any material omission.

BRIEG, a town of Silesia, Prussia, about 27 miles south-east of Breslau. It is situated on the left bank of the Oder, and on the railway between Breslau and Vienna, and is surrounded with walls, which have been partly converted into promenades. The streets are wide and regular, and commercially B. is a thriving town, its manufactures including linens, woollens, cottons, hosiery, ribbons, lace, leather, and tobacco. The battle-field of Mollwitz (q. v.) lies a little to the west of Brieg. Pop. (1880) 17,508.

BRIEL, BRIE'LLE, or THE BRILL, a fortified seaport town, on the north side of the island of Voorne, S. Holland. It is situated near the mouth of the Maas, about 14 m. W. of Rotterdam, in lat. 51° 54′ N., and long. 4° 10′ E. B. possesses a good harbor, and is intersected by several canals. It has a population of (1879) 4442, the male portion of which are chiefly engaged as pilots and fishermen. B. may be considered as the nucleus of the Dutch republic, having been taken from the Spaniards by William de la Marck in 1572. This event was the first act of open hostility to Philip II., and paved the way to the complete liberation of the country from a foreign yoke. In 1585, B. was one of the towns made over to England as security for certain advances made to the states of Holland; it was restored to the Dutch in 1616. B. was the first town of Holland which, without extraneous aid, expelled the French in 1813. The celebrated admirals De Witt and Van Tromp were natives of this place.

BRIENNE-LE-CHATEAU, or, as it is now called, BRIENNE-NAPOLEON, a small town in the dep. of Aube, France, on the right bank of the river Aube, and about 14 m. north-west of Bar-sur-Aube. It is celebrated as the place where Napoleon I. received his earliest military education, he having entered the school here in 1779, when he was 10 years old, and remained until 1784. It is also remarkable on account of the battle fought here between the French and the allies in 1814. On the 29th of January, Bonaparte, who had collected his forces in the vicinity of B., with a view to check the advance of the allies on Paris, attacked Blucher, who was stationed in the town, and drove him out with considerable loss. In the struggle, the town, which was chiefly composed of wood, was almost reduced to ashes. On the 30th, the contest was renewed, and Blucher was forced to retreat to Trannes. On the following day, Napoleon deployed his forces in the plain between La Rothière and Trannes, and on February 1, the corps of the Crown-prince of Würtemberg and Count Giulay, and the Russian reserves of grenadiers, having joined Blucher, Prince Schwarzenberg gave orders to renew the combat. After a sanguinary struggle, during which Napoleon, feeling the importance of the contest, exerted all his influence over his troops, led several charges in person, and frequently exposed himself to danger, victory at length declared decisively for the allies at every point. During the night of February 1 and the morning of the following day, the French troops retreated from Brienne-le-Chateau. The loss on both sides was about equal, consisting of nearly 5000 killed and wounded. The allies took 9000 prisoners, and 70 pieces of artillery. This victory at B. opened the way to Paris, and led to the fall of the empire.

BRIENZ, a town of the canton of Bern, Switzerland, beautifully situated at the foot of the Bernese Alps, on the north-east shore of the lake of the same name, and about 30 miles east-south-east of Bern. Its cheese is held in high repute. Pop. (1870) 2605.—The lake of B., which is about 8 miles long and 2 in breadth, is formed by the river Aar, at the foot of the Hasli valley, and by the same river it discharges its surplus waters into Lake Thun. The lake is situated at an elevation of 1850 feet above the sea; its average depth is about 500 feet, but in some places it is said to have a depth of more than 2000 feet. It is surrounded by elevated mountains, the principal of which is the Rothorn, from which splendid views of the whole range of the Bernese Alps are obtained. A small steamer plies daily on the lake between B. and Interlaken, touching at the celebrated Giessbach Fall every trip.

BRI'ERLY HILL, an ecclesiastical district of Staffordshire, England, two miles north-north-east from Stourbridge, on the Oxford, Worcester, and Wolverhampton Railway. It is a place of much activity, the district abounding in coal, iron, and fireclay; and there are here numerous colleries, large iron-works, glass-works, brick-works, and potteries. The manufacture of steam-boilers is extensively carried on. Pop. (1871) 11,046; (1881) 11,546.

BRIEUC, ST., a seaport town, in the department of Côtes-du-Nord, France, situated on the right bank of the Gouet, about 2 miles from its mouth in the Bay of St. B., a part of the English Channel, in lat. 48° 31′ N., and long. 2° 45′ W. The town is said to owe its origin to an Irishman, St. Brieuc, who built a monastery here in the 5th century. St. B. has the ruins of an old tower that formerly defended the entrance to the river, but was partially blown up by order of Henry IV. in 1598, and a cathedral, part of which dates from the 11th century. The ramparts were destroyed in 1788, and their site has been converted into a pleasant promenade, terminating in a terrace that commands a fine view of the Channel. St. B. has manufactures of woollen stuffs, linen, cotton, leather, paper, &c.; it has also ship-building yards, and a trade in agricultural produce. Pop. (1876) 13,683.

BRIG, BRI'GANTINE. A brig is a square-rigged vessel with two masts. A brigantine, or hermaphrodite brig, is a two-masted

vessel, with the mainmast of a schooner and the foremast of a brig. A brig's mainsail is the lowest squaresail on the mainmast,

Brig.

whereas the mainsail of a brigantine is a fore-and-aft sail like that of a schooner.

BRIGA'DE, in the military service, is a group of regiments or battalions, combined into one body. When a British army takes the field, it is customary for three battalions to form a *brigade*, and two brigades a *division*. Thus, at the battle of the Alma, each of the five divisions of British infantry comprised two brigades; and of these ten brigades, nine consisted of three battalions each, the tenth being somewhat stronger. It is nothing more than a temporary grouping, which can be broken up whenever the commanding officer thinks fit. The household troops, comprising the Horse Guards, Life Guards, and Foot Guards, are sometimes called the *Household Brigade*.

BRIGADE MAJOR, is a military officer who exercises duties, in a brigade, analogous to those of the adjutant of a regiment. He attends to matters of discipline, and to the personal movements of the men. When regiments or battalions are brigaded, a brigade-major is appointed, usually from among the captains. He conveys orders, keeps the rollster or roster, inspects guards and pickets, and directs exercises and evolutions; but he nevertheless remains on the books of a particular regiment, and returns to his regimental duties when the B. is broken up.

BRIGADIE'R, or BRIGADIE'R-GENERAL, is an officer of a regiment (usually a colonel or lieutenant-colonel), who, for a limited time and for a special service, is placed upon brigade duties. He is then a general or commander of a brigade, which usually contains his own regiment as one of the number. When the brigade is broken up, he falls back to his colonelcy, unless his services lead to his promotion to the rank of major-general.

BRI'GANDINE, among the articles of armor worn during the middle ages, was an assemblage of small plates of iron, sewed upon quilted linen or leather, and covered with a similar substance to hide the glittering of the metal. It formed a sort of coat or tunic. The B. was named from the *Brigans*, a kind of light-armed irregular corps, employed something like the Cossacks and Bashi-bazouks of recent days, and, like them, addicted to marauding and pilfering; hence the word *Brigand*.

BRIGA'NTES. See BRITANNIA.

BRI'GANTINE. See BRIG.

BRIGGS, HENRY, a distinguished mathematician, was born in 1556, at Warleywood, near Halifax, Yorkshire, and studied at St. John's College, Cambridge. In 1596 he was appointed first reader in geometry at Gresham House (afterwards College), London, and in 1619 first Savilian professor of geometry in Oxford. This office he retained till the time of his death, which took place in Oxford, January 26, 1631. B. made an important contribution to the theory of logarithms, of which he constructed invaluable tables. Napier the inventor had, in 1614, published a table of the so-called natural logarithms, when B. observed that another system, in which the logarithm of 10 should be taken as unity, would afford great facilites of calculation. Napier admitted the improvement on his own system, and intended to assist in carrying the plan into effect; but died in 1618, when the whole work was left to Briggs. In the same year he published his *Chilias Prima Logarithmorum*, containing the first thousand natural numbers calculated to eight decimal places, and in 1624 published his *Arithmetica Logarithmica*, the fruit of many years of unwearied application and giving the logarithms of natural numbers from 1 to 20,000, and from 90,000 to 101,000, with fifteen places. His system of logarithms is that now commonly adopted. Leaving others to carry out his calculations, for which he had provided every facility, he next employed himself on a Table of Logarithms of sines and tangents, carried to the hundredth part of a degree, and to fifteen places, which, with a table of natural sines, tangents, and secants, was posthumously published at Gouda, in Holland, 1633, under the title of *Trigonometria Britannica*.

BRIGHT, JOHN, a popular politician, first brought into notice by the Anti-Corn-Law agitation, son of Jacob Bright, a Quaker cotton-spinner and manufacturer at Rochdale, Lancashire, was born at Greenbank, near that town, November 16, 1811. In 1835, he made a foreign tour, which included a journey to Palestine, and, on his return, delivered before a literary institution at Rochdale, of which he was one of the founders, lectures on the subject of his travels, and on topics connected with commerce and political economy. When the Anti-Corn-Law League was formed in 1839, he was one of its leading members, and, with Mr. Cobden, engaged in an extensive Free-trade agitation throughout the kingdom. In the spring of 1843, he offered himself as a candidate for the representation of Durham, and, though, at first unsuccessful he became, in July of the same year, M.P. for that city. At all times an animated and effective speaker, B. was incessant, both at public meetings and in parliament, in his opposition to the Corn Laws, until they were finally repealed. In 1845 he obtained the appointment of a select committee of the House of Commons on the Game Laws, and also one on the subject of cotton cultivation in India. An abridgement of the evidence taken before the former, published in one volume, contained from his pen an *Address to the Tenant Farmers of Great Britain*, strongly condemning the existing Game Laws. At the general election of 1847, he was elected one of the members for Manchester. He co-operated with Mr. Cobden in the movement in favor of financial reform. On the formation of the first Derby ministry, February 27, 1852, B. aided in the temporary re-organization of the Corn-Law League, in favor of the principles of Free Trade; and at the general election which followed, was re-elected for Manchester. A member of the Peace Society, and strenuously opposed to the war with Russia in 1854, B. was one of the meeting of the Society of Friends, by whom a deputation was sent to the Emperor Nicholas to urge upon him the maintenance of peace; and in 1855 he energetically denounced the Crimean war. A severe illness compelled him to withdraw for a time to the continent, and in his absence he was rejected by Manchester. Elected in 1857 for Birmingham, he seconded the motion against the second reading of the Conspiracy Bill, which led to the overthrow of Lord Palmerston's government. His name then became chiefly associated with the movement for reforming the electoral representation, which resulted in the act of 1867.

In 1868 he accepted office as President of the Board of Trade, but in 1870 was again obliged to retire, in consequence of severe illness. His health having been restored, he took office in 1873 and again in 1881 as Chancellor of the Duchy of Lancaster; he was appointed Lord Rector of Glasgow University in November 1880. A collection of his *Speeches* was published in 1868; a *Life* by Robertson (1877); and *Life and Speeches*, 2 vols., by G. Barnett Smith (1881).

BRIGHTENING, in Calico-printing, is the operation of rendering the colors of printed fabrics more bright or brilliant, by boiling them in solutions of soda and other materials.

BRIGHTON, originally *Brighthelmstone*, a town and watering-place on the coast of Sussex, 50½ miles south of London. It is built on a slope ascending eastward to a range of high chalk-cliffs; to the west, these hills recede from the coast, and have a long stretch of sands. Anciently, Brighthelmstone was a mere fishing village on a level under the cliff. It was fortified by Henry VIII. and more strongly by Elizabeth; but the sea proved more dangerous than the French, and now washes over the site of the village of those days. The inroads of the sea in 1699, 1703, and 1705, undermined many cliffs and destroyed many houses. Its further inroads are prevented by a sea-wall of great strength (60 feet high, 23 feet thick at the base, and 2 miles long), extending along the cliffs, and built at the cost of £100,000. The writings of Dr. Russel, a celebrated physician of George II.'s time, first drew public attention to B. as an eligible watering-place, and the discovery of a chalybeate spring in the vicinity increased its popularity. The visit of the Prince of Wales in 1782, and his subsequent yearly residence there, finally opened the eyes of the fashionable world to its immense attractions and B. thenceforth became the crowded resort of a health-seeking population. Its progress has been very rapid, and the town is still steadily increasing. B. is for the most part extremely well-built, as becomes a favored retreat of wealth and aristocracy. It mostly consists of new and elegant streets, squares, and terraces. The hotels are magnificent. A range of splendid houses fronts the sea for nearly 3 miles, including the famous sea-wall, and the beach is easy accessible by gaps in the chalk-cliffs. Formerly, trees were a great rarity in B.; but within the last thirty years they have been planted both in and around the town, and are now to be seen of considerable size in the North Steyne Enclosures, the Level, and the Queen's Park. Pop. (1801) 7339; (1851) 65,569; (1871) 92,469; (1881) mun. borough, 107,528.

B. returns two members to parliament. The population is greatly increased during the fashionable season by the influx of visitors. Living and house-rent are about a third higher than in London.

Near the center of the town is the Pavilion or Marine Palace, a fantastic Oriental or Chinese structure, with domes, minarets, and pinnacles, and Moorish stables, begun for the Prince of Wales in 1784, and finished in 1827. It is now the property of the corporation of B., and with its fine pleasure-grounds of above seven acres, it is devoted to the recreation of the inhabitants. It stands in the Steyne, an open space between the east and west parts of the town. The Marine Parade, a fine terrace, extends about a mile along the margin of the cliff, between the Steyne and Kemp Town, a handsome district on the east. Westward, there is a similar parade or promenade, extending a great length in front of the more modern part of the town, and here there is daily a large and fashionable concourse. There are two piers—a Chain Pier on the east, opposite the Marine Parade, and a broad wooden Pier on piles on the west; both are used for promenading. A magnificent aquarium, 715 feet in length, was opened in 1872. B. has no maritime trade. It is reputedly a town for recreation and sea-bathing. Its only defect is a want of trees to shade the promenades; the sea-breeze being adverse to the growth of the trees. B. possesses several large public hotels, and is more particularly noted for its excellent private hotels or boarding-houses, locally known as 'Mansions.' B. is connected with London, and also with the towns along the coast, by railways. From its salubrity, the town abounds in boarding-schools.

BRIGHT'S DISEASE (of the kidneys), so called after the English physician, Dr. Bright, who first investigated its character, consists of a degeneration of the tissues of the kidney into fat, and will be better understood after the anatomy of the organ has been studied. Suffice it to say now, that this degenerated condition impairs the excreting powers of the organ, so that the urea is not sufficiently separated from the blood. The flow of the latter, when charged with this urea, is retarded through the minute vessels, congestion ensues, and exudation of albumen and fibrin is the result. When we apply heat to the urine from a kidney so affected, it becomes opaque, showing that it contained *albumen* (q. v.); and on examining a drop of it under the microscope, we observe the exuded lymph mixed with epithelium in the form of casts of the small ducts of the diseased organ.

The patient presents a flabby, bloodless look, is drowsy, and easily fatigued. The disease may succeed any of the eruptive fevers, and is frequently associated with enlargement of the heart.

The *causes* of this terrible malady are any which cause congestion of the kidneys—indulgence in strong drinks, long-continued suppuration, exposure to wet and cold, the exanthematous fevers, and pregnancy. The indications for *treatment* are, to remove any of those causes which may be present, rectify the other secretions, relieve any temporary congestion of the kidneys, at the same time endeavoring to increase the number of red blood globules by the administration of iron and vegetable bitters. And in the advanced stages, when the blood is poisoning the nervous centers, attempts should be made to restore secretion of urine by administering diuretics (q. v.), by giving hydrochloric and vegetable acids, sponging the patient with vinegar, and relieving the congestion of the brain by purgatives and local bleeding.

BRIGNOLES, a town in the department of Var, France, beautifully situated in a fertile valley, surrounded by forest-clad hills, and watered by a stream called the Calami, about 22 miles west-south-west of Draguignan. B., which is a very salubrious place, has manufactures of broadcloth, silk twist, soap, leather, pottery, &c.; and a trade in wines, brandy, olives, and prunes. Pop. (1876) 5164.

BRIHUE'GA, a town of New Castile, Spain, 20 miles east-north-east of Guadalajara, is situated on the Tajuña, and was formerly surrounded by walls, of which traces still exist. The remains of an old Moorish fortress now serve as a cemetery. B. has manufactures of woollens, linen, glass, and leather. Pop. 4140. Here, in 1710, during the War of the Succession, the English general Stanhope, owing to the dilatoriness of his allies in affording him support, was defeated by the Duke de Vendôme, and compelled to surrender, with all his force, amounting to about 5500 men.

BRIL, the name of two Dutch painters.—MATTHÆUS B., born at Antwerp, 1550, went during his youth to Italy, and, under the patronage of Pope Gregory XIII., painted several frescoes in the Vatican. He was also distinguished as a historical and landscape painter. He died in 1584.—His more celebrated younger brother, PAUL B., born 1554 or 1556, received instruction under Matthæus in Rome, and soon excelled his master.

His pieces were at first conceived in the fantastic style which then prevailed; but gradually his style increased in power and beauty, until it exerted a striking influence over landscape painting. The works of his riper age exhibit high poetical qualities, and a fine appreciation of the effects of light in the sky, which have been described as but little inferior to those of his great successor, Claude Lorraine. They have a character of solemn rest and calmness, and at times even an elegiac tone of melancholy, which well accords with representations of the glories of fallen Rome. A collection of excellent landscapes by B. is found in the palace Rospigliosi in Rome, and two beautiful landscapes enrich the gallery of the Pitti Palace, Florence. Besides landscapes, B. painted scenes from biblical history; among them, the 'Tower of Babel,' now in the Berlin Museum. Other pictures by B. are found in the galleries of Munich, Vienna, and the Louvre. He died at Rome in 1626.

BRILL (*Rhombus vulgaris*), a fish of the same genus with the turbot (q. v.), found in considerable abundance on some parts of the British coasts, and common in the markets of the larger towns. It resembles the turbot more than any other British species of this genus, but is at once distinguished by its inferior breadth, which (excluding the fins) is only equal to half its entire length; by the want of tubercles on the upper surface; by a few of the most anterior rays of the dorsal fin being elongated beyond the membrane; and by the coloring, which is reddish sandy-brown on the upper side, varied with darker brown and sprinkled with white pearly spots, the under side being (as in the turbot) white. The B. is taken both in sandy bays and in deep water. Although considered very inferior to the turbot, it is yet much esteemed for the table. It seldom or never attains so great a size as the turbot, rarely exceeding 8 lbs. in weight.

BRI'LLIANT is a popular name given to the diamond when cut in a particular way. See DIAMOND.

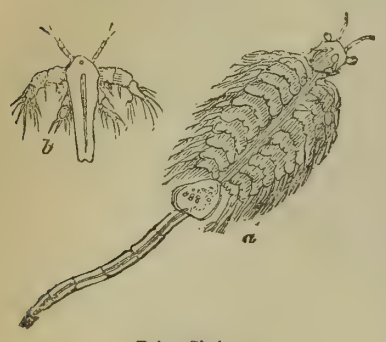
BRI'MSTONE (Saxon, *Brenne-stone*, a stone that burns) is the commercial name for Sulphur (q. v.), in sticks or rolls.

BRI'NDISI (the ancient *Brundisium* or *Brundusium*), a seaport town of Southern Italy, in the province of Lecce, is situated on a small promontory in a bay of the Adriatic Sea, about 45 miles east-north-east of Taranto. B. is a city of very great antiquity. It was taken from the Sallentines by the Romans 267 B.C., who some twenty years later established a colony here. The town, partly owing to the fertility of the country, but chiefly on account of its excellent port—consisting of an inner and outer harbor, the former perfectly landlocked, and capable of containing the largest fleets and of easy defence on account of its narrow entrance, and the latter also very well sheltered—rapidly increased in wealth and importance. It soon became the principal naval station of the Romans in the Adriatic. In 230 B.C., B. was the starting-place of the Roman troops that took part in the first Illyrian War; and from this point the Romans nearly always directed subsequent wars with Macedonia, Greece and Asia. And when the Roman power had been firmly established beyond the Adriatic, B. became a city second to none of South Italy in commercial importance. Horace, who accompanied Antony in a hostile movement on B., in 41 B.C., has made the journey the subject of one of his satires (*Sat.* i. 5). Virgil died here, in 19 B.C., on his return from Greece. The city appears to have retained its importance until the fall of the empire, but it suffered greatly in the wars which followed. When the Normans became possessed of it in the 11th c., the Crusaders made it their chief port for embarkation to the Holy Land; but with the decline of the crusades, B. sank into comparative insignificance as a naval station. The city subsequently suffered greatly from wars and earthquakes. The principal buildings are the cathedral, where the Emperor Frederick II. was married to Yolanda in 1225; and the castle, commenced by Frederick II., and finished by Charles V. The district around B. is still remarkable for its fertility, olive oil being produced in large quantities. Some years ago, B. was constituted an entrepôt for foreign goods. Since the establishment of the overland route to India, B. has greatly increased, being the most convenient point of departure for the east from Northern and Central Europe. The extensive and well-sheltered harbor has undergone great improvement, and a substantial bulwark has been built across the north arm to prevent it from being filled with sand. From 700 to 1000 vessels annually enter the port. Pop. (1871) 13,194.

BRINDLEY, JAMES, an eminent English mechanic and engineer, born in Thornsett, near Chapel-en-le-Firth, Derbyshire, in 1716. Apprenticed at 17 to a millwright, he afterwards became an engineer, and in 1752 showed great ingenuity in contriving a water-engine for draining a coal-mine. A silk-mill on a new plan, and several others of his works, recommended him to the Duke of Bridgewater (q. v.), who employed him to execute the canal between Worsley and Manchester. Thenceforth he devoted his great skill and genius to the construction of navigable canals; commenced the Grand Trunk, and completed the Birmingham, Chesterfield, and others. Once, when under examination before a committee of the House of Commons, being jocularly asked for what purpose he supposed rivers to have been created, he is said to have replied: 'Undoubtedly to feed navigable canals.' He died in 1772.

BRINE is the term applied to water highly impregnated with common salt, and BRINE SPRINGS are those natural waters containing much salt, which in many parts of the world gush out from fissures in the ground. See SALT.

BRINE-SHRIMP (*Artemia salina*), a small crustacean, of the order *Branchiopoda* (q. v.), which, unlike the greater number of animals of that order, is an inhabitant not of fresh but of salt water, and is indeed remarkable, because it is to be found in myriads swimming about in the brine of salt-pans previous to boiling, when, having been concentrated by exposure to sun and air for about a fortnight, it destroys the life of almost all other marine animals. The full-grown B. is about half an inch long. The little animal is almost transparent, and is extremely active and graceful in its movements. The workmen at salt-pans so confidently ascribe to it the rapid clearing of the brine in which it occurs, that when it does not appear in their *salterns*, they transport a few from other salterns. They multiply with extraordinary rapidity.



Brine Shrimp:
a, mature; *b*, young.

BRINJAREE DOG, a rough-haired or long-haired variety of geeyhound (q. v.), used in the Deccan, and said to be the best of the hunting-dogs of India. It is said to be superior in size and strength to the Persian greyhound, but not to be equal to the British greyhound in swiftness. It is generally of a yellowish or tan color.

BRINVILLIERS, MARIE MARGUERITE, MARQUISE DE, notorious as a poisoner in the time of Louis XIV., was the daughter of Dreux d'Aubray, Lieutenant of Paris, and received a careful education. In 1651 she was married, while still young, to the Marquis de Brinvilliers. This nobleman seems to have been a gay and careless spendthrift, who allowed his wife to do very much as she pleased. He even introduced to her a young officer named Jean Baptiste de Gaudin, Seigneur de St. Croix, who was exceedingly handsome, and who inspired her with a violent passion. Her easy husband, however, was wholly indifferent to his wife's conduct; but her father, who seems to have had a stricter sense of duty, caused St. Croix to be arrested and imprisoned in the Bastile. It was here the latter learned the art of preparing poisons, from an Italian, and on his release he imparted his fatal knowledge to his mistress, who, during his incarceration, had affected the greatest piety, spending most of her time in visiting the hospitals and in attending the sick. The marchioness now resolved to destroy her father. St. Croix eagerly abetted her, in the hope of obtaining a portion of the paternal inheritance; but in order to test the efficacy of the poison, she tried its effects upon the invalids of the *Hôtel Dieu*. Having satisfied herself, she commenced operations on her parent, kissing and poisoning him continually for eight months, until her diabolical patience was exhausted, and she was at last induced to administer a very violent dose. He died, and no one suspected the marchioness. With St. Croix's assistance, and that of a domestic servant, Jean Amelin, *alias* Chaussée, she next poisoned, with the same fearful indifference to crime, her two brothers and her sisters; her object being to find means of supporting her extravagant style of living with her paramour. Several times she attempted to poison the marquis, her husband; but he escaped, and, as was said, by means of antidotes given by St. Croix, who dreaded that he should be compelled to marry the widow. St. Croix died suddenly in 1672—his glass mask having fallen off while he was engaged in preparing a poison—leaving documents inculpating the marchioness. She was also accused about the same time by her accomplice Chaussée, who being arrested, confessed all, and was condemned to be broken alive. The marchioness escaped to England; afterwards she traveled into Germany, and next went to Liege, where she took refuge in a convent. From this, however, she was craftily decoyed by an officer of justice disguised as an abbé, and conveyed to Paris. Among her papers was found a general confession of her crimes, including the above-mentioned murders, and many others.

One strange confession stated that, out of pity for a virtuous young lady who had been imprisoned in a convent, the marchioness had poisoned a whole family! It is a singular fact, that this infamous woman was a bigot in her religious tenets, and was quite exemplary in her attendance at church. At her trial in Paris, she at first denied all charges brought against her, and pretended that the 'general confession' had been written during the insanity caused by a fever; but after being put to the torture, she made a full confession, and was beheaded, July 16, 1676. Her career had excited such terror in France, that Louis XIV. instituted a distinct tribunal, the *Chambre Ardente* (q. v.), to investigate cases of poisoning by the 'succession powder' used by the marchioness.

BRIOUDE, a town of France, in the N.W. of the department of Haute-Loire. The church of St. Julien was founded in the 9th c., on the site of a still more ancient edifice erected on the spot where the saint was martyred. Lafayette was born here. Pop. (1876) 4643.

BRISBANE, the capital of Queensland, a seaport, and chief seat of trade in the colony, is about 640 miles N. of Sydney. It stands about 25 miles from the mouth of a river of its own name, which falls into Moreton Bay. North and South B. are connected by the Victoria iron bridge, 1080 feet in length. B. possesses some fine buildings, among the chief of which are the Houses of Legislature, which cost £100,000; the post-office, telegraph office, the viceregal lodge, and the Queensland National Bank. There are upwards of 30 churches, and three daily and four weekly newspapers are published. There are three parks and well laid out botanic gardens. Regular steam communication is kept up with the other Australian ports, as well as with London. The channel of the river is being deepened to admit of large vessels coming up to B. A spacious dry dock was opened at South B. in 1881. B. is the terminus of the Southern and Western Railway; and a trans-continental line from B. to the Gulf of Carpentaria has been surveyed. Pop. (1876) 26,911; (1881) 31,109. B. was settled as a penal station in 1825 by Sir T. Brisbane.

BRISBANE, GENERAL SIR THOMAS MAKDOUGAL, soldier and astronomer, was born at Brisbane, the family seat, near Largs, Ayrshire, July 23, 1773. At the age of 16 he entered the army; and with a company he had raised in Glasgow in 1793, B. took part in all the engagements of the campaign in Flanders; and in the West Indies, to which he was sent in 1796, he greatly distinguished himself under Sir Ralph Abercromby. He afterwards served in the West Indies as colonel of the 69th; and in 1812 obtained command of a brigade under the Duke of Wellington in Spain. For his conspicuous bravery at the battle of the Nive he received the thanks of parliament. When Napoleon abdicated, B. was sent in command of a brigade to North America, from whence he was recalled in 1815, but too late to admit of his being present at Waterloo. In 1821, B., on the recommendation of his friend the Duke, was appointed governor of New South Wales, a position he held for four years, during which time he introduced many wise reforms, especially in penal treatment; secured at his own expense good breeds of horses for the colony; promoted the cultivation of the sugar-cane, vine, tobacco, and cotton; and left at the close of his administration—which was marked by perfect tolerance and protection of all classes of Christians—50,000 acres of cleared land where he had found only 25,000. But high as B. ranks as a soldier and administrator, as a man of science he holds a still higher place. While in Australia, he catalogued no less than 7385 stars, for which great work—known as 'the Brisbane Catalogue of Stars'—he received the Copley medal from the Royal Society. On his return to Scotland, he had an astronomical observatory established at his residence at Makerstoun, and devoted himself entirely to scientific pursuits. He entered warmly into the plans of the British Association for ascertaining the laws of the earth's magnetism, and in 1841 had a splendid magnetic observatory erected at Makerstoun, the observations made there filling three large volumes, published in the *Transactions of the Royal Society of Edinburgh*, of which he was president, having been elected on the death of Sir Walter Scott. He founded two gold medals for scientific merit—one in the award of the Royal Society, the other in that of the Society of Arts. He died January 27, 1860.

BRISSOT, JEAN PIERRE, one of the first movers in the outbreak of the French Revolution, and afterwards numbered among its victims, was born at Chartres in 1754, and educated for the bar. After completing his studies at Paris, he went into the office of a procurator, but quickly abandoned the legal profession for the more congenial one of authorship. From his earliest years he had devoted himself with passionate eagerness to literary studies, especially history, economy, and politics, and, among other lingual accomplishments, acquired a thorough mastery of English. His first work, *Théorie des Lois Criminelles* (1780), gained the approbation of Voltaire and D'Alembert, and was followed by his *Bibliothèque des Lois Criminelles*, which established his reputation as a jurist. Having removed to London, he there started a learned journal, under the title *Lyceum*, for which, however, he found no adequate support. He therefore returned to Paris, and soon afterwards was imprisoned in the Bastile, on a charge of having written against the queen a brochure, which, in fact, was penned by the Marquis de Pelleport. After four months in the Bastile, he was liberated through the intervention of Madame de Genlis and the Duke of Orleans. B. continued to write tracts on finance, &c., but his love of freedom and vehement hatred of despotism again involved him in danger, and, to escape from a *lettre-de-cachet*, he

was once more compelled to retire to England. He afterwards visited North America, as representative of the *Société des Amis des Noirs*. On his return to France, he zealously assisted in the outbreak of the Revolution, and was in consequence elected by the citizens of Paris their representative in the Constituent Assembly, where he exercised a predominant influence over all the early movements of the Revolution. He also established a journal, called *Le Patriote Français*, which became the recognized organ of the earliest republicans; and, through his superior knowledge of politics and the usages of constitutional countries, he gathered round him all the young men of talent and spirit who were opposed to the court-theory of absolute sovereignty. It thus happened that, without his being formally considered the head of a party, all the movements of the early revolutionists were profoundly influenced by him, and he incurred the bitter hatred of the court reactionists, who affixed the nickname of Brissotins to all the advocates of reform. Afterwards, the Brissotins formed the Girondist party. In the Convention, B. was representative of the department of Eure-et-Loir. Here his moderation made him suspected as a friend of royalty, as he opposed the 'men of September' and the trial and condemnation of the king. When Louis XVI. heard his doom pronounced, he exclaimed: 'I believed that Brissot would have saved me!'

But B. was weak enough to imagine that the best way to save the king would be to vote first for his death, and then appeal to the nation. B. and his party, which was perhaps the purest in principle and the weakest in action, ultimately fell before the fierce accusations of the Mountain, or Jacobin party, which believed, or at least pretended to believe, that the virtuous B. had received money from the court to employ against the Revolution. With 20 other Girondists B. suffered death under the guillotine, October 30, 1793.

BRI'STLES, the strong hairs growing on the backo f the hog and wild-boar, and extensively used in the manufacture of brushes, and also by shoemakers and saddlers. They form an important article of British import, between 2 and 3 million pounds being annually imported, chiefly from Russia and Germany; but they are also obtained from France and Belgium, and small quantities of inferior quality have recently been received from China. From Russia, the average annual value of B. imported into Britain is £300,000, Siberia alone supplying about £150,000. Russian B. vary in value from £6 to £60 per cwt. From Germany, about £100,000 worth per annum is received, varying from £6 per cwt. to £35 per cwt. From France and Belgium, about £20,000, varying in value from 2*s.* to about 4*s.* 6*d.* per pound. The quality of B. depends on the length, stiffness, color, and straightness—white being the most valuable. The best bristles are produced by pigs that inhabit cold countries. The Russian hog is a long spare animal, and the thinner the hog, the longer and stiffer the bristles. When the Russian hog is sent to the south and fattened, the B. become soft, and of course depreciated in value. In the summer, the hogs are driven in herds through the forests, to feed on soft roots, &c., when they shed their B. by rubbing themselves against the trees. The B. are then collected, sewed up in horse or ox hides, and sent to fairs, whence they find their way, through agents, to all countries.

BRI'STOL, an important maritime city in the west of England, long. 2° 35′ 28″ W., lat. 51°, 27′ 6″ N. upon the rivers Frome and Avon, and partly in the counties of Gloucester and Somerset, joined with the former for ecclesiastical and military purposes, but otherwise a city and county in itself. It is 108 miles distant from London by road. The ancient portion of B. consists almost entirely of shops, warehouses, offices, manufactories, and other commercial buildings. The streets are, with few exceptions, narrow and irregular; but great improvements have been effected in them recently at a cost of half a million sterling, and there are many handsome shops, and other buildings of a superior character.

Among the latter may be especially mentioned the banking-house of the West of England Company, the Assize Court and Guild Hall, Bank of England, General Hospital, Colston Hall, and Victoria Rooms. A great Central Terminus has been erected for the various railways. The most remarkable modern structure, however, is the suspension bridge over the Avon, at Clifton, which is 702 feet in span, and 245 feet above high-water. Among the ancient buildings are the Church of St. Mary Redcliffe, the Cathedral, and Temple Church, remarkable for its leaning tower. Some remains still exist of the ancient castle and walls, traces of British encampments at Clifton and Leigh, and considerable Druidic vestiges at Stanton Drew. The modern portion of B., including Clifton, Cotham, Redland, &c., consist of handsome residences, in squares, terraces, crescents, and detached villas, and some creditable specimens of architecture in churches, chapels, assembly and club rooms. The population of B. within the municipal boundaries, which coincide with those of the parliamentary borough, was 182,552 in 1871, and in 1881 it had increased to 206,503. In 1880, there were 25,000 electors, who return two members to the House of Commons. The floating harbor and quays extend for more than a mile through the city, and are formed by embanking and locking the old courses of the rivers, which now flow through a new channel cut at a cost of about £600,000. During the year 1880, there were entered inwards with cargoes 9745 vessels, with a tonnage of 1,228,742 tons, engaged in the foreign and coasting trade; and outwards, 9408 vessels, of 1,215,082 tons. The total value of the imports for 1879 was £7,275,275, against £7,057,036 in 1872. The chief trade is with Canada and the United States, West Indies and S. America, Portugal, the Mediterranean, Russia, Mauritius, Turkey, France, and west coast of Africa. The principal exports are iron, tin-plate, copper and brass, coal, salt, and manufactured goods. The manufactures are chiefly cotton goods, glass, refined sugar, earthenware, lead, chemicals, leather, and floor-cloths.

The ship-building yards have the reputation of turning out excellent sea-going vessels. The *Great Western*, the pioneer of steam communication across the Atlantic, the *Great Britain*, and the ill-fated *Demerara*, were built here. The railways terminating at Bristol are—the Great Western from the east, the Midland from the north, with a branch to Bath; the Bristol and Exeter from the west: the North Somerset from the south; the Great Western line communicating with South Wales, and short branches to Avonmouth and Portishead. The municipal government of B. is vested in a mayor, 16 aldermen, and 48 town-councillors, a lord-lieutenant, and lord high steward. The benevolent institutions of B. are numerous and well supported. The most important are the Infirmary, the General Hospital, the Blind Asylum, Orphan Asylum, Asylum for Deaf Mutes, alms-houses, reformatories, &c., and the extraordinary Ashley Hill Asylum, for 2050 orphans, built and maintained without any provision for meeting expenses, except the unsolicited contributions that happen to be sent to it. The public dinners of the Dolphin and Anchor Societies are well known from the occasional political importance of speeches made at them; but they and the Grateful Society were instituted in memory of Colston, the merchant-prince, and they collect alms for lying-in women. Among charitable institutions must also be reckoned the well-endowed Colston, City, and Red Maids Schools, and other free schools. Other educational establishments are Clifton College and the grammar school, and many proprietary and private schools; there are also a medical school, fine arts academy, and trade school. University College has 12 professors and lecturers, and had in 1880 about 500 students, of whom nearly half were women. The Baptists have a theological college here. The first records of the history of B. speak of it under the ancient British name of Caer-oder; it then became a stronghold of the Romans; on their departure was again occupied by the Britons, until, in 584, the Saxons drove them out, and giving it the name of Brightstowe or Bricstowe, made it a thriving place of trade—aboriginal slaves being a principal item in the commerce. It was sacked by the Danes. Henry III. gave it the rights of a corporate town; Edward III., those of a city and county in itself. In 1247, the parishes of Redcliffe, Temple, and St. Thomas were added to Bristol.

During the Civil Wars, it was alternately taken by Royalists and Parliamentarians, and by the latter, the castle and fortifications were razed. It afterwards became the principal port for trade with the West Indies, and carried on a flourishing business in negro slaves. In 1793, the 'Bridge Riots' occurred. In 1804 the Docks were begun, and in 1809 they were opened to shipping. In 1831, the 'Reform Bill Riots' resulted in the destruction of the Bishop's Palace, Custom-house, Excise-office, jail, toll-houses, a number of private residences, and several lives. The bill itself, by the addition of Clifton, &c., gave the city its present municipal boundaries. Among the names of note identified with the history of B. are those of the Fitzhardings family; William of Worcester; Canynge, the great merchant and restorer of Radcliff Church; Colston and Whitson, the merchants and philanthropists; Sebastian Cabot, the navigator, said to have anticipated the discovery of America by Columbus; the poets Southey and Chatterton; Lawrence and Bailey, artists; Sydney Smith, canon of Bristol Cathedral; Robert Hall, Coleridge, and Hannah More; the Misses Porter; Dr. Prichard, Dr. Carpenter, and Miss Mary Carpenter.

BRISTOL BAY, an arm of the Pacific Ocean, in Russian America, lying immediately to the north of the peninsula of Alaska. B. B. receives the waters of two considerable lakes, which, communicating with each other, offer an opening into the interior.

BRISTOL CHANNEL, an inlet of the Atlantic Ocean, in the south-west of England, between South Wales on the north, and Devon and Somerset shires on the south; or it may be regarded as an extension of the estuary of the river Severn. It is about 80 miles long and 5 to 48 miles broad, the greatest breadth being between St. Gowan's Head and Hartland Point, its most western and external points, this line passing through Lundy Isle. It is the largest inlet or estuary in Britain, having a very irregular

coast-line of 220 miles, and receiving a drainage of 11,000 square miles. The chief rivers which flow into it are the Towy, Taff, Usk, Wye, Severn, Avon, Axe, Parrot, Taw, and Torridge. The tides in it rise to an extraordinary height—at Bristol, 35 feet; at King's Road, 40; and at Chepstow, sometimes 70. The rapid flow of the tides meeting the currents of the rivers produces, in the narrow parts of the Channel, and in the mouths of one or two of the rivers which enter it, the phenomenon of the *bore*, the tide advancing like a wall of water sometimes 6 to 9 feet high. The chief Bays and harbors are, on the north, Caermarthen and Swansea bays, Cardiff Roads, the mouths of the Usk and Wye, and the Severn estuary; and on the south, Bideford or Barnstaple, Morte, Ilfracombe, Combe Martin, Minehead, Porlock, and Bridgewater.

BRI'TAIN, GREAT. See GREAT BRITAIN.

BRITAIN, NEW. See NEW BRITAIN.

BRITA'NNIA (perhaps from Celtic *brith* or *brit*, painted, the ancient Britons being in the habit of painting their bodies blue with woad), the ancient name of the island of Great Britain (see BRITANNICÆ INSULÆ). The Romans under Julius Cæsar (who wished to chastise the Britons for aiding the Veneti, a tribe in Gaul, against the Roman power) invaded Britain in 55 and 54 B.C., but they then made no permanent conquest. Nearly a hundred yeards after, in 43 A.D., the real conquest began under Claudius; and in spite of a desperate resistance by the native British princes, especially Caractacus and Boadicea, the south half of Britain was conquered, and made a Roman province. Agricola, sent by Nero in 78 A.D., consolidated these conquests, and extended the influence of Rome to the Firths of Forth and Clyde, between which, in 84 A.D., he erected a chain of forts to repel the inroads of the northern Caledonians, in the line of the stone Wall of Antoninus, afterwards erected, in 140 A.D., by Lollius Urbicus. Agricola was the first Roman to send a fleet round the island, and the first Roman general to come in contact with the Caledonians whom, under their leader Galgacus, he overthrew, in 84 A.D., at a hill called the Mons Grampius, the situation of which has not been satisfactorily determined. The Romans made many ineffectual attempts to subdue the Caledonian barbarians, and penetrated, for this purpose, through the north-east part of Scotland as far as the Moray Firth, as is attested by the remains of Roman camps and stations still existing along their line of march, and the relics of Roman art found in connection with them. Not only did the Caledonians on their own soil resist the Roman sway, but by constant inroads into the Roman territory south of the Wall of Antoninus, they so harassed the Romans themselves, that the latter were forced to abandon their conquests for 80 miles south of that wall, and to secure permanently their remaining conquests in South Britain by a line of defensive works between the mouth of the Tyne and the Solway Firth. Here Agricola had raised a line of forts, and here in 120 A.D. Hadrian built a wall, which was repaired by Severus in 210 A.D.

After this last date the Romans did not attempt to regain their lost provinces. Subject to these incursions of the Caledonians, the opposition of the native British princes, and the invasion of tribes from the opposite shores of the continent, the Romans held sway in Britain down to about the year 410 A.D., soon after which time the Saxons invaded south Britain, and ultimately subdued it. Britain, south of the Solway Firth and the mouth of the Tyne, in the reign of Claudius, formed one Roman province under a consular legatus and a procurator. Ptolemy mentions 17 native tribes as inhabiting this tract. Toward the close of the 4th c., A.D., Roman Britain constituted a diocese in the præfecture of Gaul, and was divided into five provinces, of which the boundaries, though uncertain, are supposed to have been as follows: B. Prima, England south of the Thames and the Bristol Channel; B. Secunda, Wales; Flavia Cæsariensis, the country between the Thames, Severn, Mersey, and Humber; Maxima Cæsariensis, the rest of England to the Scottish border; and Valentia—soon abandoned by the Romans—or Scotland south of the Wall of Antoninus. The population of Roman Britain included Roman and Germanic elements, which had partially blended with the native Britons, who were of Celtic stock, with an earlier Euskarian or Basque admixture. The Romans governed Britain by a vicarius or vicegerent resident at Eboracum (York), under whom were consulars, presidents, and other subordinate officers. To insure the obedience of the natives, at least three Roman legions—chiefly composed of Gauls, Germans, Iberians, and but few pure Romans—were stationed in Britain; viz., at Eboracum, Deva (Chester), and Isca (Caerleon) in S. Wales. Under the Romans, many towns (coloniæ and municipia)—56 are enumerated by Ptolemy—arose in Britain, and diffused Roman law and civilization over the country. The towns of Eboracum (York) and Verulamium (near St. Albans) had the privileges of Roman citizenship. The Romans made many roads or streets (*strata*), of which there are still numerous remains, across the country, all centering in London. They also developed it into a corn-growing country. Druidism was the religion of the Britons at their conquest by the Romans, but the latter introduced Christianity and Roman literature into the country. There are many remains still extant of the presence of the Romans in Britain, such as camps, roads, ruins of houses, baths, flues, altars, mosaic pavements, painted walls, metallic implements and ornaments, weapons, tools, utensils, pottery, coins, sculptures, bronzes, inscriptions, &c.

These remains show that the Romans wished to render their British conquests permanent, and that they had greatly improved the arts of the ancient Britons, as is evident on comparing the remains with the far ruder native antiquities of the British pre-Roman or pre-historic era, such as tumuli, barrows, earthworks, so-called Druidical monoliths and circles, cromlechs, cairns, pottery, weapons, tools, utensils, ornaments, &c. Many of the Roman remains in Britain also show that the Romans had introduced into the country the refinements and luxuries of Rome itself.

Under the term BRITANNIA, Great Britain has been personified in the fine arts as a female seated on a globe or on an insulated rock, and leaning with one arm on a shield, the other hand grasping a spear or a trident. The first example of this personification is on a Roman coin of Antoninus Pius (died 161 A.D.). The figure reappears first on the copper coinage of England in the reign of Charles II. (1665); the celebrated beauty, Miss Stewart, afterwards Duchess of Richmond, is said to have served as model to the engraver, Philip Roetier. The Britannia that appears on the reverse of British copper coins since 1825 was the design of Mr. W. Wyon. See COINAGE.

BRITANNIA METAL is an alloy very largely employed in the construction of the cheaper kinds of tea and coffee pots, teaspoons, &c. The proportions of the metals used in its manufacture are various, but the average composition in 100 parts is: tin, 85½; antimony, 10½; zinc, 3; and copper, 1. B. M. is harder than pewter (q. v.), hence vessels or spoons made of it are not so liable to lose their shape, or to be indented with a slight blow. A variety of B. M., called *Queen's Metal*, is also extensively used for similar purposes, and it ranks intermediate in hardness between pewter and ordinary B. Metal. Queen's Metal is composed of—tin, 9; antimony, 1; bismuth, 1; and lead, 1.

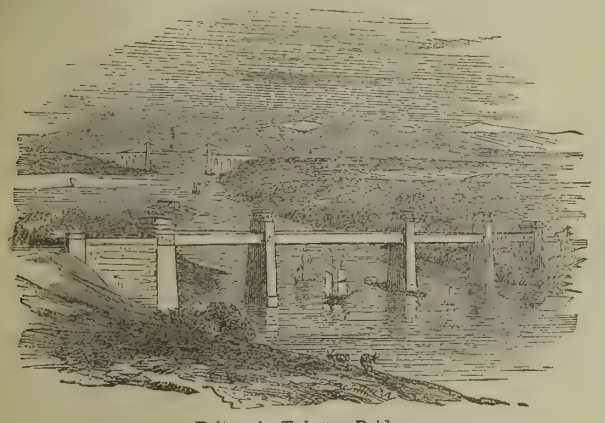
The present composition of Britannia metal at Birmingham is usually 90 tin + 8 antimony + 2 copper, without any zinc or bismuth; although some manufacturers deviate a little from this formula, by adding one or both of the metals last named. The manufacture was begun at Sheffield by Handcock and Jessop, in 1770; it reached Birmingham towards the close of the century, and made gradual progress. At first, the articles were made by stamping with dies, and soldering up into form; this being a slow operation, rendered the articles expensive. Afterwards, the curious process of *metal-spinning* was introduced; and this, with the subsidiary operation of swaging, rendered a great reduction in price possible.

In the spinning process, a thin sheet or piece of Britannia metal is placed upon a wooden model shaped like the article to be made; the model is made to rotate in a lathe; and burnishers and other tools are employed to press the yielding metal into all the curvatures of the model. Ductility is an essential quality to the attainment of this end with the metal; how complete it is, may be seen in such articles as Britannia metal teapots and dish-covers, the principal forms of which are not given by hammering, stamping, or casting, but by spinning. Besides spinning and swaging, the processes include stamping, soldering, casting, and polishing. When electro-plating was introduced, an increased use of Britannia metal arose, as it forms a good ground or basis for the deposited silver. Britannia metal spoons and ladles, made by casting, stamping, and burnishing, have been nearly driven out of the market by German silver; but the former metal is more largely used than ever for hot-water jugs, soup tureens, gravy-dishes, vegetable and side dishes, dram bottles, drinking-cups, sandwich cases, wine-coolers, soap-boxes, liquor-frames, cruets, waiters, trays, &c.; and as a basis for electro-plate. Birmingham is the chief seat of the manufacture.

BRI'XHAM, a market-town and seaport of Devonshire, England, beautifully situated on the south side of Tor Bay, 5 miles south from Torquay, and 22 miles directly south from Exeter. The town occupies the sides of two hills, and is divided into two parts, called Upper and Lower B., the former consisting chiefly of a long straggling street. Some of the more recently erected parts of the town are well built, and contain good houses, but the older parts are mean. The prosperity of B. depends chiefly on its fisheries, it being the head-quarters of the great Devonshire fishery of Torbay, in which many vessels are employed, mostly trawlers, of which there are about 200. These are decked sloops of 40 to 50

tons burden, and generally managed by three men and a boy. Great quantities of fresh fish are sent to London, Bath, and Bristol. Considerable quantities of iron ore are raised in the neighborhood and shipped here. B. has also a number of vessels engaged in the coasting and foreign trade, the foreign trade being chiefly with the Mediterranean. The Admiralty have an establishment here for watering the navy. Near B. is a station of the South Devon branch of the Great Western Railway. It was at B. that the Prince of Orange, afterwards William III., landed, November 4, 1688. Pop. (1871) 4941.

BRITANNIA TUBULAR BRIDGE, a railway bridge over the Menai Strait, remarkable alike for its gigantic dimensions, and as being the first construction of the kind ever undertaken. With a view to facilitate communication with Ireland, *via* Holyhead, the directors of the Chester and Holyhead Railway in 1845 sought the aid of Mr. Robert Stephenson, the great engineer, to bridge the strait with such a structure as should admit of the safe passage of heavily laden trains without in any way interfering with the navigation of the channel. About a mile above the suspension-



Britannia Tubular Bridge.

bridge, and nearer Carnarvon, a rock in the middle of the strait rose ten feet above the water at low tide; and on this site, provided by nature, it was resolved to erect the bridge in the form of a rectangular tube, composed of wrought-iron plates riveted together in a manner to combine the greatest strength with the greatest lightness. See STRENGTH OF MATERIALS and TUBULAR BRIDGES. In the spring of 1846, the undertaking was commenced; by the 22d of June 1849, the Britannia Tower on the rock in the center of the strait was completed (height, 191 feet 6 inches above high-water mark). Other two towers, some 18 feet lower, were erected on each side of the Britannia Tower; thus dividing the space into four spans, of which the two center ones are 460 feet each, the other two being comparatively narrow. The short tubes between the abutments and the shore towers were constructed, by means of strong scaffolding and stages, in the places they were to occupy when finished; the long central itubes were built at the water-edge, from whence they were floated off on pontoons to the base of the towers, which had grooves or recesses made to receive them, and then elevated gradually (supports being built under their ends as they ascended) by powerful hydraulic presses to the requisite height, 102 feet above high-water mark.

On the 13th of October 1849, the first long tube, 472 feet in length (12 feet being allowed for the rest at both ends), and about 1800 tons in weight, was safely fixed at its proper height above the sea. The other center tube was got up by December; and on the 5th of March, 1850, a train swept through, and the bridge was open for traffic. In August the parallel line of tubes was completed, and the up and down trains could now pass over the Menai with as little delay and danger as over any other part of the line. The total length of the bridge is 1841 feet, of the tubes, 1513 feet. The extreme height of the tube at the Britannia Tower is 30 feet, diminishing to 22 feet 9 inches at the abutments, 'the difference being made to give a true parabolic curve to the top while the bottom is straight.' Inside, the width is 13 feet 8 inches throughout, and the height 26 feet at the middle, and 18 feet 9 inches at the ends. To provide for the expansion and contraction of the metal, the bed-plates in the shore towers and in the abutments, on which the tubes rest, are made to move freely on cast-iron rollers and balls. This precaution, for securing free movement to the tubes, was not unnecessary, as it has been found that between the expansion of summer and contraction of winter there is a difference of fully 12 inches. The total weight of iron used was nearly 12,000 tons, of which the tubes contain 9360 tons of malleable iron, 1015 tons of cast iron, and 175 of permanent railway. In their fabrication 186,000 different pieces of iron, fastened together by more than 2,000,000 rivets, were used; and in the towers, abutments, &c., there is 1,492,151 cubic feet of masonry. The total cost was about £602,000. The whole structure was completed in less than five years. See TUBULAR BRIDGE.

BRITA'NNICÆ I'NSULÆ, a term used by ancient classic writers previous to Cæsar for the British Isles, including Albion (England and Scotland), and Hibernia or Ierne (Ireland), with the smaller isles around them. Aristotle, in the beginning of the 3d c. B.C., knew only of Albion and Ierne. Cæsar, about 54 B.C., was the first to apply the name Britannia to Albion. Ptolemy, in the 2d c. A.D., is the first to apply Little Britain to Ierne or Ireland, and Great Britain to Albion or England and Scotland. Herodotus, in the 5th c. B.C., is the first writer to mention Britain with any sort of definiteness; previous Greek writers speak of Britain only in connection with the Phœnician tin trade carried on with the Cassiterides or Tin Isles (the Scilly Isles and Cornwall), which they often confound with the Azores. The Phœnician trade with the British Isles began about 1000 B.C., the Phœnicians giving the native Britons salt, skins, and bronze vessels in exchange for tin and lead. Ptolemy enumerates 52 different Celtic or Gaelic tribes as inhabiting Britain in his time. See CELTIC NATIONS.

BRITISH ARMY. In ARMIES MODERN, a succinct account is given of the relative strength and organization of the chief European armies, with the exception of that of the British empire, reserved for consideration in the present article.

Like other modern armies, the British army originated in the feudal system (q. v.). When regal power, tempered by parliament, superseded that system, the people, according to their rank in life, were expected to provide themselves with certain kinds of weapons and defensive armor. The justices of the peace were empowered to see to these military duties of the people. When the nation was either actually engaged in war, or apprehensive of invasion, the sovereign issued commissions to experienced officers, authorizing them to draw out and array the fittest men for service in each county, and to march them to the sea-coast, or to any part of the country known tobe in most danger. See ARRAYER. It was in the time of Henry VIII. that lord-lieutenants and deputy lieutenants of counties were first appointed as standing-officers for assembling and mustering the military force. During the earlier years of the Tudors, contracts were made by the king with 'captains,' who undertook to provide, clothe, and feed so many fighting-men for a given money-allowance; but the power intrusted to the lord-lieutenants gradually changed this system, in relation at least to home defence. In the reign of Charles I., the important question arose, whether the king of England did or did not possess the right to maintain a military force without the express consent of parliament? and this question was all the more bitterly discussed when the king billeted his soldiers on the people. After the troubles of the civil wars and the Commonwealth, Charles II. found himself compelled to agree, on his Restoration, to the abandonment of all the army except a kind of body-guard or household brigade of 5000 men, sanctioned by the parliament, In the 13th year of his reign, he succeeded in obtaining a statute, declaratory that 'the sole and supreme power, government, command, and disposition of the militia, and of all forces by sea and land, and of all forts and places of strength, is the undoubted right of his majesty; and both or either of the Houses of Parliament cannot nor ought to pretend to the same.' Both Charles II. and James II. found, however, to their mortification, that this statute did not in effect give them so much real military command as they had wished and intended—because the Commons, by holding the purse, virtually held the power.

It was in the time of William and Mary that the real basis for the modern B. A. was laid. The DECLARATION OF RIGHTS (q. v.) settled, in positive terms, 'that the raising and keeping of a standing army in time of peace, without consent of parliament, is contrary to law.' The first MUTINY ACT (q. v.) was passed in 1689, to last for six months only; but it has been annually renewed ever since, except in three particular years; and it constitutes the warrant on which the whole military system of England is exercised by the sovereign, with the consent of parliament. Since then, with only three interruptions, the ministers of the crown have annually applied to parliament for permission to raise a military force, and for money to defray the expenses. The Sovereign can make war, and can bestow military employments and honors; but the Commons, as the representatives of the tax-paying nation, provide a check on the grasping by courtiers of military privileges. The law on army regulation has been revised, and the B. A. made the subject of special legislation in the Army Discipline Bill passed in 1879.

The great distinction between the B. A. and that of almost every other state in Europe, is that the service is *voluntary*. The subjects of the crown engage, by free choice, to serve in the army for a definite number of years. In the rare cases where forced service by ballot is obtained, it is in the militia, not the regular

army. See MILITIA. The British soldier has much hard colonial life to bear, and many long voyages to make; he is, moreover, almost entirely shut out from the chance of being a commissioned officer. As a consequence, the ranks are mostly filled from the more necessitous classes of the community—by those who from want of steady habits, or of education, are the least fitted for industrious pursuits; whereas in France and many other foreign countries, the profession of arms is regarded as an honorable one, of which even the private soldier feels proud. Mr. De Fonblanque, comparing the peace establishments of the chief European armies in 1857, found that of England to be the smallest in ratio to population, but the most costly in relation to its strength. The English ratio was 1 in 128; the French, 1 in 95; the Prussian, 1 in 80; the Russian, 1 in 72; the Austrian, 1 in 68. An English private soldier costs the country £52 per annum; French, £36; Prussian, £31; Austrian, £18, 10*s*.; Russian, £13, 5*s*. The English cost per man is still higher now than it was in 1857, on account of increased attention being paid to the well-being of the soldier.

The B. A., in all its completeness, is supposed to be commanded by the Sovereign, assisted by the Secretary of State for War in some matters, and by the officer commanding in chief in others. The component elements are the household troops; the infantry of the line; the cavalry of the line; the ordinance corps, comprising artillery and engineers; other bodies of native troops, maintained out of the revenues of India; the militia; the yeomanry cavalry; the reserve; the volunteer artillery and rifles; and sometimes during war, foreign legions. The 'peace establishment' of the B. A. varies according to the political aspect of affairs abroad, and to the strength of the economizing principle at home. In 1814, when England was engaged in tremendous contests abroad, the regular army reached 200,000 men, exclusive of fencibles, foreign legions, and militia. In the first few years after the termination of the great war against Napoleon, the reductions in the B. A. involved the compulsory retirement of no less than 10,000 military officers, who thereupon went on half pay; these, by filling vacancies, transfers and deaths, have nearly disappeared. The elasticity which permits the enlargement or contraction of the army arises from varying, not so much the number of regiments, as the number of battalions in a regiment, of companies in a battalion, or of men in a company. If we compare the strength of the regular army at various periods between 1820 and 1879, we shall find that the actual number of regiments has varied but little. But of late the 110 line regiments have been reorganized as 71 (of linked battalions). For this and connected changes, see WAR SERVICES.

The strength of the B. A. declined from 1815 to 1835, since when it has increased. These augmentations have been occasioned partly by our wars, and partly by a sense of insecurity amid the vast armaments of the continent. In compaing the strength of the forces at different periods, much confusion is apt to arise from different modes of interpreting the words 'British army.' This designation may include the whole of the royal troops in India, whether supported out of imperial or of Indian revenues; it may include the militia, the volunteers, the yeomanry cavalry, the foreign legions—or it may exclude any one or more of these. The 'British army,' and the 'military force of the British empire,' are often treated as convertible terms: to the production of much confusion where actual numbers are given. In the following table, relating to the official year 1879—1880, it is shown of what component elements the B. A. now consists. The militia and the volunteer corps are not here included.

BRITISH ARMY VOTED FOR 1879—1880.

	Home and Colonies.	India.		Total British Army.
Horse Artillery	3,131	2,478	=	5,609
Cavalry, including Household Cavalry	12,907	4,312	=	17,219
Artillery	19,225	9,667	=	28,892
Engineers	5,198	428	=	5,626
Infantry, including Foot Guards	76,366	45,768	=	122,134
Service Corps	2,990	..	=	2,990
Colonial Corps	2,485	..	=	2,485
Army Hospital Corps	1,745	..	=	1,745
Additional force in consequence of reinforcements to Natal	3,900	..	=	3,900
	127,947	62,653		190,600

Under the column 'India,' are included only those troops of the royal army which are *lent* to India, and paid for out of Indian revenues; the other military forces in that region are enumerated under EAST INDIA ARMY. Of the total 190,600 forming Her Majesty's forces, 7980 are officers; 16,550 non-commissioned officers, drummers, and trumpeters; and 166,070 rank and file. There are voted for the use of this army, 11,325 horses. The total cost cannot well be estimated per head; because, besides pay and sustenance for the soldiers, there are stores and wages for fortifications and military buildings, military weapons and combustibles, and the various kinds of half-pay and pensions. The total expenditure sanctioned by parliament may, however, conveniently be thrown under four headings, and given in round numbers as follows:

Pay and Allowance of Combatants	£4,944,200
Auxiliary and Reserve Forces	1,258,500
Stores and Works of every kind	6,817,200
Pensions, Militia, Volunteers, &c	2,625,800
	£15,645,700

—being the charge for a *peace* establisment, in which to admit of expansion for actual war, the upper ranks (which cannot be summarily created) are disproportionately large. For the sum taken in aid of the Army Estimates to meet the expenses for raising and training the recruits, and for the non-effective services of the European army serving in India, a separate estimate was presented (1879–80), amounting to £1,100,000.

All the component elements of the army, in *personnel* and *matériel*, and the organization and duties of the troops, will be found noticed under their proper headings. The total military strength of the United Kingdom—including all the various kinds of force, also India and the colonies—comprised the following in 1879:

Regulars (including India and the Colonies)	190,600
Army Reserve, 1st Class	22,000
" 2d "	24,000
Militia (including permanent staff and militia reserve)	137,556
Yeomanry Cavalry	14,614
Volunteers (including staff)	244,263
	633,033

BRI'TISH ASSOCIATION, an Association whose object is, by bringing together men eminent in all the several departments of science, to assist the progress of discovery, and to extend over the whole country the latest results of scientfic research. A prevailing impression that England had fallen behind other countries, both as to the general estimation in which scientific men were held, and the prosecution of science itself, led to its formation. It was thought that an imposing union of men of science with the nobility, gentry, and clergy might tend to revive the philosophic spirit of the country. Such meetings had already taken place in Germany, and probably suggested the idea of this institution. Many leading men of the age took part in its formation, but the honor of being its founder must be ascribed to Sir David Brewster. By his exertions the first meeting of those who were favorable to the design was held at York in the year 1831. The Archbishop of York, the mayor and council of the city, entered warmly into the project. At this meeting the constitution of the society was determined, the several sections had their provinces assigned to them, and subjects were proposed on which reports were to be drawn up and read at the ensuing meeting. This took place at Oxford in 1832. The university had cordially welcomed the new Association, the papers read gave it a high character, and from this date it may be said to have been in complete and successful operation. The jubilee meeting was held at York in 1882. An enumeration of the several sections of the society, each of which has its own committee and president, will show the wide range of topics it embraces: Section A., Mathematical and Physical Science; B., Chemistry; C., Geology; D., Zoology and Botany, including Physiology; E., Geography and Ethnology; F., Economic Science and Statistics; G., Mechanical Science.

At the close of each meeting, it is determined at what town in the United Kingdom the next shall be held, and a president of the whole Association is appointed, who delivers an inaugural address, in which he is expected to present a general survey of the latest advances of science. The rules and by-laws of the society, it is not necessary here to particularize; but it should be mentioned that the subscriptions of a continually increasing membership have placed at its disposal a large fund, which has been expended in the prosecution of science. In many cases, as in long astronomical calculations, or extensive meteorological observations, the labor of subordinates is required, and a certain apparatus, and it is in defraying such expenses that the funds of the B. A. are very wisely employed.

Besides the immediate ends sought to be obtained by such an Association, its utility will be evident if we reflect on the intimate connection that exists between the several branches of science; and the impossibility there is that one mind can be thoroughly conversant with them all. He who now hopes to make discoveries in science must limit himself to a few chosen studies; and yet such is the interlacing of all the several branches of inquiry, that he must often find it indispensable to know the last results of each. The botanist or the physiologist must consult the accomplished chemist; the chemist must call in the aid of those who have specifically studied the action of heat, light, and electricity; the geologist needs them all, and is in turn consulted by them all.

Thus, a certain brotherhood of science is formed, in which each has his specialty, and yet each leans upon his brother.

In ancient times it was otherwise. The facts on which a philosopher speculated were those which lay open to the eyes of all. A Thales could see the rain fall and plants grow, and forthwith pronounce that the vital energy of all things was to be found in water. He could exercise his imagination in perfect independence of the labor of all other men. The philosopher of modern times cannot move a step without a careful consideration of the theories of his predecessors and contemporaries; he has to take notice of the innumerable facts brought to light by various observers, aided by those artificial arrangements which convert observation into experimeut.

Two classes of men, of the most opposite character, are greatly aided by an Association such as this. The humble and plodding workmen are taught where their patient industry will most avail; they are cautioned against re-discoveries; they are told where their love for collecting or experimentalizing may be best applied. And that other class of men, who generalize, who ever seek to embrace all the multifarious facts of science under a few great laws—these are provided with the very last intelligence from every department of inquiry, and may forthwith proceed to weave it into their own comprehensive scheme.

Nor are we to overlook the benefit which the whole community derives from the rapid dissemination of the latest results or speculations of philosophy. Not only do our idle and fashionable, as well as our manufacturing towns and our universities, welcome the meetings of the B. A., but from this *Parliament of Science* the utterance of scientific opinion goes forth over the whole kingdom through the agency of the press. Within three days after one of its meetings, there is not a workshop or a tea-table in the country that has not derived from it a new topic of conversation. This kindling of an interest in science, through the whole population we regard as amongst the greatest advantages of the British Association.

BRITISH EMPIRE. See GREAT BRITAIN and IRELAND.

BRITISH GUM, DEXTRINE, or LEI'OCOME, is a substance extensively employed by calico-printers and others for the thickening of colors, instead of the much more expensive gum arabic. It is prepared from potato-starch (q. v.) or sago-starch by passing the grain through iron cylinders at a temperature about 500° F. It differs from starch in giving no blue color with tincture of iodine, and in being readily soluble in water, and thus yielding a thick liquid resembling in consistence mucilage (strong solution of ordinary gum). B. G. is the material which is produced by baking in the crusts of loaf-bread (q. v.), and which communicates to them their very agreeable taste.

BRI'TISH MUSE'UM. The British Museum, an important national institution in London, originated in a bequest of Sir Hans Sloane, who, during a long lifetime, gathered an extensive and, at the time, unequalled collection of objects of natural history and works of art, besides a considerable library of books and manuscripts. These, in terms of his will, were offered, in 1753, to the government, on conditon that £20,000 should be paid to his family, the first cost of the whole having amounted to more than £50,000. The offer was accepted; the necessary funds were raised by a lottery ! and the collection, along with the Harleian and Cottonian Libraries were arranged in Montague House, which had been purchased for £10,250. The new institution, thenceforth called the BRITISH MUSEUM, was opened in 1759. From time to time, purchases and donations succeeded each other rapidly. Montague House sufficed for the reception of all these acquisitions, till the Egyptian antiquities arrived in 1801. The purchase of the Townley marbles in 1805, necessitated the erection of a gallery for their reception. This, however, did not meet the increasing demand for space. The old house was condemned, and plans were prepared by Sir R. Smirke for new buildings; but none were undertaken till 1823, when the eastern wing of the present building was erected for the reception of the library of George III., which had been presented to the Museum by George IV. The subsequent progress of the work was very slow. The building was completed in 1847. It is a hollow square, whose sides are opposite to the four points of the compass.

Throughout the exterior of the building, the Grecian Ionic is the order of architecture adopted. The principal front is towards the south, facing Great Russel Street, and presents an imposing columnar façade, 370 feet in length. The great entrance-portico, in the center, is composed of a double range of columns, 8 in each range. The columns are 5 feet in diameter at their base, and 45 feet in height. The tympanum of the portico is ornamented with an allegorical sculpture by Westmacott, typical of the progress of civilization. On either side of the Museum, there is a semi-detached house, containing the residences of the chief officers of the establishment. These give an additional length of 200 feet, making the whole length of the structure 570 feet. The interior of the building is admirably adapted to the purposes for which it is devoted. Some of the galleries, from their size and dimensions, have a very imposing appearance, as the King's Library, the Bird Gallery, &c. The grand entrance-hall is a noble and lofty apartment, built in the massive Doric style: it contains a statue of Sir Joseph Banks by Chantrey, and an ideal representation of Shakspeare by Roubilliac.

Scarcely had Smirke's plans been carried out, when demands were made from several of the departments for more accommodation. Additions have accordingly been made, rooms having been provided for the print department, and several new galleries for the recent acquisitions of antiquities; but the most important addition, is the magnificent reading-room which has been erected in the internal quadrangle. In no department of the Museum was additional accommodation more needed than in the library. The number of readers had increased beyond the means of accommodation, and so short of space were they for books, that the estimates for purchases were restricted to only the half of the sum which the trustees considered desirable, for the sole reason that the library would be inadequate for the reception of extensive additions. After considerable delay, and the consideration and rejection of several plans, nothing was done till Mr. Panizzi, at that time keeper of the printed book department, suggested a plan which promised to meet the important requirements of speedy erection and economy in cost. The plan was at length adopted, and the result is a building than which none are better, few perhaps so thoroughly adapted to the purposes for which it is intended. Parliament voted the first grant for it in 1854. It was opened in 1857. The total cost was about £150,000, which includes the fittings and furniture, and the necessary shelves for immediate use. The building was erected in the interior quadrangle, which it completely occupies, with the exception of an interval of about 28 feet all round, necessary for lighting and ventilating the surrounding building.

The reading-room is circular. It is constructed principally of iron, with brick arches between the main ribs. The dome is 106 feet, in height, and its diameter 140 feet, being second only to the Pantheon of Rome, and that but by two feet. The use of iron has economized the space to an extraordinary degree, for while the piers which support the Pantheon fill 7477 feet, those on which the reading-room rests occupy only 200 feet. Equally remarkable has been the saving of space in the fitting up of the library. The shelves are formed of galvanized iron plates, edged with wainscot, and covered with leather, and are supported on malleable iron standards. In all the cases except against the external walls, the bookcases are double, a lattice of iron-work being fixed for the longitudinal separation of the books. Thus, throughout the whole interior of the new building, walls are dispensed with, the divisions being in all cases formed of the double ranges of books. The building contains three miles lineal of bookcases eight feet high. Assuming them all to be spaced for the average octavo book size, the entire ranges form 25 miles of bookshelves, and would accommodate 1,000,000 such volumes. In addition to this, the dome-room, which is the reading-room, has accommodation for 60,000 volumes. This magnificent room contains ample accommodation for 300 readers. Each person has a space of 4 feet 3 inches long. He is screened from the opposite occupant by a longitudinal division, which is fitted with a hinged desk, graduated on sloping racks, and a folding-shelf for spare books. In a recess between the two are placed inkstand and penholders, thus leaving the table unencumbered. By an ingenious contrivance, one part of the iron framework is made to distribute fresh air in the summer and heated air in the winter. The vitiated air is conveyed through apertures in the soffits of the window, into one of two separate spherical and concentric chambers which extend over the whole surface of the roof, and escapes through outlets around the lantern.

The other chamber, between the external covering of copper and the brick vaulting, has for its object the equalization of temperature, during extremes of heat and cold out of doors. Every modern improvement, in short, has been applied when it could be serviceable for the comfort or convenience of the readers. Much praise is due to the architect and builder, but a larger share is owing to the late Sir A. Panizzi, who not only supplied the original design, but daily, almost hourly, superintended the progress of the work, continually suggesting little improvements, and in the end, producing a room which is admired by all who use it. It is now lighted at night by the electric light.

This building, while supplying amply the demands of the printed book department, did nothing to meet the requirements of the other departments. Various schemes have been suggested; the best, and perhaps in the end the cheapest, of securing the ground immediately arouud the Museum, has been given up, and the trustees resolved to erect a building, to be devoted entirely to Natural History—that is to say, to the departments of Botany, Zoology, Geology, and Mineralogy—on the site occupied by the International Exhibition of 1862. Parliament voted in the year 1873, £80,000 for this purpose, and a beginning was made by the

contractor. The whole cost of the new building very nearly reached the sum of £400,000. This elegant new terra-cotta building, situated in the Cromwell Road, near South Kensington Museum, was designed by Mr. Alfred Waterhouse.

Contents.—At first, the contents of the Museum were arranged under three departments—Printed Books, Manuscripts, and Objects of Natural History. Under the last head were included the antiquities, works of art, &c., comprised in the Sloane collection, their number being too scanty to entitle them to constitute a separate department. The progress of the Museum has caused a more precise division of its contents. From time to time, the number of the departments has been increased, so that, instead of three, there are now twelve—viz., Printed Books, Maps, Manuscripts, Prints and Drawings, Oriental Antiquities, Greek and Roman Antiquities, Coins and Medals, and British and Mediæval Antiquities and Ethnography, Zoology, Botany, Geology, and Mineralogy. In noticing the contents of the Museum, we shall refer to them in this order. We can but allude here to the most important portions of the collection, and must refer for more particular information to works specially devoted to this subject; such as the various handbooks and catalogues prepared by the officers of the Museum.

Printed Books.—This is the largest department in the Museum. It occupies the whole of the ground floor on the north and east sides, the new building erected in the quadrangle, and a considerable portion of the basement of the Museum. The keeper of the department has the help of four assistant-keepers and about 50 assistants. There are in addition upwards of 50 attendants.

The original bequest of Sir Hans Sloane consisted of 50,000 volumes. When these were placed in Montague House, a small collection of 2000 volumes, bequeathed to the nation by Major Edwards in 1738, was added to them. In 1757, George II. presented the library of printed books which had been collected by the kings of England since Henry VII., and which included the libraries of Cranmer and Casaubon. He also annexed the important privilege, which the Royal Library acquired in the reign of Queen Anne, of being supplied with a copy of every publication entered at Stationers' Hall. By this means, the library has been supplied with the current British literature without expense or trouble, and the trustees have been able to devote the funds of the Museum to the purchase of the earlier literature of the country and foreign publications. Among subsequent additions to the library, may be mentioned the voluminous collection of pamphlets, &c., relating to the civil wars of England between 1640 and 1660, presented by George III.; the musical libraries of Sir J. Hawkins and Dr. C. Burney; Garrick's collection of old English plays; Dr. Bentley's collection of the classics, annotated by his own hand; the law library of F. Hargrave; Sir J. Banks's valuable and extensive collection on natural history; and a large mass of tracts and pamphlets relating to the French Revolution, purchased from J. Wilson Croker, and of very great value. The most important addition was made in 1823, when George IV. presented the splendid library that had been collected by his father during his long reign, at an expense of little less than £200,000. This library, which, from the terms of the gift, cannot be mixed with the general collection, occupies a large and handsome hall, extending along the whole of the ground-floor of the eastern side of the Museum. It is undoubtedly the finest and most complete library ever formed by a single individual. 'It contains,' says Sir H. Ellis, 'selections of the rarest kind, more especially works of the first ages of printing; it is rich in the early editions of the classics; in books from the press of Caxton; in the history of the states of Europe, in the languages of the respective countries; in the transactions of academies; and in a grand geographical collection.' The magnificent library of the Right Honorable Thomas Grenville, in importance second only to the King's Library, was bequeathed to the Museum in 1846. It consists of 20,240 volumes, which cost upwards of £54,000.

In the same year was obtained also the extensive collection of Chinese works, amounting to 11,509 volumes, which belonged to Robert Morrison. By purchases, bequests, and donations, the library has become one of the first in the world, containing now over 1,300,000 printed volumes. See LIBRARIES. But even this figure large though it is, does not represent the immense collection of separate and distinct articles in tracts, pamphlets, and manuscripts. The British Museum Library is (with the exception, perhaps, of the National Library of Paris) the largest collection of printed literature in the world. Since the opening of the new reading-room, and the consequent acquisition of the book-accommodation, the want of which long hindered the proper increase of the library, the rate of increase has been enormous. During the year 1880, there were added 27,543 volumes, including music and volumes of newspapers, of which 2379 were presented, 15,361 purchased, 8857 acquired by home copyright, and 941 by international copyright. The number of parts of volumes was 39,873. In addition, the library had accumulated numerous miscellaneous articles. The pieces of music added were 5911 complete works. The total number of articles received during the year amounted to 76,774. About 2000 sets of newspapers were added.

A catalogue of the printed books in seven octavo volumes, was published in 1813—1819. So great have been the additions to the collection since the publication of that catalogue, that the interleaved copy of it, in which the new entries were made, had expanded in 1846 into 82 folio volumes. This is now superseded by one general MS. catalogue, contained in upwards of 2000 folio volumes. The plan of printing the title slips was adopted in 1880; and a printed catalogue is in progress. There are separate catalogues of the Grenville Library, in 6 volumes; of music, in 126 volumes; of newspapers in 4 volumes; of the pamphlets in the King's Library, in 9 volumes; and of the pamphlets published during the Civil War and Commonwealth, called the 'Thomason Collection,' in 12 volumes, all folio. These various catalogues are placed in the central circular stands in the reading-room, for consultation by readers. Here also are copies of the catalogue of the books of reference, arranged around the wall of the room, to which the readers have free access without the intervention of an official. These books, forming a library of 20,000 volumes, have been carefully selected to represent all the different branches of knowledge. The facility of consultation has been increased by the employment of different colors in the binding, corresponding to the colors of a hand-catalogue scattered throughout the room. Thus theological works are bound in blue, historical in red, philosophical in green, and so on.

The right of access to the library is easily obtained. Any person desiring it, is 'to apply in writing, addressed "To the Principal Librarian of the British Museum," and not otherwise, specifying his description and place of abode, and accompanying his letter with a written recommendation satisfactory to an officer of the Museum.' Formerly, the right of admission was granted only for six months at a time, and had then to be renewed. Under the new regulations, the ticket, once granted, does not require renewel; it can of course be withdrawn, and is not granted to persons under 21 years of age. When the reader has become well known to the officials, he is not even asked to show his ticket.

Maps.—The maps, charts, plans, and topographical drawings were separated from the library, to form a distinct department in 1867. There are over 50,000 published and 20,000 manuscript maps in the Museum. Many of the latter have thrown much light on the history of early geographical discovery.

Manuscripts.—The manuscripts are contained in several rooms in the south-east angle of the building. The work of the department is carried on by a keeper, assistant-keeper, a keeper of oriental manuscripts, and nine assistants. The manuscripts are for the most part bound in volumes, and placed in cases around the rooms. The collection consists of: 1. The Sloanean manuscripts, relating chiefly to medical and natural history subjects. 2. The Cottonian manuscripts, rich in documents referring to the history of Britain, including two of the originals of *Magna Charta*, in registers of English monasteries, and in original letters of royal and illustrious personages. This collection contains the *Durham Book*—a copy of the Latin Gospels, with an interlineary Saxon gloss, finished in the year 720. 3. The Harleian manuscripts, a collection rich in illuminated MSS., in ancient, civil, and ecclesiastical records, in manuscripts of the classics, among which is one of the earliest known copies of the *Odyssey*, and in early English poetry. 4. The manuscripts of the Ancient Royal Library. These were collected by our kings from Richard II. to George II.; many of them were obtained from the monasteries, on their destruction. Amongst the most valuable treasures here are the *Codex Alexandrinus*, a manuscript of the Bible written in uncial Greek, before the close of the 5th c.; and the *Basilicon Doron* of James I., in his own handwriting.

5. The Lansdowne manuscripts. This collection comprises the Burghley and Cæsar papers, the manuscripts of Bishop Kennett, and numerous valuable historical documents and state papers. 6. The Hargrave manuscripts, almost exclusively connected with law. 7. The Burney manuscripts, containing a large collection of the Greek and Latin classics. Among them is a copy of the *Iliad*, answering that of the *Odyssey* in the Harleian collection. 8. The Howard-Arundel manuscripts, obtained from the Royal Society. This collection is singularly rich in materials for the history of our own country and language. 9. The Oriental manuscripts, a collection composed of several purchases and bequests. It includes the manuscripts acquired by Mr. Rich while consul at Bagdad, and consists of numerous Syriac, Arabic, Ethiopic, and other oriental codices. A large series of Ethiopic manuscripts was obtained at Magdala, on the occasion of the Abyssinian war. 10. Additional manuscripts. This collection consists of innumerable bequests, donations and purchases, which from the establishment of the Museum have been and are still being acquired. Among recent additions may be specified a charter of William the Conqueror; the original mortgage-deed of a house in Blackfriars, dated 11th March 1612, and signed by William Shakspeare; the holograph manuscript of Scott's *Kenilworth*, and of many of Burns's poems, including the *Cottar's Saturday Night*, and the songs published in

Johnson's *Scots Musical Museum;* an extensive series of papal bulls; several *Books of Hours*, including the famous *Bedford Missal;* and a large collection of original letters and papers relating to the affairs of Scotland during the 16th and 17th centuries. Catalogues of the complete collections have at different times been published. The additions to the ever-increasing Oriental and Additional collections are at intervals published in supplements to each of the original catalogues. Copies of all these, with manuscript lists of the annual additions, are placed in the reading-room for consultation.

Supplementary catalogues were printed up till 1853; since then the additions have been kept up in manuscript catalogues. A general class catalogue, embracing all the collections, has been commenced, and the printing of it has begun. The first part is a catalogue of ancient and illuminated manuscripts, illustrated with photographic *fac-similes*, of which several volumes are published.

The right of using the reading-room includes the privilege of consulting the manuscripts. During 1880, the number of deliveries of manuscripts to readers in the reading-room amounted to 29,239; besides, the number consulted in the rooms of the department was about 6000. These numbers do not include the volumes exhibited to visitors on private days.

Prints and Drawings.—The collections of this department, managed by a keeper and two assistants, are kept in rooms in the north-west angle of the building. They consist of prints and drawings bequeathed to the Museum, in 1799, by the Rev. C. M. Cracherode; of those bequeathed in 1824 by Mr. Payne Knight; and of numerous smaller bequests and donations. No purchases were made for this department until about 1840, when a sum was first included in the estimates for this purpose. Since that time, the prints and drawings have been increasing at a rate equal to any of the other departments of the Museum. The collection is arranged in *schools*. 1. The Italian school, containing original drawings by Leonardo da Vinci, Raphael, Correggio, Tintoretto, Paul Veronese, Michael Angelo, Guido Reni, Salvator Rosa, and others. 2. The German school, containing drawings by Albert Dürer, Hans Holbein, Dietrich, Hollar, and others; and engravings by Lucas Cranach, Martin Sehon, Gauer, and others. 3. The Dutch school, containing several superb originals of Rubens, an extensive and nearly complete set of the works of Rembrandt, with many drawings by A. Cuyp, Teniers, Van Dyck, &c.; and engravings and etchings by Berghem, Lucas van Leyden, Rembrandt, Ostade, &c. 4. The French school, with drawings by Watteau, Claude Lorraine, &c., and etchings and engravings by Bourdon, Boisseaux, Le Prince, &c. 5. The Spanish school, represented by some drawings of Murillo, and others of less note. And, 6. The English school, containing drawings by R. Wilson, Wilkie, Stothard, Callcott, Gibson, &c.; a splendid collection of Hogarth's prints, and specimens of the works of Barlow, Gaywood, Raimbach, Finden, Worlidge, Geikie, &c.

This department contains also an extensive and very valuable collection of works in Niello; a beautiful silver cup, designed and carved by Benvenuto Cellini, and a wonderful stone-carving in alto-rilievo by Albert Dürer, representing the birth of St. John.

Oriental Antiquities.—Within the last ten years the objects in the Museum, included under the name Antiquities, have been divided into four departments. The first of them includes the Egyptian and Assyrian antiquities. The Egyptian monuments date from a period as remote as 2000 years before the Christian era, and come down to the Mohammedan invasion of Egypt, 640 A.D. The collection has been obtained chiefly from these sources: the antiquities which fell into the hands of the British army at the capitulation of Alexandria, presented by George III.; presents from General Vyse, the Duke of Northumberland, the Marquis of Northampton, Sir Gardner Wilkinson, and others; and acquisitions from the Earl of Belmore, Mr. Salt, and M. Anastasie. The sculptures are formed of granite and basalt; they represent human and allegorical figures, sometimes of colossal size. There are several beautifully sculptured sarcophagi. Most of the monuments are inscribed with hieroglyphics (q. v.). The key to this dead and forgotten language was furnished by the celebrated Rosetta Stone (q. v.), which is placed in the center of the gallery. The smaller Egyptian remains are exhibited in a gallery on the upper floor; they consist of objects relating to religion, as representations of divinities and sacred animals, in wood, metal, stone, and porcelain; of objects relating to civil and domestic life, as dress, personal ornaments, household furniture, artistic and writing implements, armor, and weapons of war, &c.; and of objects relating to death and burial, as mummies and coffins, with the scarabæi, amulets, and other ornaments found with them. A collection of papyri is exhibited on the north-west staircase, containing extracts from the ritual of the dead.

The Assyrian antiquities are contained in a suite of rooms recently erected on the outside of the Egyptian Gallery, and in a spacious room on the basement. The collection consists of sculptures excavated at Nimrud, Khorsabad, and Koyunjik by Layard in 1847—1850, and more recently by Rassam and Loftus, under the direction of Sir H. C. Rawlinson. The Nimrud sculptures are the oldest, belonging to a period ranging from 930 B.C. to 747 B.C. Those obtained from Khorsabad seem to have been executed under a monarch who reigned about 747—721 B.C., while the collection from Koyunjik belong to the time of Sardanapalus, apparently 721 B.C. and 625 B.C. The monuments consist chiefly of slabs of gypsum, alabaster, and limestone sculptured in low relief, the subjects being the exploits of the king whose palace walls they ornamented.

Many of the sculptures are covered with Cuneiform (q. v.) writing, which, by the labors of Rawlinson, Hincks, and Smith, has been deciphered, giving us a history of this remarkable people, and corroborating the narrative of the sacred Scriptures whenever they refer to the same event. See ASSYRIA. Besides the series of sculptures, the Assyrian collection includes a variety of smaller but highly curious and instructive objects, discovered at Nimrud and Koyunjik.

Greek and Roman Antiquities.—This collection occupies four apartments, which run parallel to the Egyptian Gallery. The Lycian Gallery contains a series of architectural and sculptural remains from ancient cities in Lycia, obtained by Sir C. Fellows in 1842–1846. In the next gallery are the remains of the famous Mausoleum (q. v.) at Halicarnassus, erected in honor of Mausolus by his widow Artemisia. These remains were discovered by C. T. Newton, Esq., in 1857—1859. In the same room are some remains of the Temple of Athene Polias at Priene, including the stone on which its dedication by Alexander the Great is inscribed. The Elgin Gallery contains the sculptures from Athens and Attica, the greater portion of which were obtained by the Earl of Elgin, and purchased from him by parliament in 1816 for £35,000. The most important series in the gallery is the decorations of the Parthenon (q. v.), which, notwithstanding their dilapidated condition, form the most valuable monument of Greek art which has descended to modern times. The gallery contains also sculptures and casts from the Temple of Wingless Victory, the Temple of Theseus, and the Erechtheum, at Athens. In an extension recently made to this gallery, are a colossal lion from Cnidus, and a drum of a sculptured column, and other remains, from the Temple of Diana at Ephesus. The Hellenic Gallery contains a number of antiquities brought from Greece and its colonies at different times. The most important are 23 slabs of a frieze sculptured in mezzo-rilievo, which, from the locality where they were found, are called the 'Phigalian Marbles.'

The gallery on the south side of the building is occupied with the Roman and Græco-Roman sculptures. The bulk of the collection was formed by Charles Townley, Esq., and purchased in 1805 for £20,000. Subsequent additions have been made by the bequest of the collection of R. P. Knight, Esq., in 1824, and by various purchases and donations.

The collection contains an interesting series of Roman portrait sculptures, and a very extensive mythological series, amongst which are some of universal fame—the Venus, Clytie, the Discobolus, and many others. A room on the basement is appropriated to mosaics and miscellaneous monuments, such as representations of animals, architectural and decorative fragments, and sacred and domestic implements. A fine collection from Southern Italy, exhibiting specimens of the arts of the Etruscans, Greeks, and Romans, was bequeathed to the Museum by Sir William Temple in 1856.

The collections of smaller remains are placed in a suite of rooms on the upper floor. They consist of—1. An extensive series of vases, commonly, though not correctly known as Etruscan, formed from the collections of Sir W. Hamilton and Mr. Burgon, from purchases at the sales of the Prince of Canino, M. Durand, and others; and from excavations in Sicily, Rhodes, and on the sites of Greek colonies in Cyrene and elsewhere. 2. A miscellaneous collection of terra-cottas, mural paintings, and other objects. 3. Bronzes of Greek, Etruscan, and Roman workmanship, consisting of sculptures, and various domestic and other articles, as candelabra, lamps, vases, horse-trappings, armor, &c. 4. The collection of engraved gems and gold ornaments now, since the addition of the Blacas and Castellani collections, perhaps the richest in the world.

Coins and Medals.—The very large collection of these objects is arranged in chronological order under five great divisions, viz.: Greek, Roman, Mediæval and Modern, English, and Oriental. The department is under the care of a keeper, assistant-keeper, and four assistants.

British and Mediæval Antiquities and Ethnography.—The British collection is arranged in chronological order. The oldest series contains the antiquities of the Stone and Bronze Periods, consisting of celts, daggers, swords, shields, and early pottery. The British-Roman antiquities comprise specimens of earthenware, lamps, and miscellaneous articles. A small collection of sepulchral urns, weapons, and personal ornaments represent the Anglo-Saxon period. The antiquities found in London, and be-

longing to Mr. C. Roach Smith, were some years ago transferred to this collection. The Ethnographical collection contains antiquities as well as objects of modern use.

In 1855 the extensive collections of antiquities and ethnography, belonging to Henry Christy, became the property of the Museum, having been bequeathed by their proprietor. Felix Slade bequeathed his valuable collection of glass to the Museum, and it is arranged so as to show the history of glass in all its branches.

Natural History Museum at South Kensington.—In 1856 the trustees united the Natural History departments under Professor Owen, who was then appointed superintendent of Natural History. In the spring of 1881 the new building erected at South Kensington, for the reception of the zoological, mineralogical, geological, and botanical departments, was opened to the public. The following departments, therefore, though nominally belonging to the B. M., now form the Natural History Museum at Cromwell Road, South Kensington.

[*Zoological Department.*—To give an idea of the contents of this and the other natural history departments, would be to write an epitome of the various sciences they illustrate. This department contains a collection of animals arranged in systematic order in the galleries, comprising stuffed mammals, birds, reptiles, and fishes, and the hard portions of radiate, molluscan, and articulate animals. A room is specially devoted to the fauna of Britain. In rooms on the ground and basement floors are arranged the collections of insects, of osteology, and of specimens preserved in spirits. An idea of the extent of the collection may be formed from the fact, that 142 separate publications, illustrative of the contents of the department, in the shape of catalogues, lists, &c., have been issued under the superintendence of the indefatigable past and present keepers. During the year 1880, there were added to this collection 24,283 specimens of animals, of which 4718 were vertebrata, 4206 mollusca and radiata, and 15,359 annulosa. In 1873, the unique and extensive collection of birds formed in the Eastern Archipelago by Wallace, was acquired by purchase.

Botanical Department.—The herbarium of Sir H. Sloane, the nucleus of this collection, consisted of about 8000 species, bound in 262 volumes. In 1820, the magnificent herbarium of Sir Joseph Banks was bequeathed to the Museum, and under the superintendence of the late Robert Brown, was transferred to two rooms prepared for it in the south-east angle of the building. The collection has since been rapidly increasing: during the year 1880, about 9000 species of plants were added; and in the year 1873, the late William Wilson's herbarium of British and foreign mosses was acquired by purchase. The collection contains an extraordinary number of typical specimens—the identical plants from which the original descriptions were taken by Linnæus, Aublet, Jacquin, Brown, Bentham, Bennett, and others. The exhibition rooms contain a series of specimens illustrating the most striking characteristics of the great divisions of the vegetable kingdom, arranged in order; and a series of fossil plants, the value of which is increased by the transparent sections showing their structure, which are placed beside them.

Geological Department.—This collection occupies the wall-cases of the principal gallery on the north side of the Museum. It contains an extensive series of the fossil remains of plants and animals from the various fossiliferous strata; it is especially rich in the fossils of the secondary formations. Amongst its more valuable contents may be mentioned the collections of Dr. Mantell, the Tertiary fossils collected by Dr. Falconer in India, and the remarkable fossil birds from New Zealand.

Mineralogical Department.—The minerals are contained in the table-cases in the Geological Gallery. They are arranged according to a chemical classification. Many valuable and unique specimens exist in the collection, which is rapidly increasing. In the year 1880, the number of specimens added was 324.

The expenses of the Museum are paid by grants of public money. According to the estimates, £136,432 were required in 1881—1882.

Admission to the Museum was at first obtained by printed tickets, which were delivered by the porter to persons making a written application. There could be no more than 45 visitors, at the utmost, per day, under the regulations then in force. Now, all who present themselves are freely admitted; and every week-day the Museum is visited by large numbers: as many as 43,000 holiday-folk have passed through the building in one day.

BRI'TISH NA'VY. Under NAVIES, MODERN, will be found a brief description of the chief navies belonging to the continent of Europe, and to the United States of America. The B. N. is separately treated in this place.

While the Romans occupied Britain, they were obliged to maintain a fleet of war-vessels on the coasts to protect it from the ravages of the Saxons, who were the pirates and bucaneers of those times. When the Romans had departed, and the Saxons became dominant, the coasts were infested by another naval power—the Scandinavian Vikings. It was Alfred the Great who first established what may be called a navy in this island, consisting of efficient vessels well manned, for protection, and not aggression. Ethelred made the building of a ship a condition for holding a certain acreage of land. William the Conqueror strengthened the navy by the institution of the CINQUE PORTS (q. v.). During the first three centuries after the Conquest, we read of British fleets of 240, 400, and even 730 sail—a proof that the vessels must have been very small even if there were no exaggeration of numbers. Until 1485, the fleets were collected just as wanted; but in this year, Henry VII. conceived the idea of a *permanent* navy to be ready at all times. He built the largest ship of the age, the *Great Harry*. Henry VIII. pursued the course established by his father, and still further strengthened the navy by instituting the Admiralty, the Navy Office, the Trinity House, and the dockyards at Woolwich, Portsmouth, and Deptford. The *Henri Grace de Dieu*, the largest ship built by him, was of 1000 tons burden; but most of the vessels were high, unwieldy, and narrow, with the guns nearly down to the water's edge. The ships of the navy presented an aggregate tonnage of 12,000 tons at the period of Henry's death. Elizabeth made a large increase in the navy; but they were not all royal ships which were sent to struggle against the Spanish Armada. James I. made many improvements in ship-building, by encouraging a distinguished naval architect, Phineas Pett. Charles I., who built the *Sovereign of the Seas*, of 100 guns, was the first to group the royal ships into rates and classes. Cromwell brought up the navy to the strength of 154 sail, including a large number of two-deckers.

Charles II. allowed it to fall into decay for a time; but his brother, the Duke of York, who afterwards became James II., not only restored it, but brought it to a higher state of efficiency and strength than ever. When William of Orange became king of England, he found a navy carrying 7000 guns and 42,000 seamen; he built many additional ships, some with as many as 80 guns, and established Plymouth dockyard. Queen Anne succeeded to the possession of a fine navy; which at her death had increased to 198 ships, mounting 10,600 guns, with a tonnage of 157,000 tons. George I. attended to the navy chiefly in repairing the ships after a period of war, and in supplying a new armament. George II. greatly added to the number of ships, established a naval uniform, and increased the renown of the B. N. during the war against Spain.

The long and eventful reign of George III. was especially distinguished by the achievements of the navy. When he came to the crown in 1760, he found himself in possession of 127 ships of above 50 guns, and 198 of 50 guns and under, manned by 70,000 seamen. These numbers, by building and by capture, were increased to 174 and 203 respectively, by the end of the American war. Throughout the European struggle, from 1793 to 1815, the B. N. exhibited a spectacle, for vastness and achievements, which had never before been equalled in any country. In the first nine years of this period, between 1793 and 1802, England lost by war 5 ships of the line and 46 smaller vessels; but she captured from the French, Dutch, Spaniards, and Danes, in various battles, 74 ships of the line and 519 smaller vessels; or rather, four-fifths of this number were captured, and one-fifth destroyed. Besides these more than 800 privateers were taken and destroyed by the English. Of the total number of captures, 144 ships of war were at once converted into British ships, and added to our navy. When war recommenced in 1803, England had 189 ships of the line, and 781 smaller ships of war; during the next seven years, the seamen varied from 100,000 to 120,000, and in 1810 the number was raised to 140,000. At all times, many of the ships of the royal navy are unemployed or out of commission; but it frequently happened during that great war, that England had 450 liners, frigates, and sloops, besides smaller armed vessels, employed simultaneously. The conquered vessels added to the navy between 1803 and 1815 were upwards of 100 in number.

After the termination of the great European struggle, a large number of ships of war were put 'in ordinary,' or out of commission, and their officers placed on half-pay. In 1820, the vessels in commission, in ordinary, and building, comprised 127 ships of the line, 311 frigates and sloops, and 27 smaller vessels; but in this total of 465, there were only 113 in commission. In the nineteen years that next followed, almost wholly years of peace, the total number of ships of the line, frigates, and sloops, decreased; the gun-brigs, shooners, and cutters increased in number; while the first germs of a new element, a *steam navy*, made their appearance.

The year 1839 must be viewed as a turning point in the history of the British navy. Twenty-four years of peace had thrown the memory of warlike achievements into the background; and the House of Commons had insisted on the lessening of these estimates which provide for armies and navies. It was now found, however, that both Russia and France had accumulated formidable navies. From that year to the present, the B. N., in common with the navies of other powers, has been undergoing a series of 'reconstructions.' First, ships of larger size, and carrying heavier

guns, were built. These ships were of immense power in the days of wooden broadsides, but are now useless for purposes of war. The next stage, from about 1853 to 1859, was the conversion of our force from a sailing to a steam navy. This became the era of great steam frigates of about 5000 tons, and of heavy armaments in a few great guns, of which the *Mersey*, 36 guns, may be taken as a leading specimen. With the introduction of rifled guns, of force hitherto undreamt of, came the necessity for armor-plated sides. The fighting part of the navy (i. e., the line of battle) changed once more after 1860 to low-sided vessels, clad in thousands of tons of iron plates. The *Warrior* was the first ship so built in England, and she was followed by a whole squadron similarly protected. Guns, however, went on increasing in offensive power; and whereas 5-inch plates were at first thought sufficient, now, 10-inch, 12-inch, 14-inch, and even 22-inch plates are necessary to exclude shot. Such a vast weight of armor all over a ship would sink any vessel of moderate dimensions. The principle of turret-ships is therefore becoming predominant, in which the greater part of the veesel, clad in comparatively light armor, is under water, or only just visible above the surface. The earliest formidable turret-ship was the ill-fated *Captain*, which, in 1870, capsized in the Bay of Biscay, and entombed 600 brave seamen, with the inventor Captain Coles. Ships of analogous construction with lower freeboard have been since built; and now the *Inflexible*, of 11,165 tons, carries 4 guns of 81 tons. Several of the Italian ironclads are yet more powerful. See TURRET-SHIPS, ARMOR-PLATES.

The expenditure on the B. N. greatly increased between 1839 and 1875, on account of the changes just adverted to. In 1839, the number of men and boys voted was little over 25,000; in 1881, it was about 58,800. Even as late as 1852, the expenditure was only £6,500,000, against £11,155,900, in 1882–83.

The B. N. is composed of some 75 ironclads, about 360 steam-vessels, and 120 sailing-vessels. In 1882 there were in commission 253 vessels. The unarmored ships comprise cruisers, despatch vessels, gun-boats, several large old-fashioned two-deckers, troop-ships for India, tugs, old-wooden vessels for harbor-service.

All matters about ships, seamen, &c., will be found under their proper headings. See TURRET-SHIP; also ARMOR-PLATES and WAR-SERVICES.

BRITTANY. See BRETAGNE.

BRITTON, JOHN, an eminent English topographical and antiquarian writer, the son of a small farmer and village shop-keeper, was born July 7, 1771, at Kingston-St.-Michael, near Chippenham, Wiltshire, and, losing his parents young, received but a scanty education. Some short notices which he had contributed to the *Sporting Magazine* brought him into acquaintance with its publisher, Mr. Wheble, who employed him to compile the *Beauties of Wiltshire*, which he did in conjunction with a young literary friend named E. W. Brayley. They also prepared the *Beauties of Bedfordshire* in the same manner. B. afterwards issued a more elaborate work, entitled the *Architectural Antiquities of England*. One of the most important of his subsequent publications was *The Cathedral Antiquities of England*, 14 vols. fol. and 4to, 1814—1835, with upwards of 300 highly finished plates. Altogether, his illustrated works of architectural and topographical description and antiquities number 87, besides others of a similar kind which he edited.

BRIVE, a town of France, in the department of Corrèze, pleasantly situated in the midst of vineyards, and shut in by a fine circular avenue of elms, about 15 miles south-west of Tulle. It has manufactures of woollen, cotton-yarns, &c. Pop. (1872) 8016.

BRIZA. See QUAKING GRASS.

BRIZURE, BRIZÉ or BRISÉ, terms used in heraldry to indicate that a charge is bruised or broken. See ROMPU.

BROACH, or BROCHE, an old English term for a spire springing directly from a tower without any intermediate parapet. Such spires are common in England, and in some places in Scotland, particularly in Fife.

Broach.

BROAD ARROW, a government mark, thus stamped, cut, or otherwise fixed on all solid materials used in Her Majesty's ships or dock-yards, and on government stores generally, in order to prevent embezzlement. The origin of the mark is obscure. Previous to the year 1698, the naval authorities prosecuted a dealer in marine-stores, for having in his possession certain stores bearing the B. A. of his majesty. The defendant allowed the evidence against him to go on, and when asked what he had to say, replied, that it was *very curious* that the king and he, as a dealer, should both have the same private mark on their property! The receiver of stolen goods was acquitted, and this led to the passing of the act 9 and 10 Will. III. c. 41 (1698), which enacts that persons in possession of naval stores, or goods of any kind marked with the B. A., or other marks therein mentioned, and usually employed in marking naval stores for the navy, shall forfeit all such goods and £200, and also pay costs. The mark is for iron, wood, &c., what the color-thread is for sailcloth and ropes, which enables the government to identify the smallest piece of such articles.

BROAD-BILL. See SHOVELLER.

BROAD-BOTTOM ADMINISTRATION, a name derisively applied to the ministry formed by Henry Pelham in 1744, because it professed to include all parties of weight and influence in the state in a grand coalition, and comprised no less than nine dukes. Thus for a time the Whig party were reunited, and even Tory support secured. The ministry was dissolved in 1754, by the death of Pelham, though several of its original members had seceded long before.

BROA'DSIDE, the simultaneous discharge of all the guns on one side of a ship of war. The fighting power of a ship used to be estimated by the weight of all the shot and shell that could be fired off at once from one side or half of the ship. Thus, the broadside of the old-fashioned *Duke of Wellington*, 131-gun war-steamer, amounted to 2400 lbs. With iron-clad turret-ships the term is inapplicable.

BROADSTAIRS, a quiet watering place in Kent, 2 miles E.N.E. of Ramsgate. The church dates from the 12th c. Near B. is a noble orphanage.

BROADSWORD is a sword with a broad blade, usually for cutting only, not for stabbing. See CLAYMORE.

BROCA, PAUL, the most eminent of modern anthropologists, was born in the Gironde in 1824. He studied medicine and became Professor of Pathology at Paris, and famous as a sugeon. He was founder and secretary of the Anthropological Society of Paris, founder and professor of the Anthropological Institute or School, and founder and editor of the *Anthropological Review*. He wrote several monographs, as on Strangulation and Hernia, on Aneurisms, on Anæsthesia, on Abscesses, on Hybrids, and on various anthropological subjects. He was leader of the evolutionist school in France. In the last years of his life, he was made a life member of the senate. B. died 9th July 1880.

BROCADE. This term is used to describe a silken fabric on which a figure of any kind is formed by the threads of the warp or weft being raised by the heddles, or, more, generally, by the Jacquard-loom, in such order as to produce the pattern required. The word has much the same application to silk textures that damask has to linen textures or to worsted textures for upholstery uses. See WEAVING, and JACQUARD-LOOM.

BROCAGE BONDS, or bonds securing a reward for the promotion of a marriage by influence to be used, are void by the law of England and of Scotland.

BRO'CCOLI, a well-known and much esteemed garden vegetable, one of the many varieties which cultivation has produced of the *Brassica oleracea*, the common kale or cabbage. B. is said to have been originally brought to Italy from Cyprus about the middle of the 16th century. Its name is Italian. It differs little from Cauliflower (q. v.), of which it may be considered a mere variety, having colored instead of white heads, and a deeper tinge of color in the leaves, being also more hardy, the character from which its chief importance is derived, as it can be readily obtained at seasons when there is no cauliflower in the open garden. It is perhaps inferior to cauliflower, however, in delicacy of flavor.

There are many subvarieties, the number of which is, of course, continually increasing; and some of these are preferred for early spring sowing, with a view to an autumn crop; others for later sowing, with a view to a crop in the following spring. The subvarieties differ in size, in their more cut or entire leaves, in the greater or less degree of color—generally purple—with which the leaves are tinged, in the more or less compact form of the whole plant, in the more or less green, yellow, or purple color of the head, &c. Some of the kinds of B. preferred for late sowing and spring use are known by the general name of Cape B., the first of them being said—but on doubtful authority—to have been introduced into Britain from the Cape of Good Hope. The mode of cultivation of B. pretty much resembles that of cauliflower, except as to the times of sowing and transplanting, and that it is generally—even in Scotland—sown in the open ground, and not in a hotbed. A similar richness of soil is required. Various modes of protection in winter are adopted. In mild winters, protection is scarcely or not at all needed, but precautions are generally employed against severe weather. It is found very advantageous to plant in trenches of 6 inches deep, and to earth up the plants, as they are thus not only in some measure preserved from frosts, but also from the winds of winter, which are apt to shake and loosen plants, so as to cause their destruction. It is a common practice

to take up some of the most advanced plants in the beginning of winter, and to lay them in a sloping position with their heads towards the north. The heads produced in this way are not in general so large as they might be, but they are sometimes procured when otherwise they probably would not.

BROCHURE, a French word (from *brocher*, to stitch), equivalent to the English word Pamphlet (q. v.)

BRO'CKEN (*Mons Bructerus*, *Melibocus* of the ancient Romans), popularly known as the *Blocksberg*, is the highest summit of the Harz Mountains. It is situated in the province of Saxony, Prussia, about 20 miles west-south-west of Halberstadt, and has an elevation of 3740 feet above the sea. The mountain is very frequently veiled in mist and cloud-strata, and is celebrated for the phenomenon known as the *Brockengespenst* ('Spectre of the Brocken'), which is nothing more than the shadow of men, houses, or other objects thrown upon the misty eastern horizon by the light of sunset. (See Milner's *Gallery of Nature;* Leibrock, *Der Brocken*, 1864.) In clear weather, a fine view is obtained from the summit of the Brocken.

BROCKHAUS, FRIEDRICH ARNOLD, the founder of the well-known firm of Brockhaus in Leipsic, and publisher of the *Conversations-Lexicon*, was born at Dortmund, May 4, 1772. In 1802, circumstances led him to Holland, where, however, his business schemes did not prosper. He returned to Germany in 1810, and in the following year commenced business in Altenburg. Before this, however (in 1808), B. had purchased the copyright of the *Conversations-Lexicon*, which had been commenced in 1796, and he completed the first edition, with the addition of two supplementary volumes in 1809—1810. In 1812, a second improved edition of the work was commenced under the supervision of B. as editor. The peace of 1815 enabled B. to pursue prosperously his peaceful and civilizing career. In 1817, his business had so increased that he found it necessary to leave Altenburg for Leipsic, where, in the following year, he commenced book-printing in addition to book-publishing. In the course of a few years, the *Lexicon* passed through six editions; it has now arrived at the eleventh edition. Through all the enterprises of B. as a publisher, a zealous devotion to the cause of liberty and general enlightenment may be traced. He died August 20, 1823. B. was not only an able and assiduous man of business, but distinguished for his literary culture, his knowledge of the world, and his numerous social accomplishments. He was also eminently patriotic, and furthered many literary undertakings, simply through a pure love of 'fatherland.'

The business was afterwards carried on by HEINRICH BROCKHAUS, second son of the former (b. 1804, d. 1874), and now by Heinrich's sons, Rudolf and Edward. Among the numerous publications issued by the house, may be mentioned the later editions of the *Conversations-Lexicon*, with an *Atlas;* the *Universal Encyclopædia*, by Ersch and Gruber; and the German *Penny Magazine*, founded in 1833.

BROCKHAUS, HERMANN, third son of F. A. Brockhaus, was born at Amsterdam, January 28, 1806; studied at Leipsic, Göttingen, and Bonn, and lived successively in Copenhagen, Paris, London, and Oxford. From 1848 till his death in 1877, he held at Leipzig the chair of ordinary professor of the Sanscrit language and literature. Among his several works on Oriental literature may be mentioned, the *First Five Books of the Large Collection of Fables, Kathá Sarit Ságara, in Sanscrit and German* (1839); an edition of the drama *Prabodha Candrodaya*, by Krishna Misra, with Hindu scholia (1845); Nachschebi's Persian version of the *Seven Wise Masters* (1845); and (in 1854) the Persian text of the *Songs of Hafiz*. After 1856, he was editor of the *Universal Encyclopædia*. B.'s method of printing Sanscrit in Roman types is now generally adopted in Germany.

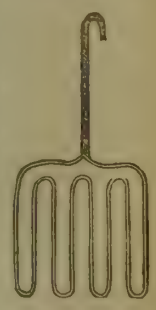
BRO'CKVILLE, a town of Upper Canada, or Ontario, taking its name from General Brock, who, during the last American war, died in the arms of victory on Queenston Heights, between the town and falls of Niagara. It stands on the left bank of the St. Lawrence Proper, about 40 miles below Kingston, and about 160 above Montreal. Originally, its communications downward were interrupted by powerful and rugged rapids, which, however, are now, one and all, either avoided by canals or overcome by steam. B. is a thriving place, with (1881) 7609 inhabitants.

BRODIE, SIR BENJAMIN COLLINS, BART., a distinguished surgeon, third son of the Rev. Peter Bellinger Brodie, rector of Winterslow, Wiltshire, was born there in 1783. He studied under Sir Everard Home at St. George's Hospital, to which he was, in 1808, elected assistant-surgeon, and afterwards surgeon. He had previously lectured both on anatomy and on surgery. In 1810, he was elected a Fellow of the Royal Society, and in 1811 received their Copley medal for his physiological papers contributed to the *Philosophical Transactions*. In 1834 he was created a baronet, and he held the appointment of serjeant-surgeon to Queen Victoria, as well as that of first surgeon in ordinary to the Prince Consort. He was made D.C.L. of Oxford in 1850; was president of the Royal Society, a corresponding member of the Institute of France, and a foreign member of other learned societies and academies in Europe and America. Author of *Lectures on Local Nervous Affections* (1837, 8vo.); *Hunterian Oration*, 1837; *Lectures Illustrative of Subjects in Pathology and Surgery* (1840, 8vo.); *Introductory Discourse on the Duties and Conduct of Medical Students* (1843. 8vo.); *Psychological Inquiries as to Mental Faculties* (3d ed., 1856); an edition of his works with *Autobiography* appeared in 1865. He also contributed papers to several scientific journals. He died in 1862.—B.'s son, Sir B. C. BRODIE, F.R.S., was in 1855 elected Aldrichian Professor of Chemistry at Oxford, a chair suppressed in 1866. He died 24th November 1880.

BRO'DY, a town of Galicia, Austria, is situated on a swampy plain, surrounded by forests, about 58 miles east-north-east of Lemberg. B., which was made a free commercial town in 1779, has a large trade in the agricultural produce of the country with Russia, Poland, and Turkey. Its chief manufactures are leather and linen; jewelry, manufactured goods, and colonial produce are imported by way of Odessa. The trade is almost entirely in the hands of the Jews, who form so large a proportion of the inhabitants, that B. has been called 'The German Jerusalem.' Pop. (1880) 20,071.

BROG, or BROGUE, a rudely formed species of shoe, formerly in use by the aboriginal Irish and the Scottish Highlanders, and of which there were different varieties. See SHOES, SHOE-TRADE. The name has been applied to a modern kind of shoes, with some fanciful peculiarities.—The term Brogue is also used to signify the peculiar pronunciation of English that distinguishes natives of Ireland.

BROILING is a convenient and expeditious mode of cooking small pieces of meat, by laying them on a gridiron over a bright fire, or even on the coals themselves. This is perhaps the most primitive mode of preparing meat for eating, as may be supposed from the great ease and simplicity with which the operation is managed. B. is, in fact, a quicker sort of roasting. The albumen of the outside being sealed up at once, the meat is rendered extremely nutritious, and therefore this process is much to be recommended. But to broil meat so as to preserve its odor, juice, and fat, requires care. The meat should be prepared for the gridiron by being beaten slightly with the rolling-pin, trimmed of superfluous fat and skin, and cut so as to look well on the dish. The fire should be perfectly clear, and of a red-hot surface to answer to the size of the gridiron, that all parts of the meat may be equally cooked. Just before setting the gridiron over, some salt should be sprinkled on the fire to prevent the flare. The gridiron should be perfectly clean and smooth, being always rubbed when it is put away; and, before using, it should be warmed, greased with suet, and rubbed again with paper. When it is placed on the fire, the back should be higher than the front. The meat should never be touched with a fork, but turned rapidly with the broiling tongs; and when sufficiently done, should be served immediately on a very hot dish, being seasoned according to taste.



Gridiron.

In large ranges there should be a broiling stove, and an apparatus for B. suited to it; by this the heat of the fire can be easily regulated. But for all ordinary purposes, a fire of charcoal, or of common coal, and a grooved gridiron, to preserve the gravy, is all that is necessary. Sometimes a gridiron is used to hang before the fire, when a dinner is being dressed, and the top of the fire is occupied; this is convenient, but it is an inferior way of cooking, the meat being roasted rather than broiled. There is a gridiron sold in the streets which is very well adapted to small low fires, as it is easily put in between the bars (see fig.).

BROKEN KNEES. The part commonly termed the knee of the horse is the carpus or wrist of man, and from the peculiar conformation of a quadruped, is much exposed, and liable to serious injury. By *broken knee* is meant the abrasion or more serious injury of the joint by a fall; and even when the wounds are healed, the scar usually remains to indicate that the horse has once fallen, and is 'broken-kneed'—an animal is then regarded as unsafe, and seriously deteriorated in value.

Causes.—The fall is necessarily the immediate cause of the broken knee; as to the cause of the fall, it is usually to be looked for elsewhere than in the horse himself. As a rule, the safety of a horse's action is very great, particularly about the age of from four to seven or eight years. Rarely does a horse at any age fall on his knees unless his feet have suffered from improper shoeing; the animal then moves cautiously, and is very apt to 'stumble.' Undoubtedly, some horses of defective conformation and sluggish disposition are more likely to stumble and fall than a well made, high-actioned steed; nevertheless, the most perfect animal may gradually be rendered unsafe by improper shoeing. See SHOEING OF HORSES.

Symptoms.—It is important, so soon as the injury is done, to determine the extent and depth of the wound. If it be merely a superficial wound, the case is a simple one; and unless the skin is much bruised, the hair will grow, and the animal not be permanently blemished. The sheath, however, through which the tendon over the joint passes, may be opened, and the tendon itself injured. The wound is then gaping, heals rather slowly, and sloughs have to be thrown off. Lastly, the joint itself may be opened, and this is indicated by a free discharge of the joint-oil or synovia, and by the bones being seen or felt on probing. The worst form of accident is that when the bones of the joint are fractured. The system suffers when the wounds are serious, and severe fever sets in.

Treatment.—Whatever may be the form of injury, the first injunction is to wash the wound thoroughly with cold water applied constantly for hours. The joint will swell, become hot and painful, and in some cases irritative fever occurs. Then the animal should be kept on low diet, and be purged with four, five, or six drachms of aloes, according to its size, &c. Should the wound be deep, much dirt remaining in the tissues, a large linseed-meal poultice should be applied over the joint for a day or two, until free suppuration sets in. If this is retarded, and in all cases when the poultice does not appear necessary, cold fomentations may be continued, using either some infusion of chamomile, or one part of tincture of arnica to twelve of water, or one part of Goulard's Extract to a similar quantity of water. The severe symptoms speedily subside, unless the bones are fractured or the joint otherwise seriously injured.

Usually, the wound heals rapidly, the joint-oil ceases to flow; and in order to insure a contraction of the wound, mild astringent or caustic applications should be used, such as tincture of myrrh, sulphate of zinc lotion, or sulphate of copper in crystal rubbed over it. When the wound is thoroughly healed, the hair may not grow rapidly, even in parts where it should form; in this case its production may be accelerated by the use of a very mild cantharidine ointment, which should act as a mild irritant, but not as a blister. In some cases of severe broken knee, it is advisable to fix the limb so that the animal may not move the joint much. In veterinary jurisprudence, a broken knee is regarded as a *blemish*, not as an unsoundness.

BROKEN WIND, a disease or unsoundness of the respiratory organs of the horse, which, from the French *pousse*, was termed, by some of the old English writers on farriery, *pursiness*. The Germans term it *Dämpfigkeit*, or asthma, though in many of their works it receives also the name of *Herzschlägigkeit*, from a belief that it consists in palpitation of the heart. The nature of the malady is not well understood, though it appears in the form of difficulty in the act of expiration, the horse making an extraordinary or spasmodic effort to expel from the lungs the air which has readily entered them in inspiration.

Symptoms.—A broken-winded horse is usually an animal that does not thrive, is lean, and has a dependent belly, the muscles of which are unusually active as expiratory muscles. The characteristic symptoms are best observed when the horse is exercised, the breathing becoming very labored, the nostrils dilated, the eyes bloodshot, and even blue, showing imperfect purification of the blood in the lungs. On watching the chest and flank, the ribs are observed very actively moved, and after collapsing, when the air is expelled from the lungs, are further depressed by a spasmodic jerk brought about by the abdominal muscles. A broken-winded horse has a bad cough, of the kind referred to by veterinarians as characteristic of unsoundness, and termed a *hollow cough*. When the animal is oppressed by fast work, or dragging a load up a hill, the pulse is excessively rapid, and the heart beats energetically. From this circumstance, it is regarded by some as a disease of the heart. Others have believed the diaphragm affected, but in reality it is the lungs, or the apparatus for expelling the air from these organs, that is at fault. The diaphragm being a muscle of inspiration, it is probably in no way implicated. No doubt, when the heart is diseased, the function of breathing is sometimes much affected, but these are not the symptoms of true B. W., any more than when the lungs are in part rendered impervious to air, and the act of inspiration is rendered short. This condition constitutes *thick wind*, and is often one of the remote results of inflammatory disease of the lungs.

Causes.—Low-bred horses are liable to B. W., especially if improperly fed on innutritious and bulky food, and at the same time kept at hard and fast work. Whatever may be the way in which the condition of the alimentary canal operates in producing B. W., of this we are certain, that the function of digestion is much impaired. Indeed, the term B. W. is believed to have had reference originally to the constant escape of flatus. B. W. is far more rare now a days than of old, and it is at present most common in those countries where horses are worst managed, and fed almost exclusively on coarse, indigestible, or innutritious kinds of hay and beans.

Treatment.—The treatment of B. W. is very unsatisfactory; and we can only hope for palliation of the symptoms by keeping the alimentary canal in proper order, administering occasional purgatives, and feeding on a proper quantity of the best oats, which should always be bruised; also allowing the horse the best hay in spare quantities—viz., from 10 to 12 lbs. daily. Some veterinarians have vaunted their powers in curing this disease, and recommended large doses of camphor, digitalis, and opium; but these potent narcotics only operate for a very short time, and as their effects pass off, the symptoms return, and often with increased severity. We may say that B. W. is incurable; and horses very frequently drop down exhausted when at hard work, and die either from congestion of the lungs, hæmorrhage, or simple suffocation.

B. W. is so bad a form of unsoundness, that horse-dealers sometimes attempt, and even successfully, to hide the defect for the time they may be engaged in the sale of a horse, and this they do by causing the animal to swallow *shot* or *grease*. A certain portion of lead weighing in the stomach has a wonderful effect in diminishing the symptoms, which become again obvious enough a few hours after the ruse has been practised on some unwary purchaser.

BRO'KER (so called, from a Teut. and Slav. root, *brak* or *wrak*, signifying refuse, blemish; as if the function had originally been to select good articles of merchandise and reject blemished ones: the German term is mäkler, from *makel*, blemish), an agent employed to make bargains and contracts between other persons, in matters of trade, commerce, and navigation, for a compensation commonly called brokerage. Where he is employed to buy or sell goods, he is not intrusted with the custody or possession of them, and is not authorized to buy or sell them in his own name.

In this respect, he differs from a factor, and he differs from an auctioneer in two particulars: a B. may buy as well as sell, but an auctioneer can only sell; a B. cannot sell personally at public auction, for that is the appropriate function of an auctioneer, but he may sell at private sales, which an auctioneer (as such) does not. A B. is strictly a middle-man, or intermediate negotiator between the parties, and for some purposes, he is treated as the agent of both parties, but primarily he is deemed merely the agent of the party by whom he is originally employed. There are several sorts of brokers, such as STOCK BROKERS, SHARE-BROKERS, SHIP-BROKERS, INSURANCE-BROKERS, and BILL-BROKERS (q. v.). Persons who appraise goods, sell or distrain furniture for rent, are also called brokers, although differing entirely in their occupations from the preceding commercial agents. The business of a Pawnbroker (q. v.) is also of a different nature.

Brokers, in London, must be admitted by the lord mayor and aldermen, paying £5 on admission, and a like sum annually, under a penalty of £100; but they are no otherwise subject to the control of the Court of Aldermen. A list is kept by the city of brokers admitted, and of those who have been convicted of fraud or disqualified (33 and 34 Vict. c. 60).

By the Larceny Consolidation Act, 24 and 25 Vict. c 96, s. 76, it is enacted that any person, who, being a banker, merchant, B., attorney, or agent, and being intrusted for safe custody with the property of any other persons, shall in any manner convert or appropriate it to his own use, shall be guilty of a misdemeanor, and be liable to be kept in penal servitude from five to seven years, or to suffer some other punishment, by imprisonment for not more than two years, with hard labor or confinement. See FACTOR. See also BROKER in AM. SUPP.

BRO'KERAGE is the remuneration or compensation allowed to a broker (q. v.).

BRO'MBERG, a town of Prussia, in the province of Posen, 69 miles north-east from the city of that name, is situated on the Brahe, about 6 miles from its junction with the Vistula. B. has manufactures of woollens, linen, chicory, tobacco, and Prussian blue; a large sugar-refinery, distilleries, breweries, potteries, and corn-mills. The *Bromberg Canal*, by uniting the rivers Netz and Brahe, connects the Oder and Elbe with the Vistula. Pop. (1880) 34,044.

BROME-GRASS (*Bromus;* Gr. *bromos*, a kind of oat), a genus of Grasses, very nearly allied to FESCUE (q. v.), with flowers in lax panicles, glumes many-flowered, the outer palea bifid at the extremity, and awned beneath, and the very short stigma growing from the face of the germen, beneath its apex. The species are numerous, and some of them are very common British grasses—none more so than the SOFT B. (*B. mollis*), an annual or biennial, which has very soft downy leaves, grows well on poor soil, and is readily eaten by cattle, but is not much esteemed by farmers, either for the quantity or quality of fodder which it yields. Its seeds have also the reputation of possessing deleterious or poisonous properties: and those of two other species of this genus, *B. purgans* and *B. catharticus*, the former a native of North America, and the latter of Chili, are said to be emetic and purgative. The

whole subject of the existence of poisonous properties in the seeds of these grasses, requires further investigation. Soft B., although now disliked by farmers, was formerly sown as a fodder-grass, and its large seeds were even regarded as making hay more nutritious; so that there are some who view its present proscription as a thing which ought to be reconsidered, and who deem it not improbable that its weighty produce, both in foliage and seeds, and its adaptation to poor soils, may yet recommend it to the favor of agriculturists. Very similar to it are SMOOTH B. (*B. racemosus*), FIELD B. or MEADOW B. (*B. commutatus* or *B. pratensis*, and *B. arvensis*), all of which seem very much to resemble it in their properties.—The TALL B. (*B. giganteus*, also known as *Festuca gigantea* and *Bucetum giganteum*), a native of Britain, which reaches the height of four or even five feet, affords a great bulk of foliage, but is not much relished by cattle. Naturally growing in shady places, it succeeds even in dense woods, and is sometimes sown to form covert for game.—

Rye Brome-grass (*Bromus secalinus*).

RYE B. (*B. secalinus*) is generally regarded as a troublesome weed, especially in fields of rye. It is very abundant in some parts of Europe. In a young state it has a great resemblance to rye. Its seeds, which are large, retain their power of germination for years, and do not lose it by passing through the intestines of animals. Deleterious effects have been erroneously ascribed to bread made from rye, along with which these seeds have been ground; but poultry are very fond of them, as of those of other species of this genus.

BROMELIA'CEÆ, a natural order of monocoty ledonous plants, allied to *Amaryllideæ* and *Irideæ* stemless, or with short stems, and rigid, channelled, often spiny and scaly leaves. The flowers are in racemes or panicles; the calyx 3-parted or tubular, persistent, more or less cohering with the ovary; the petals three, withering or deciduous, equal or unequal, imbricated in bud. The stamens are six, inserted into the tube of the calyx and corolla, the anthers opening inwards. The ovary is 3-celled, the style single, the fruit capsular or succulent, many-seeded; the seeds with a minute embryo lying in the base of mealy albumen.—The order contains about 170 known species, all natives of the warmer parts of America, although some of them are now naturalized both in Asia and Africa. The best known plant of the order, and the only one much valued for its fruit, is the Pine-apple (q. v.). B., with their strong spiny leaves, cover the ground in many places, so as to form impenetrable thickets. Many of them are epiphytic, or grow upon trees, without being parasites, particularly the species of *Tillandsia*, one of which is the New Orleans Moss, Long Beard, or Old Man's Beard of the West Indies and of the southern parts of the United States, hanging from the trees like the lichens of colder climates. The leaves of some are so formed and placed as to retain near their base a quantity of water, often affording a delicious refreshment to the traveler in a hot climate. The water is, perhaps, of use to the plant itself in droughts. Not a few of the B. are capable of vegetating long without contact with earth, and of sustaining long drought without inconvenience, for which reason, and because of their beautiful and fragrant flowers, some of them are very frequently suspended from the balconies in South America as air-plants. But the plants of this order are more generally valuable for their fibres than upon any other account. *Tillandsia usneoides*, the New Orleans Moss already mentioned, yields a fibre, easily obtained, and in great abundance, which is used instead of hair for stuffing mattresses. The fibres of the leaves of the pine-apple, and of some other species of this order, have been made into fabrics resembling the finest white muslin, whilst they are found also to possess sufficient strength for cordage. It is supposed that the produce of different species of *Bromelia* is often included along with that of the American Aloe or *Agave* (q. v.), under the name of *Pita* fibre or Pita flax, the appearance and properties of the fibres being very similar, as well as those also of the fibres of the species of *Yucca*.

The fibre of the pine-apple is, in some countries, very frequently twisted into fishing-lines, and made into nets and into ropes intended for immersion in water, being very little liable to injury from this cause. Abundant as the plant is in its native regions, and now so perfectly naturalized as to form thickets in many parts of the old world, there seems no limit to the quantity of this fibre which might be procured.—The Pine-apple cloth of the Philippines is called *Pina muslin* and *Batiste d'ananas*. It is also sometimes erroneously called *Grass*-cloth. 'With a magnifier, the fibres may be seen to be very numerous and fine, but not twisted at all, as in grass-cloth or the finest muslins and cambrics.' The Philippine pine-apple fibre is obtained from a species called by the Spaniards *pigna* or *pina* (a cone), and which has by botanists been named *Bromelia Pigna*, although some regard it as a mere variety of the pine-apple, with small and rather dry fruit. It grows in great abundance in the Philippine Islands, and is cultivated by the Chinese near Singapore, and the fibre exported to China. This firbre is prepared also in Malacca, Java, Celebes, &c. When bleached, the pine-apple fibre can be spun like flax. A patent for this has been taken out in Britain by Mr. Zincke.

The WILD ANANAS (*Bromelia Penguin*) of the West Indies, the *Bromelia Karatas*, common in South America, the *B. Sagenaria*, common in some parts of Brazil, and the *Billbergia variegata*, which grows in wild luxuriance in Mexico, where it is called *Caroa*, often covering miles of country—all yield fibres which are used for cloth, cordage, nets, &c. The fibre of *Bromelia Sagenaria* is known as *Curratow* fibre. Very strong ropes are made of it.

The genus *Bromelia* has a 3-parted calyx shorter than the corolla, and the fruit is succulent. The species are pretty numerous, the leaves of all of them are more or less characterized by spiny serratures. The fruit of *B. Pinguin*, already mentioned, affords a cooling juice, which is used in the West Indies mixed with water, to make a drink for patients in fever and dysentery. It is said to be diuretic. A vinous liquor is sometimes made from it.

BROMIC ACID is the only known compound of bromine and oxygen. It is prepared by acting upon bromine (Br) by caustic potash (KO), when much bromide of potassium (KBr) is formed, accompanied by bromate of potash ($KOBrO_5$), a compound of potash and B. acid. It likewise combines with silver, lead, and mercury, yielding salts, all of which are styled Bromates.

BRO'MINE (Greek, *bromos*, disagreeable smell: symb. Br.; equiv. 80; spec. grav. 2·96), one of the chemical elements, occurs in combination in sea-water to the extent of about 1 grain to the gallon. It is found more abundantly in certain saline springs, especially those at Kreuznach and Kissengen in Germany. It is also present in water and land-plants and animals. In the extraction of B. from concentrated sea-water, from which common salt has been separated in quantity, and which is then called *bittern*, or from salt springs, the liquor—which contains the B., as bromide of magnesium (MgBr)—has a stream of chlorine gas (Cl) passed through it, which forms chloride of magnesium (MgCl), and liberates the bromine. The liquid thus becomes of a more or less yellow tint, and if it be then agitated with ether, and allowed to settle, the latter floats up the bromine. The ethereal solution is then treated with potash, which principally forms bromide of potassium (KBr), and fixes the B., so that the ether may be distilled off. The residue is then treated with oxide of manganese and sulphuric acid in a retort with heat, which results in the liberation and distillation of pure bromine. It exists as a deep red liquid of density 2·966 (nearly 3), which readily evolves red fumes of a very irritating and suffocating nature. It is very poisonous, actually destroying the animal tissues. It is sparingly soluble in water, more so in alcohol and ether, and its water solution possesses great bleaching properties. When raised to the temperature of 145°·4 F., it boils, and reduced to 9°·5 F., it becomes a red crystalline solid. B. combines with great rapidity with metals, occasionally with ignition, as with antimony, and forms a class of salts. Treated with hydrosulphuric acid, B. yields hydrobromic acid (HBr), which is the analogue of hydrochloric acid, as B. is of chlorine.

BRO'MSEBRO, a village of Sweden, in the län, and 27 m. S. of the town, of Calmar. It is celebrated as the place where treaties were entered into between Sweden and Denmark in 1541, 1641, and 1645.

BRO'MSGROVE, a market-town of Worcestershire, England, near the small river Salwarp, 12 miles south-south-west from Birmingham. It is 1¼ mile east from a station on the Birmingham and Bristol Railway. The Birmingham and Worcester Canal also passes near it. It is situated in a highly cultivated and richly wooded valley. The principal street is about a mile in length. There is a very flourishing grammar-school, founded by Edward VI. in 1553. The linen manufacture was formerly carried on at B.; button-making and nail-making are at present the principal branches of industry. B. returned two members to the House of Commons in the reign of Edward I., but was afterwards disfranchised on petition of the inhabitants themselves, because the trade of the town had declined. Pop. (1871) 6966; (1881) 7959.

BRO'NCHI are the subdivisions of the trachea or windpipe. Opposite the third dorsal vertebra, the latter divides into two branches or B., of similar structure to itself—namely, round and

cartilaginous in front; and flat, with muscular and fibrous tissue behind, lined with mucuos membrane. Of these B., one goes to each lung, the right being little more than an inch; the left about two inches in length. On entering the substance of a lung, the B. divide into smaller branches, which again subdivide, until they are no larger in diameter than one-fiftieth to one-thirtieth of an inch, which give origin to, or terminate in, small polyhedral cells, which seem to cluster round their extremities, and open into them. These are the air-cells; they consist of elastic tissue, with a lining of mucous membrane, and beneath the latter, a layer of minute blood-vessels of the lung. See RESPIRATION, ORGANS AND PROCESS OF.

BRONCHI'TIS, or inflammation of the lining membrane of the bronchial tubes, is a disease of very common occurrence in Great Britain, and one of the greatest importance, for, if neglected, it not only destroys life, but if carelessly treated, may lead to premature and miserable old age. The first symptoms are generally those which distinguish a common cold—viz., shivering, headache, and sense of weariness, with occasional cough; but the cough continues, and recurs in paroxysms; there is a feeling of oppression on the chest, and the person *wheezes* when he breathes. He also breathes more rapidly, six or ten respirations in the minute more than he did when in health, and his pulse is quicker; and the ear applied to his chest, after these symptoms have continued for two or three days, will hear a rattling, as if air was bubbling through thickish fluid, which is the case; he is breathing through an extraordinary amount of mucus secreted by the inflamed lining membrane of the tube. During his paroxysms of cough. This mucus is spit up. If the inflammation extend no further, it is termed *tubular* B., and is seldom a fatal disease in the first attack; but, as may be expected, it will often extend, or, in some cases, begin in the small tubes—*vesicular* B.—when the symptoms just described will be present, but in a greater degree, the breathing being so embarrassed that the patient can no longer lie down, but requires to sit or stand up, and use all his muscles of respiration. Though he coughs, he spits very little, till about the third day, when he expectorates large quantities of yellow fluid. At last, prostration becomes so complete that he ceases to spit, and dies suffocated by the accumulated mucus, from the fifth to the seventh day.

In less severe cases, or those which yield to treatment, the delicate tubes may be permanently injured by the inflammation. They may be thickened, which narrows their calibre; this will prevent the proper passage of the air, and gives rise to wheezing on any exertion, and cough, especially in winter. Moreover, after repeated attacks, one of the tubes may be blocked up entirely, so that the portion of lung to which it ought to conduct air, is no longer filled, and consequently collapses and wastes. This compels the adjacent tubes and air-cells to dilate to receive more air at the expense of their elasticity (emphysema (q. v.); the air-cells may even burst, and so by degrees the apparatus for aërating the blood becomes less and less perfect. The treatment of B. must vary with the patient's constitution; but in most cases, counter-irritation, applied through the medium of mustard or hot turpentine fomentations, will be found very useful. These remedies act more rapidly than a blister, and may be frequently repeated. It should be remembered that patients suffering from B. are very easily depressed. Such medicines as ammonia should be given, to promote expectoration, combined with the liquor ammoniæ acetatis, to produce perspiration. In very acute cases, after a brisk purge, salines, with ipecacuanha or squills, may be given, and an emetic will remove accumulations of mucus.

In the B. of old persons, chloric ether will be found very useful, and may be combined with sedatives, as henbane; but opium must be given with great caution, or not at all, as it tends to increase the congestion of the inflamed tubes. The paregoric elixir (compound tincture of camphor) is an old and popular remedy in B., but enough has been said to impress on the reader the danger of tampering with bronchitis. In every case where it is possible, a skilled medical man should be employed, to determine, by the stethoscope, not only the disease but its exact situation; and as it is but too likely to recur at some future period, or symptoms caused by it to appear, a skilled opinion has a permanent value to the patient. See CATARRH.

BRONDSTED, PETER OLUF, a learned antiquary, born near Horsens in Jütland, November 17, 1780. On completing his course of studies at the University of Copenhagen, he, in 1806, went to Paris, where he remained two years. He afterwards visited Italy and Greece, where he made excavations which furnished valuable materials for the study of classical antiquity. He died rector of the Copenhagen University in 1842. B.'s principal work is *Travels and Researches in Greece* (2 vols., Paris, 1826.) In addition to several smaller archæological papers, amongst which was one in English, entitled *An Account of some Greek Vases found near Vulci* (Lond. 1832), and another on the bronzes of Siris, which appeared at Copenhagen, 1837, B. also wrote some valuable contributions to Danish history from Mediæval Norman Manuscripts (2 vols., Copenh. 1817—1818) and *Memoirs of Greece during the Years* 1827 *and* 1828 (Paris, 1835).

BRONGNIART, ALEXANDRE, an eminent French chemist and naturalist, born at Paris in 1770, is said to have delivered a lecture on chemistry before he was 15. In 1790, he visited England for a scientific examination of the Derbyshire mines and pottery works, and on his return to France, published a *Mémoire sur l'Art de l'Emailleur*. Appointed in 1800 director of the porcelain manufactory at Sèvres, he held that office for the remainder of his life, and revived an almost lost art of painting on glass. In his *Essai d'une Classification des Reptiles*, 1805, he established the four divisions of reptiles, and first gave them the names of *Saurians, Batrachians, Chelonians*, and *Ophidians*. His *Traité Elémentaire de Minéralogie*, published in 1807, at the instance of the Imperial University, became a text-book for lecturers. In 1814 appeared his *Mémoire sur les Corps Organisés Fossiles nommés Trilobites*, a name which, as well as a basis of classification for those singular *crustacea*, naturalists owe to Brongniart. In 1815 he was elected a member of the Academy of Sciences of the French Institute; he was also a member of the Royal and Geological Societies of London, and of other learned bodies. In 1845, appeared his *Traité des Arts Ceramiques*. He died 14th October 1847.

BRONGNIART, ADOLPHE THEODORE, son of the preceding, author of several botanical works held in high esteem, was born in 1801, in 1833 became professor of botany at the Jardin des Plantes, Paris, and in 1834 member of the Academy of Sciences. In 1852 he was elected a foreign member of the Royal Society of London. He died in 1876.

BRO'NI, a town of Northern Italy, in the province of Pavia, about 11 miles S.E. of the town of Pavia, in a beautiful situation at the foot of the Appennines. It has a singular old church, some portions of which date from the 10th century. In its vicinity is the castle of Broni, celebrated in history as the place where Prince Eugene obtained a victory over the French in 1703. Pop. about 7000.

BRONN, HEINRICH GEORG, a German naturalist, was born at Ziegelhausen, March 3, 1800, and educated at Heidelberg University, where he devoted himself to the science of forests and natural history. In 1828, he commenced at Heidelberg a course of lectures on the physical and industrial sciences, and in 1833 was nominated ordinary professor of the same. After Leuckhardt's departure from Freiberg, B. was appointed to the zoological lectureship. B. wrote several important scientific treatises. His first was *A System of Antediluvian Conchylia* (Heidelberg, 1824), which was followed by *A System of Antediluvian Zoophytes*. In 1824, he visited the southern countries of Europe; and in 1827, made a second journey to Italy. On his return, he published the Results of his Journey (2 vols., Heidelberg, 1825—1830). In 1834 appeared his most important geological work—*Lethæa Geognostica;* in 1841—1849, his *History of Nature;* and in 1850, his *Universal Zoology*, which was the first attempt to develop zoology in its entirety with reference to extinct organisms. B. died in 1862.

BRO'NTÉ, a town in the province of Catania, Italy, situated at the western base of Mount Etna, about 22 miles north-north-west of the city of Catania. B. has manufactures of woollen and paper, and the district produces oil, almonds, wine, &c. But the town is celebrated chiefly for its connection with Admiral Lord Nelson, who was created Duke of B. by the Neapolitan government in 1779, with an annual income of 6000 *oncie* (about £3750). Pop. (1872) 14,589.

BBONTÉ, CHARLOTTE, one of the most distinguished of modern novelists, was born at Thornton, in the West Riding of Yorkshire, on the 21st of April, 1816. Her father, a clergyman of Irish descent, removed, with six young children and an invalid wife, from Thornton to Haworth, in the same county, in 1821. Soon after their arrival, Mrs. Bronte died, so that Charlotte, trying hard in after-life, could but dimly recall the remembrance of her mother. Her father, eccentric and solitary in his habits, and full of extravagant theories for making his children hardy and stoical, was illfitted to replace a mother's love.

When Charlotte was eight years old, she was sent with three of her sisters to Cowan's Bridge School, which, whether deservedly or not, had an unfortunate notoriety conferred upon it twenty-five years later in the pages of *Jane Eyre*. Her two eldest sisters falling dangerously ill, and dying a few days after their removal thence, and the low situation evidently disagreeing with Charlotte's health, she was sent home when little more than nine, and remained there, 'the motherly friend and guardian of her younger sisters,' till, in 1831, she was sent to Miss Wooler's school at Roe Head, where her remarkable talents were duly appreciated by her kind instructress, and friendships formed with some of her fellow-pupils that lasted throughout life. A few years later, she returned to Miss Wooler's school as teacher there, and also had some sor-

rowful experiences as governess in one or two families. It was with a view of better qualifying themselves for the task of teaching that Charlotte and her sister Emily went to Brussels in 1842, and took up their abode in a *pensionnat*. When Charlotte returned home in 1844, a new shadow darkened the gloomy Yorkshire parsonage. Her father's sight was declining fast, and her only brother was a source of continual anxiety. It now seemed plain that school-keeping could never be a resource, and the sisters turned their thoughts to literature. Their volume of poems was published in 1846; their names being veiled under those of Currer, Ellis, and Acton Bell, but it met with little or no attention. Charlotte's next venture was a prose tale, *The Professor*, and while it was passing slowly and heavily from publisher to publisher, *Jane Eyre* was making progress. In the August of 1847, it was submitted to Messrs. Smith and Elder, and published by them two months later. It took the public by storm. It was felt that a fresh hand, making new harmonies, was thrown over the old instrument. Henceforward, Charlotte B. had a 'twofold life, as author and woman.' Over the latter, the clouds closed thicker and thicker. Mr. Bronte had indeed recovered his sight; but the sister Charlotte so intensely loved, and whose genius she ever delighted to exhalt above her own, Emily—the Ellis Bell of *Wuthering Heights*—died in 1848. Her only brother also died in the same year; and Anne, the youngest of the family, following in 1849, Charlotte was left alone with her aged father in that dreary deserted home among the graves. Nevertheless, her energy never flagged. *Shirley*, begun soon after the appearance of *Jane Eyre*, was published in the autumn of 1849; and *Villette*, written under the frequent pressure of bad health and low spirits, came out in 1852.

In the spring of 1854, Charlotte B. was married to her father's curate, the Rev. A. Nicholls, who had long known and loved her. It is a relief to find that a little bright sunshine was permitted to the close of a hitherto clouded life. It was, however, but brief; for serious illness set in, and on the 31st of March 1855 she died. A fragment of an unfinished novel appeared in the *Cornhill Magazine* for April 1860. See Mrs. Gaskell's *Life of C. B.* (1857).

BRONZE is a reddish-yellow, fine-grained alloy of copper and tin, in variable proportions. It was early known, and what is usually spoken of as *brass* in regard to the ancient nations, was in reality bronze. The brass or B. referred to in the Bible was probably composed of copper and tin, though some translators consider it likely to have been copper alone. The examination of the most ancient coins and metallic ornaments and implements leaves no doubt as to the acquaintance of the ancients with B.; so much so, that in the antiquarian history of European nations, there is a distinct period styled the *Bronze Period* (see next art.). At the present time, B. is largely used for house and church bells, Chinese gongs, ordnance or cannon metal, and speculum or telescope metal. In the preparation of the various kinds of B., great care must be taken to keep the tin from being burned away or wasted. To obviate this, it is customary to use much old B., as worn-out cannon, &c., and when that is fused in the furnace, to add the new copper and tin. The best Cornish and Banca tin are employed for the better kinds of castings, especially where strength of alloy is required. For inferior work, old scrap tin, which often contains lead, is used; and where strength of material is not an object, a little zinc and lead are added. In either case, during the fusion of the mixed metals in the furnace, at a high temperature, as little air as possible must be admitted to the furnace, otherwise the metals are oxidized, and the alloy is deteriorated. B., when well made, is, excepting gold, platinum, and some of the rare metals, the most durable metallic material with which we are acquainted; and this, coupled with its extreme hardness, rendering it difficult for time and ordinary wear and tear to efface inscriptions or medallions stamped on it, has led the mint in France, some years ago, to issue a bronze coinage in place of copper; and for the last twelve or fifteen years bronze coinage has taken the place of a copper coinage in Great Britain.

The principal varieties of B. have the following average composition:

		Copper.	Tin.
	Brass ordnance or bronze cannon	9	1
	Bronze for toothed wheels	10	1
	" for mathematical instruments	12	1
	" for bearings of machinery	8	1
	Chinese gongs and cymbals	5	1
	Musical bells	6	1
	House bells	4	1
	Large bells	3	1
	Telescope or speculum metal	2	1
Ancient.	Mirrors	2	1
Ancient.	Hard bronze	7	1
Ancient.	Medium bronze	8	1
Ancient.	Soft bronze	9	1
Ancient.	Flexible bronze nails	20	1

Recently, B. has been deposited on small statues and other articles, in greater or less thickness, by the electrotype process (see GALVANISM), forming very pleasing ornaments at a cheaper rate than ordinary B. ornaments can be purchased for. The same process has been suggested for coating those parts of machinery which are liable to rust.

The novel word *steel-bronze* first began to be common about 1875, when Uchatius devised a new method of hardening the old bronze or the Austrian guns. This steel-bronze, with which Austria is mainly armed, has accordingly no steel in it; but is almost as hard as cast-steel, and was for Austria about 75 per cent. cheaper than steel. *Silico-bronze* and *phosphorus-bronze* are copper alloyed with silicon and phosphorus respectively, and are used for conducting electricity. *Manganese-bronze* is a valuable material for making screw-propellers.

BRONZE, AGE OF. Aluminium also (q. v.) forms several valuable alloys with copper, a term used by many modern archæologists to distinguish the second of the three successive periods into which, as they hold, the primitive or prehistoric antiquities of a country may be divided. They take for granted that among a rude or savage people, stone would come into use before any kind of metal; and that of metals, copper being oftener found ready for the hammer, would come into use before iron. These assumptions—which, in so far, are only in accordance with what has actually been observed among uncivilized races—have obtained from a very early date. Lucretius, writing in the century before the Christian era, has recorded them with his usual vigorous precision (*De Rer. Nat.*, v. 1282).

More than one antiquary of the last century appears to have suggested the distribution of archæological objects into eras of stone, of copper or bronze, and of iron. But the proposed classification received scarcely attention until about forty years ago, when it was adopted and developed by Mr. C. J. Thomsen, superintendent of the Ethnographical and Archæological Museum of Copenhagen, in his *Ledetraad tit Nordisk Oldkyndighed* (Kjöbenhavn, 1836), and by Mr. Nilsson, professor of zoology in the university of Lund, in Sweden, in his *Skandinaviska Nordens Urinvonare* (Lund, 1838—1843). According to the theory of these writers—which is held by almost all archæologists in Denmark, Sweden, and Norway, by many in Northern Germany and in Switzerland, and by a few in other parts of Europe—the first three stages in the progress of a nation from barbarism to civilization are as clearly identified and defined by their relics of stone, of bronze, and of iron, as the comparative antiquity of geological strata, or periods of the world's creation, is determined by the fossils which they are found to contain.

The name of the 'age of stone' is given to the period when weapons and implements were made of stone, amber, wood, bone, horn, or some such easily wrought material, and during which very little or nothing was known of metals. During this era, the people, few in number, and savage in their habits, clothed themselves chiefly with skins of animals. They buried their dead in large sepulchral chambers, covered by what have been called *cromlechs*, or girdled round by the unhewn stone pillars called 'Druidical circles.' The bodies have most frequently been found unburned, and often with rude urns beside them.

During the 'age of bronze,' weapons and implements were made of copper or of bronze, and iron and silver were little or not at all known. The dead were burned, and their ashes kept in urns, or deposited in stone-chests, which were covered by conical mounds of earth or heaps of loose stones. In the urns, articles of gold and amber are found, but never of silver. Most articles of metal appear to have been cast; where marks of the hammer appear, it is contended that the forging or beating must have been by a stone hammer upon a stone anvil.

The 'age of iron' is the name applied to the third and last of the three supposed periods. During this era, it is conceived that iron displaced bronze in the manufacture of weapons and implements, and that silver and glass came into use. The dead were still occasionally burned; but they were frequently buried without burning, often seated on chairs, and, at times, with a horse in full war-harness laid beside the body of his master.

The Scandinavian and German antiquaries admit that their three periods run, more or less, one into another; that stone weapons continued to be used throughout the age of B.; that B. and gold were not unknown in the age of stone; and that weapons of stone and B. continued to be used in the age of iron. This admission obviously detracts very much from the practical value of the classification for chronological or other scientific purposes. But the late Mr. J. M. Kemble, and other British antiquaries, have taken objection to the classification altogether, as irreconcilable with generally admitted facts, when carried out to its strict and necessary consequences. They point to the everyday discovery of objects of stone, B., and iron, in the same ancient urns, graves, and dwellings. They instance the case of the Huns, who had swords of iron, while they pointed their arrows with bones; the case of

the Anglo-Saxons, who fought with stone mauls at Hastings; and the case of the Germans, who used stone-hammers in the Thirty Years' War. They show stone weapons, in some of which the traces of metal are still fresh, while others attest for themselves that they could not have been cut but by a thin sharp metal point.* They prove from Greek and Roman writers that the nations of the north and west of Europe used iron weapons during what must have been their B. age. And they repudiate the proposed appropriation of different modes of burial to the different ages—a point on which the supporters of the theory appear to be hopelessly divided among themselves—on the ground, that graves assigned to the B. period have been found to contain more iron than B., and that other supposed characteristics of sepulchres of the B. age are quite as common in sepulchres of the iron age. But although the threefold classification of the Scandinavian and German archæologists cannot be relied upon for historical uses, it may be accepted as a very convenient mode of arranging archæological objects. It has been adopted, with some modifications, in the Gallery of British Antiquities in the British Museum at London, in the National Museum of the Antiquaries of Scotland at Edinburgh, in the Museum of the Royal Irish Academy at Dublin, and in other collections, where the articles are classed, for the most part, according to the materials of which they are made.

BRONZE-WING, BRONZE-WINGED PIGEON, and BRONZE PIGEON, names given in the Australian colonies to certain species of pigeon (see PIGEON and COLUMBIDÆ), chiefly of the genus *Peristera* of Swainson, on acconnt of the lustrous bronze color with which their wings are variously marked. They are otherwise also birds of beautiful plumage.—The COMMON B. or Bronze-winged Ground Dove (*Columba* or *Peristera chalcoptera*) is distributed over all the Australian colonies. It is often seen in flocks, feeds on the ground, and builds its nest chiefly on low branches of trees growing on meadow-lands or near water. It is a plump bird, often weighing fully a pound, and is acceptable at every table,—The BRUSH B. or Little Bronze Pigeon (*C.* or *P. elegans*) is not so plentiful nor so widely distributed, chiefly inhabiting Tasmania and the southern parts of Australiar It inhabits low swampy ground, never perches on trees, resembles a partridge in its habits, and makes a loud burring noise like a partridge when it takes wing on being alarmed.—The HARLEQUIN B. (*C.* or *P. histrionica*) is found in the north-western parts of New South Wales in great flocks, feeding on seeds.—Some of the species of *Geophaps*, another of the genera or sub-genera of the *Columbidæ*, are also sometimes called Bronze-wing. Their partridge-like appearance and habits have gained for them the name of Partridge Pigeon (q. v.).

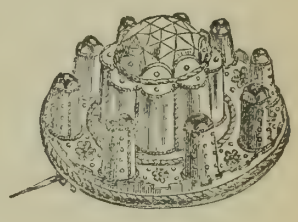
BRONZING is the process of covering plaster or clay figures, and articles in ivory, metal, and wood, so as to communicate to them the appearance of the ordinary bronze. Several of the materials employed are of little value, whilst others are expensive. Thus, *gold powder* is used for the finer work, and is prepared by grinding gold-leaf with honey on a stone slab till a very fine state of division is attained, then washing out the honey, and drying the gold powder. Inferior gold-leaf, or that which contains much silver and copper, yields the *German gold powder* employed in bronzing. *Copper powder* is prepared by introducing an iron bar or plate into a solution of copper, when the latter metal is precipitated as a finely divided red powder. *Mosaic gold*, or *musivum*, is made by fusing 1 lb. of tin, introducing ½ lb. mercury, allowing the alloy or amalgam to cool, then pulverizing and grinding up with ½ lb. sal-ammoniac, and 7 oz. sublimed sulphur. Ultimately, the whole is subjected to the process of sublimation, when the tin, as a brilliant yellow powder, resembling gold, is left in the subliming vessel. The color of mosaic gold may be deepened by the addition of red oxide of lead, and it then assumes a copper tint. *Gold size* is prepared by heating 1 lb. of linseed oil, and gradually adding 4 oz. of gum animi in very fine powder. When boiled sufficiently it assumes the consistence of tar, and may then be strained through cloth. When employed in bronzing, some vermilion is added to make it opaque, and turpentine, to make it thin and limpid enough to be easily laid on the plaster cast or other article with a brush, and the object may ultimately be rubbed over with soft chamois leather, which is occasionally dipped into the gold size. The other B. powers are best laid on with a solution of gum-arabic or isinglass, either of which acts as a cement.

Gun-barrels are bronzed by acting upon them with the chloride or butter of antimony (*bronzing* salt), or with hydrochloric or nitric acids, when the surface of the iron gets partially eaten into, and covered with a thin film of oxide; after which the gun-barrel is thoroughly cleaned, oiled, and burnished. A brownish shade is thus communicated to the barrel, which protects it from rust, and at the same time renders it less conspicuous to an enemy or to game. In the bronzing operation known as the Damascus, the barrel is treated with dilute nitric acid and vinegar, to which sulphate of copper has been added. The result is, that metallic copper is deposited irregularly over the iron surface; and when the latter is washed, oiled, and well rubbed with a hard brush, a very pretty appearance is communicated to the barrel. Articles in wood that require to be bronzed, are first coated with a mixture of size and lampblack, and dried, and then a bronze-powder, consisting of very finely divided patent yellow, raw umber, pipe-clay, lampblack, and Prussian blue, is put on with a brush. After being dried again, the article is burnished with cloth or leather, covered with a layer of Castile soap, and, lastly, cleaned up with a woollen cloth. Copper vessels, coins, &c., are bronzed by heating them in a copper boiler containing vinegar, with 2 parts of verdigris, 1 of sal-ammoniac dissolved in it, when, after sufficient boiling, a pleasant reddish-brown hue is imparted. Bronze and copper articles may have an antique appearance communicated by applying a solution of sal-ammoniac 1 part, cream of tartar 3, common salt 6, hot water 12, and more or less nitrate of copper, when an ancient greenish hue is obtained.

BROOCH (from a root signifying to pierce; comp. Eng. *to broach*; Fr. *brocher*, to spit, or to stitch; Wel. *proc*, to stab), an ornamental pin or instrument for fastening the dress, consisting for the most part either of a ring or disc, or of a semicircle, there being a pin in either case passing across it, fastened at one end with a joint, and at the other with a hook. Brooches were much used in antiquity, and varied in form as much as in modern times.

They were worn both by men and women, and with a view both to ornament and use, from the time of Homer to the fall of the Western Empire. Nay, in the early portion of the middle ages, and even amongst semi-barbarous tribes, the art of making *fibulæ*

Hunterston Runic Brooch,



Brooch of Lorn.

seems not only to have flourished, but to have attained marvelous perfection. Many of those found, both in Ireland and in Scotland, are wonderfully beautiful in workmanship, and still more so in design; and it is doubtful whether antiquity has left us anything in the way of personal ornament more perfect than the so-called Hunterston B., of which a wood-cut is subjoined. It was found in 1830, on the estate of Hunterston, in the parish of West Kilbride, Ayrshire, near to the scene of a conflict which preceded the battle of Largs in 1262. It is of silver, richly wrought with gold filigree, and elaborately chased with lacertine and ribbon patterns. It is set with ornaments of amber; diameter, $4\frac{3}{10}$ inches. On the reverse are runes, which have been variously read. Dr. Wilson says, 'what is decipherable reads in good Scottish Celtic into what he explains to mean—Malbritha, his friend, in recompense to Maolfridi.'—*Prehistoric Annals*. One of the most famous articles of the kind existing in Scotland is the *Brooch of Lorn*, in the possession of Macdougal of Dunolly, near Oban. It is believed to be identical with one torn from the breast of Robert Bruce by Alexander of Lorn, the ancestor of Macdougal, in a personal contest with the king. This interesting article is of silver, about 4 inches in diameter, with a circle of jeweled obelisks.

BROOKE, HENRY, dramatist and novelist, was born in 1708, in the house of Rantavan, county Caven, Ireland. His father was a wealthy clergyman. Young B. was first sent to school to one Felix Somerford, where he so distinguished himself that his tutor, in the fullness of his heart, prophesied that he would play a great part in life. His talent for rhyming first made itself evident here, and it received further development while he resided at Dr. Sheridan's school in Dublin. In 1724, he went to study law in London, and became the chosen friend of Pope and Lyttleton. From the heart of this brilliant literary society he was recalled to Ireland by a dying aunt, who left him guardian of her child, a girl of twelve. B. put the child to a Dublin boarding-school, and married her secretly two years thereafter. Four or five years subsequently, when his wife had borne him three children, he removed to London, and once more became a bright particular star in the galaxy

* M. Frederic Troyon of Lausanne, one of the Swiss antiquaries who accept the three periods of their Scandinavian brethren, instances certain stone axes (now in the collection of Baron Renberg, at Prague), which were found, along with their cores, at the site of a primitive manufactory of these weapons in Bohemia. 'These cores,' he says, 'when replaced in the holes from which they had been taken (easily verified by the corresponding veins of the stone), left so little play-room, that it was evident they could only have been detached by a metal point, and not by a hollow cylinder, which could not have given to the hole its conical form, now quite apparent. Instead of the soft iron which is employed nowadays in such operations, the ancients used copper or bronze; and, of course, water and silicious sand were likewise employed in the process.'

of metrepolitan genius. In London, he published a poem, entitled *Universal Beauty*, which Pope admired, and of which he perhaps turned a couplet here and there. Shortly after, B. returned to Ireland; but in 1736 he was again in London, and was introduced to the Prince of Wales, who cultivated his friendship, and made him presents of books and china. About this time, he published his play, entitled *Gustavus Vasa*, full of the noblest sentiments, and the most inconceivable characters. In 1740, B. was taken ill, and returned to his native country, where he published several books, and a tragedy, *The Earl of Westmoreland*, which was performed in Dublin. In his later years he removed to Dublin, and died there in 1783. The sonorous eloquence of his plays has not saved them from oblivion; and his novel, entitled *The Fool of Quality*, is the only work of his which is likely to meet the eyes of modern readers. It was originally published in five volumes, and was greatly admired by John Wesley. A new edition was published in 1859, with a preface by the Rev. C. Kingsley.

BROOKE, Sir James, Rajah of Sarawak, and Governor of Labuan—a man strongly imbued with the spirit of the old adventurers of the Elizabethan time—was born at Coombe Grove, near Bath, 29th April 1803. He early entered the East India army, was seriously wounded in the Burmese war, and returning home on furlough, spent some time in travel on the continent. Shipwrecked on the voyage out to join his regiment, he was unable to reach India before his furlough had expired; his appointments consequently lapsed, and he quitted the service. He now conceived the idea of putting down piracy in the Eastern Archipelago, and of carrying civilization to the savages inhabiting these islands. He purchased a yacht, which he manned with about twenty sailors, and after a three years' cruise in the Mediterranean, to test the sea-worthiness of his vessel and the seamanship of his crew, sailed from London for Sarawak, a province on the north-west coast of Borneo, October 1838.

When he arrived there, Muda Hassim, the uncle of the sultan of Borneo, was engaged in a war with some rebel tribes. B. lent his assistance, and in return had the title of Rajah and Governor of Sarawak conferred upon him, the native governor being forced to resign. B. immediately set about reforming the government, instituted free trade, and framed a new code of laws. The murderous custom of head-hunting, prevalent among the Dyaks, he declared to be a crime punishable with death, and vigorously set about the extirpation of piracy. This was done so draconically as to occasion great dissatisfaction in this country; and the result was, that parliament abolished the 'head-money' that had been previously paid for the slaughter of pirates. Certain charges, however, brought against B. in the House of Commons, in connection with this matter, were declared by a Royal Commission to be unsubstantiated. The head-money was received, not by B. and his associates, but by the British ships-of-war that had co operated with him. On his return to England, B. received a warm welcome, was created a Knight Commander of the Bath in the year following; and the island of Labuan, near Sarawak, having been purchased by the British government, he was appointed governor and commander-in-chief, with a salary of £2000 a year. In 1857, B., who had been superseded in the governorship of Labuan, but who still acted as Rajah of Sarawak for the sultan of Borneo, was attacked at night in his house by a large body of Chinese, who were irritated at his efforts to prevent opium-smuggling, and only escaped with his life by swimming across a creek. The Chinese committed great havoc on his property, but their triumph was short-lived. B. collected some natives, attacked the Chinese, defeated them in several successive fights, and ultimately forced them into the jungle, where they must have perished of starvation. Upwards of 2000 Chinese were killed, and all their flourishing settlements destroyed. Returning to England soon after this, B. lectured in several of the chief towns on the advantages likely to result to this country from a possession of Sarawak, and urged the desirableness of the British government taking it under its protection, as otherwise it was likely to fall into the hands of the Dutch. To enforce this view, an influential deputation waited upon the Earl of Derby (then head of the government) in November 1858, but he declined to entertain it. He returned to Borneo in 1861, but visited England again twice before his death, on the second occasion having the satisfaction of seeing the independence of Sarawak recognized by the English government. The town prospered greatly under his régime; he found it a place of some 1000 inhabitants, he left it a town of 25,000; and the exports to Singapore, which, in 1840, amounted to £25,000, were in 1858, £300,000. B. died in 1868: a biography appeared in 1877.

BROO'KLIME (*Veronica Beccabunga*), a species of Speedwell (q. v.) abundant in ditches, water-courses, and wet places near springs in Britain, common also in most parts of the continent of Europe. It is a perennial plant, with procumbent stems, rooting at the base; the leaves on short stalks, elliptical, obtuse, and slightly serrate, both stems and leaves smooth and very succulent; the small blue flowers, in form resembling those of the other Speedwells, in racemes, the stalks of which arise from the axils of the opposite leaves. The leaves and young shoots have a bland or slightly bitter taste, and are a tolerable ingredient in spring salads. They are sometimes sold along with water-cresses. —See Cress, Water.—In Scotland, the plant is called *Water Purpie*.

BROO'KLYN, a city on the west end of Long Island, in the United States, belonging to New York state, in lat. 40° 42′ N., 73° 59′ W. It stands at the south-west extremity of Long Island Sound, which is here appropriately known as East River, partly in allusion to the narrowness of its channel and the rapidity of its tide, and partly in contradistinction to North River as a second name of the Hudson. Between B. and New York there are numerous ferries of about three-quarters of a mile in width, on which ply ferryboats every few minutes by day, and every half-hour by night. B. is connected with New York by a suspension bridge nearly half a mile long and 125 feet above the water. In 1850, the population was 96,838; in 1870, 396,099; and in 1880, 566,689. B. was founded by the Dutch in 1625, and in 1776 its neighborhood was one of the principal seats of the revolutionary war. Occupying comparatively elevated ground, B. commands a complete view of the adjacent waters and their shores, while, notwithstanding its inequalities of surface, it consists chiefly of straight streets, crossing each other at right angles. It is divided into wards, and governed by a mayor and a board of aldermen. B. has a very large number of churches (whence it is often called the 'city of churches'), several flourishing banks, various literary institutions, and numerous seminaries of education—and ample share, in short, of all that characterizes a wealthy, populous, and intelligent community. It has an immense trade in grain, the warehouses being capable of holding about 12,000,000 bushels. It possesses also a national navy-yard, which embraces 45 acres of land, and magnificent docks, including a wet-dock for the largest vessels, the most extensive in the Union. See Brookln in Am. Supp.

BROOKS, Charles Shirley, novelist and journalist, was the son of Mr. William Brooks, an architect, and was born at Brill, in Oxfordshire, about the year 1820. B. was educated chiefly by the late Rev. T. J. Bennett, canon of St. Paul's; and upon leaving school, was articled to an attorney. Upon serving out his time, he passed with distinction the examination in the Law Society's Hall. Literature, however, had more charms for him than the law, and he had not long been settled in London, before he tried the experiment of living by it as a profession. He wrote dramas—*Our New Governess, Honors and Tricks, The Creole, The Daughter of the Stars;* and he contributed at the same time to some of the leading periodicals and journals. An introduction to the editor of the *Morning Chronicle* procured him a steady engagement as writer of the Parlimentary Summary for that journal. He was also sent by the proprietors of the *Chronicle* on a mission into Russia, Syria, and Egypt, to report on the condition of labor and the poor in those countries; and the results of his observations appeared in a series of letters in that journal. B. was also a contributor to *Punch* from the commencement of that periodical. The 'Essence of Parliament' in *Punch* is said to have been regularly contributed by him. He also wrote for it 'Miss Violet and her Offers,' 'The Naggletons,' &c. B. also contributed political and other articles to the columns of the *Illustrated London News*. As a novelist, B. is a graceful and pleasing writer, and therefore deservedly popular. He is author of *Aspen Court, The Gordian Knot, The Silver Cord* (originally published in *Once a Week*), and *Sooner or Later*. B. is likewise the author of *The Russians of the South*. He acquired a reputation as a lecturer. On the death of Mr. Mark Lemon, in 1870, B. became the editor of *Punch*. He died in 1874. A volume of his *Wit and Humor* appeared in 1875.

BROOM-CORN, a grass cultivated in North America for the manufacture of brooms and whisks, which are made of the tops of the culms and the branches of the panicle. It is regarded as a mere variety of the same species (*Sorghum saccharatum*), of which the shaloo, or sugar-grass (see Sugar-cane and Durra), is another variety. It has been much longer cultivated in North America, however, than the sugar-yielding variety. Its introduction is ascribed to Dr. Franklin, who, seeing an imported whisk in the possession of a lady of Philadelphia, found a single seed on it, and planted it. It is said to have been brought from the East Indies. It is now extensively cultivated in all parts of the United States, and especially by some branches of the religious society called Shakers. The manufacture of brooms is annually becoming of greater importance, much capital being invested in it. The crop of B. has a beautiful appearance when near maturity. It often attains a height of 12—15 feet. The stalks are long and hard, and mostly used for manure, although cattle will feed on them before they are touched by frost, and cattle are very fond of the leaves. The seed is used like Indian corn, for feeding poultry, and sometimes for feeding cattle and horses. The usual practice in harvesting B. is to bend the stalks 2½—3 feet from the ground

and leave them a few days to dry, then to cut them over 6—8 inches below the panicle, laying the tops in heaps, to be conveyed to the scraper, which is often wrought by horse-power, and which removes the seed from them. Improved machinery has recently begun to be employed in the manufacture of brooms and whisks from B., and they are therefore produced with much greater rapidity than before. It is supposed that, in 1860, about 10,000 acres of B. were cultivated in the state of New York, 9000 in Illinois, 6000 in Ohio, and about an equal amount in all the other states of the Union, or 30,000 acres in all; the value of the produce about 1,590,000 dollars. Great numbers of brooms and whisks of this material are exported to Britain.

BROOM, a name given to a number of species of shrubs of the closely allied genera *Cytisus*, *Genista*, and *Spartium*, of the natural order *Leguminosæ*, sub-order *Papilionaceæ*—all of them having long slender branches, along which are produced axillary flowers. The genera differ in the form of the standard (see PAPILIONACEÆ), which is roundish in *Spartium*, broadly ovate in *Cytisus*, and oblongo-ovate in *Genista*, whilst *Spartium* has also an acuminate keel, and that of *Cytisus* is very obtuse, that of *Genista* being oblong, and not wholly including the stamens and pistil.

The legume is many-seeded in all, the calyx 2-lipped, and the filaments united in a tube.—COMMON B. (*Cytisus scoparius*, the trivial name being from the Lat. *scopæ*, long twigs, or a besom)—which has by different botanists been ranked in each of the genera just named, although it possesses the characters above assigned to *Cytisus*, but has recently been made the type of a new genus, under the name of *Sarothamnus scoparius*, or *communis*—is a well-known native of Britain and of the continent of Europe, growing in dry soils, and ornamenting hedge-banks, hills, and bushy places, in May and June, with its large yellow flowers, which are on short stalks, drooping, solitary, but produced in considerable number along the straight slender branchlets. The whole aspect of the plant is graceful. The lower leaves have three oblong leaflets, the upper ones, or bracts, are simple; the branches are angular and of a very dark green, very tough, and much in use for making besoms. They have also been used for tanning and dyeing; and their fibre has been woven into a coarse strong cloth, and even made into paper. The whole plant is very bitter, with a peculiar nauseous taste and smell when bruised. The young tops and seeds are used in medicine, being powerfully diuretic, and very beneficial in some kinds of dropsy. They are also mildly laxative, and in large doses emetic.

Common Broom:
a, flowering branchlet; *b*, end of branchlet, not flowering, showing leaves with three leaflets; *c*, a pod; *d*, the tube of stamens cut open.

They are commonly administered in the form of a decoction. B. inhabits colder climates than furze, reaching to a greater elevation on mountains, and being found beyond the northern limit of furze. It varies in size from a very humble shrub to one of 20 or even 30 feet in height, and when it reaches this size, the wood is of great value for the finer purposes of cabinet-makers and turners.—IRISH B. (*Cytisus* or *Sarothamnus patens*), not unfrequent as an ornamental plant in British shrubberies, is not at all a native of Ireland, but of Spain and Portugal.—PORTUGAL B., or WHITE B. (*Cytisus albus*), a native of the countries bordering on the Mediterranean, is very often planted in Britain as an ornamental shrub, and is much admired for the beauty of its fascicled white flowers, which are produced upon long filiform branches. Its leaves have three leaflets. It sometimes attains a height of 15 or 20 feet.—SPANISH B. (*Spartium junceum*) is a native of the south of Europe, generally growing in dry soils and rocky situations, and attaining a height of 8 feet or upwards. Its branches are upright, round, and rush-like, a characteristic of this genus. They are smooth, and bear only a few small simple leaves, which soon drop off. The fibre of the branchlets is much used in some parts of Italy, France, and Spain, for making cloth, ropes, &c. In the south of France, the plant is cultivated on dry unproductive soils. The branchlets are made into bundles, dried, beaten, steeped, and washed, in order to the separation of the fibre. It possesses medical properties similar to those of the common broom.—A white-flowered species (*S. monospermum*), occasionally to be seen in British shrubberies, grows abundantly on the loose sands of the coasts of Spain, and produces a similar fibre. It is mentioned by Barth as growing in great abundance in Africa to the south of the Great Desert. Many species somewhat resembling these are occasionally to be seen in Britain among ornamental plants, some of them often in greenhouses. The Canary Isles produce some remarkable for the fragrance of their flowers. The name B. is not given to those species of *Cytisus* (q. v.) and *Genista* (q. v.) which do not display in a marked degree the character of having long slender twigs.—BUTCHER'S B. (q. v.) is a plant of an entirely different family.

BROO'MRAPE. See OROBANCHEÆ.

BRO'RA BEDS are a series of strata occurring at Brora, a village in Sutherlandshire, of the same age as the inferior oolite of Yorkshire. They are chiefly remarkable for the occurrence in them of a seam of coal of good quality 3½ feet thick, being the thickest stratum of true coal hitherto discovered in any secondary strata in Britain.

BROSSES, CHARLES DE, a learned French historian, was born at Dijon, February 8, 1709. His first work was *Lettres sur l'Etat de la Ville d'Herculaneum*, the result of a tour through Italy in 1739. At the suggestion of his friend Buffon the naturalist, he wrote the *Histoire des Navigations aux Terres Australes* (1756), in which he described the supposed great southern continent under the several names Magellania, Australia, and Polynesia. The last two of these names, now commonly used, were first employed by Brosses. His next work was *Du Culte des Dieux Fétiches*, &c. (1760). It was followed by a *Traité de la Formation Mécanique des Langues* (1765), which, in spite of many errors, contains not a few novel and ingenious observations and conjectures. During the greater part of his life, B. was occupied in endeavoring to supply the *lacunes* in the works of Sallust; and having collected about 700 fragments by this historian, he published, with such interpolations as he deemed necessary, the *Histoire de la République Romaine dans le cours du Septième Siècle, par Salluste* (1777). B. died as president of the parliament of Burgundy, May 7, 1777. His letters from Italy, under the title *Italie il y a cent Ans*, were edited and republished by his son René, Count de Brosses, in 1834.

BROTH is an infusion or decoction of vegetable and animal substances in water. It is customary to use more or less meat, generally ox-flesh, with bone, and certain vegetables, as cabbage, greens, turnips, carrots, pease, beans, onions, &c. The whole are mixed together in cold water, heat slowly applied, and the materials allowed to simmer for some hours. The meat yields up certain ingredients, whilst others are retained in the residual flesh. The following table will illustrate this.

Ox-flesh heated with water

Yields to the Water.	Leaves in the Boiled Meat.
Albuminous matter.	Fibrin.
Gelatine.	Coagulated albumen.
Kreatine.	Gelatinous tissue.
Extractive matters or Osmazome.	Fat.
Lactic acid.	Nervous matter.
Salts.	
Fat.	
Saccharine matter.	

The vegetables yield albuminous constituents, coloring and mucilaginous matter, and volatile oils and salts.

The real nutritive material present in broth is less than is generally thought, though it aids in satisfying the cravings of the appetite. To invalids, however, the form of broth known as Beef-tea (q. v.) is of great importance, as it affords the weak and sickly stomach a light palatable article of diet at a time when stronger food would do the weakened system much harm. See NUTRITION.

BRO'THERHOODS, RELIGIOUS. These were societies instituted for pious and benevolent purposes, and were numerous in the middle ages. Their origin is probably to be traced to the desire which then prevailed to imitate the spiritual orders. They were usually founded at first without ecclesiastical authorization, on account of which, several of the confraternities that either did not seek or did not obtain the recognition of the church, assumed the character of sects, and were suspected of heresy. To this class, among others, belonged the Beghards and Beguines (q. v), the Brothers and Sisters of the Free Spirit (see below), the Apostolic Brethren (q. v.), the Flagellants (q. v.), who, tolerated by the church for a while, at last incurred its displeasure, and were severly persecuted. We may also reckon among religious B. the old building corporation, from which sprang the order of Freemasons, the religious character of whose secret societies indicated, in the opinion of the church, a peculiarly dangerous gnosis and symbolism. Others coming into existence under ecclesiastical

oversight, or at least being confirmed by the church, had no *arcana*, but were simply dedicated to the promotion of religion, either by the imposition of new penances, the acceptance of new and severer devotions, or the assisting of strangers, travelers, the unprotected, the oppressed, the destitute, and the sick.

Nor can we refuse our admiration and approbation to such self-denying fraternities, when we remember how defective were the early communities in charitable institutions. They were most numerous in Italy, Rome alone boasting more than a hundred.

BROTHERS AND SISTERS OF THE FREE SPIRIT, a sect which sprang up in the Rhine country during the 13th c., and afterwards spread into France and Italy. It grounded its peculiarities on the biblical doctrine, that the Holy Spirit is a spirit of 'freedom.' Misunderstanding the true nature of spiritual freedom, the members of this sect conceived themselves released not only from the thraldom of the church, but also from the obligations of morality. They set aside the marriage-tie, and indulged in licentiousness. A few even maintained that the deeds of the body could not possibly affect the soul. Intellectually, they are said to have been given to Pantheism. The synods of Cologne in 1306, and of Treves in 1310, decreed their suppression, and in the persecutions which ensued, they appear to have been completely dispersed.

THE BRETHREN OF SOCIAL LIFE, BRETHREN OF THE COMMON LOT, or BRETHREN OF GOOD WILL (also called HIERONYMITES and GREGORIANS, from Hieronymus and Gregory the Great, whom they claimed as patrons), a fraternity founded about 1376 by Geert Groote (b. at Deventer, 1340—d. 1384), and Florentius Radewin (b. 1350, at Leerdam, in South Holland—d. 1400). This society—which professed to be a copy of the earliest Christian communities, and was in several respects a forerunner of the subsequently formed societies of United Brethren, now sometimes styled Moravians—was composed of persons who sought after pious and spiritual exercises without any conventional distinctions of order, &c. Community of goods, ascetic habits, industry, care of the education of young persons, and the use of the vernacular language in divine service, were some of the chief points insisted on by the brethren, who were not fettered by manastic or any other vows. Perfect community of goods was a rule of their societies.

Despite the persecutions which they suffered from the mendicant friars, they were recognized and sanctioned by several popes and by the Council of Constance. They became most numerous in the Netherlands and North Germany, but also spread themselves in Italy, Sicily, and Portugal, so that, in 1430, they reckoned more than 130 societies. The last was founded at Cambray in 1505. Several brotherhoods or Gregorians assisted in the Reformation. In other cases, their institutions fell into the hands of the Jesuits. Though the original founders of these societies were opposed to all learning and science which was not purely moral and practical, their followers rendered most important services to popular education, having free schools in connection with many of their houses, supporting students at other schools, and distributing useful books. They have, indeed, been not incorrectly described as pioneers of the Reformation. After the revival of learning in Italy, the Brethren of Social Life entered into the spiritual activity of the time. The most important and distinguished members of the society were Gerhard Zerbold of Zütphen, Thomas-à-Kempis, and the learned Cardinal Nicholas Cusa.—Female societies, of a similar character, sprung up at the same time with those of the Brethren of Social Life. At the head of each was a superior or directress, who was styled the *Martha*.

BRO'THERS, a name given to a group of six or eight rocky islets immediately outside the Strait of Bab-el-Mandeb, varying in height from 250 to 350 feet. They lie off the African coast about 9 miles south of the island Perim, now occupied by England. Of the loftiest point, the lat. and long. respectively are, 12° 28′ N., and 43° 22′ E.—Brothers is also the name given to three isolated mountains near the coast of New South Wales, between Harrington Inlet to the south, and Port Macquarie to the north, or between lat. 32° and 31½° S. They are valuable as landmarks.

BROTHERS, LAW OF DESCENT AMONG. In the law of England, this was immediate, without reference to the parent as the *commune vinculum*; but by the 3 and 4 Will. IV. c. 106, s. 5, it is enacted that no brother or sister shall be considered to inherit immediately from his or her brother or sister, but every such descent shall be traced through the parent. See INHERITANCE.

BROTHERS, LAY, an inferior class of monks, not in holy orders, but bound by monastic rules, and employed as servants in monasteries (q. v.).

BROTHERS AND SISTERS OF CHARITY. Under these names there exist in the Roman Catholic Church two widely ramified beneficient societies, for the nursing of the poor and sick in hospitals, without distinction of faith, rank, or nation. The order of the Brothers of Charity, or Compassionate Brothers, was established in 1540, at Seville, in Spain, by the Portuguese John di Dio (died 1550), who had served in Africa under Charles V. The funds for the purpose were obtained by begging. The primitive object of the society was the care of the sick, and the reformation of women of immoral character: it was composed of lay-members, under no rule. In the year 1572, the order received the papal recognition, and was subjected to the rule of St. Augustine. All the privileges of the mendicant orders were conceded to it in the year 1624, and it was then divided into a Spanish congregation, with a major-general in Granada, and an Italian or extra-Spanish congregation, with a major-general in Rome. To the latter belong also the Brothers of Charity in Switzerland, Germany (where Austria is their chief seat), Poland, the Netherlands, France, and other countries. The European members of the order clothe themselves in black; the extra-European, who are under a separate general of their order in America, wear brown. Their services to distressed humanity continue to be held in high estimation. The Sisters of Charity, formerly also, on account of their dress, called *Gray Sisters*—independent associations of unmarried Christian females, for the alleviation of human suffering, especially for the tending of the sick and the poor—were first called into existence in France, in 1634, by Vincent de Paul (born 1576), greatly assisted by the noble-hearted and self-devoted widow, Le Gras, by birth De Marilac. The society was recognized in 1655 by Clement IX., and in 1685 already numbered 224 convents. The French Revolution sorely interrupted the abundant and benevolent labors of the Sisters of Charity by the suppression and proscription of their convents in France; but Napoleon restored the order in 1807 by the convocation of a General Chapter of the scattered sisters, under the presidency of the Empress Mother, and by the grant of the necessary funds; and there exist at present more than 300 associations in France, where, in the villages, elementary education is in great part conducted by them. They attend the sick in all the great hospitals.

There exists in Germany a Roman Catholic association of unmarried females, not bound by conventual rules, and possessing the right of withdrawing from the association at pleasure, but placed under a strict supervision, and occupied in the same duties as the Sisters of Charity. The Institute of Deaconesses (q. v.) in the Protestant churches of the continent of Europe is of a very similar character.

BROTHERS, RICHARD, a fanatic, whose prophecies and writings excited an unusual sensation in his day, was at one time a lieutenant in the British navy, which he quitted in 1789. Refusing, from conscientious scruples, to take the requisite oath to enable him to receive his half-pay, he was reduced to great distress, and ultimately placed in the workhouse. Dating his first call from 1790, he announced himself, in 1793, the apostle of a new religion, 'the Nephew of the Almighty, and Prince of the Hebrews, appointed to lead them to the land of Canaan.' In 1794, he published a book, in two parts, entitled *A Revealed Knowledge of the Prophecies and Times*, &c.; and in 1795, an *Exposition of the Trinity*. He was the author of several other publications, marked by a strange mixture of reason and insanity. In consequence of prophesying the death of the king, and the destruction of the monarchy, he was committed to Newgate, but soon liberated. Some of his political predictions, especially in reference to the state of the continent, were either altogether or partially fulfilled; and many persons were induced to sell their goods, and prepare to accompany him to his New Jerusalem, which was to be built on both sides of the river Jordan, where he was to arrive in the year 1795. His disciples were not confined to the poor and ignorant, but even men of ability and education were deluded into believing in him, two of the most eminent being Nathaniel Brassey Halhed, Esq., M.P., the orientalist, and Sharp, the celebrated engraver. As a dangerous lunatic, he was at length, by order of government, committed to Bedlam, but released April 14, 1806, and died January 25, 1824.

BROUGHAM, HENRY, LORD BROUGHAM AND VAUX, was born in Edinburgh, 19th September 1778. His father, Mr. Henry Brougham, was the descendant of an ancient family in Westmoreland, and his mother, Eleonora Syme, who was a woman of much talent, was a niece of Robertson the historian. B. received his education at the High School, and afterwards at the university, of Edinburgh.

He gave early promise of future ability, some mathematical papers written by him at the age of eighteen having been considered worthy of publication in the Transactions of the Royal Society. He spent some time traveling on the continent, and in 1800 was admitted to the Scotch bar. In company with Jeffrey, Horner, and Sydney Smith, B.'s first public efforts were given to the service of the *Edinburgh Review*, and he contributed to it some of its most powerful articles. His liberal political views excluded him from the hope of promotion in Scotland, and a character which he had acquired for eccentricity and indiscretion, excluded him from all legal practice, except the unremunerative practice of the criminal courts. After seven years of vain attendance in the courts of Edinburgh, he betook himself to a field

more worthy of his ambition, and in 1808 passed at the English bar.

In London, B. first attracted public notice by the admirable appearance he made at the bar of the House of Commons, when he was employed on behalf of certain Liverpool merchants to ask the repeal of the Orders in Council. Soon after this, in 1810, he entered parliament, and within a few months of the time of taking his seat, brought in and carried his first public measure—an act making participation in the slave-trade felony. He was welcomed by the opposition leaders, to whose party he had attached himself, as a most powerful assistant in their attacks upon the government. B. succeeded in carrying the repeal of the obnoxious Orders in Council shortly before the general election of 1812, and then ventured to contest along with another Whig, the membership for Liverpool against Canning and another Tory. He was defeated, and remained without a seat in parliament till 1816, when he was returned for Winchelsea, and again became an active member of the opposition. By this time he also established some reputation in the courts of law. He never, indeed, acquired a very large practice, but he repeatedly distinguished himself by speeches of great vigor and ability in the defence of persons prosecuted for libel by the crown. His most famous appearance as an advocate, however, was in defence of Queen Caroline, when, along with Denman, he defended the injured queen with unequalled courage and disinterestedness, at the cost, as both well knew, of exclusion, for years to come, from all professional advancement. But his eloquence and boldness, though they forfeited for him the favor of the crown, gained him that of the people, and for the ten years between 1820 and 1830, B. was the popular idol. He made no bad use of his power.

In 1822, he used it, though in vain, in support of a scheme of national education; and to his activity is owing, in great measure, the establishment of the London University of the first Mechanic's Institute, and of the Society for the Diffusion of Useful Knowledge. In 1830, B. delivered a most powerful speech against slavery, and in consequence of it—as he himself believes—was invited to stand, and returned, as member for the great popular constituency of the county of York. The aristocratically disposed Whigs would—had they dared—have excluded B. from the Reform ministry; but, in addition to having enormous popularity, he was virtually their leader in debate in the Commons, and was thus, in spite of his unmanageableness, indispensable. After various intrigues, B. was offered, and was persuaded, against both his interests and his inclinations, to accept a peerage and the chancellorship. He took his seat in the Lords in November, 1830, and assisted very materially in carrying through that House the great measures then proposed by the liberal ministers. He shared in the general unpopularity which afterwards attached to them, and when they were dismissed by William IV. in 1834, B. left office, never to return to it. After that time, he held in the Upper House a position as nearly analogous as may be to that formerly held by him in the Commons, criticising freely the conduct of successive administrations, and steadily forwarding every measure for social progress.

It will be as a law-reformer that B. will be best remembered. He took up Romilly's uncompleted task, of carrying into practice the ameliorations suggested by Bentham. His efforts in this direction began as early as 1816, when he introduced into parliament a bill to remove various defects in the law of libel. In 1827, in a memorable speech which occupied six hours in delivery, B. enumerated the defects in nearly every branch of English law, and made proposals for dealing with law-reform on a proper scale. These, as might have been expected, met with little encouragement. It has been the fortune of many of his measures to be carried afterwards, in a mutilated form, by other hands. After he left office, B. also succeeded in carrying various reforms in the law, among which may be noted some very extensive changes in the law of evidence.

Among the measures proposed by B., but left for future law-reformers to carry, were bills for the codification of the criminal law, for the establishment in England of a system of public prosecutors, and for the giving of compensation to parties acquitted. Lord B.'s acts and bills, as well those regarding the slave-trade, education, and other public questions, as those touching on law-reform, have been collected and published by Sir J. E. Eardley Wilmot (Lond., Longman, 1857). The large well-filled volume which they form is the most fitting monument that could be preserved of the activity, perseverance, and public spirit of the man.

As an orator, more especially as a debater in parliament, B. was, among the men of his time, inferior only to Canning. He was wont, however, to indulge in his speeches in too large an admixture of exciting elements: argument was mingled with fiery declamation; ridicule, sarcasm, invective, were freely used; and these he dealt out with a vehemence and energy that at times carried him far beyond bounds. The power of ready, rapid, and forcible diction was eminently his. In many other fields besides oratory, B. has won a high reputation. He cultivated mathematical and physical science with success, and ventured upon the domain of metaphysics, and even of theology. His miscellaneous writings are of great extent, and upon an almost incredible variety of subjects. They were, however, intended more to serve purposes of the moment, than as permanent additions to our literature; and though they display great powers of rapid comprehension and nervous clear exposition, it cannot be said that we are indebted to their author for any new truths in politics or morals, or any original discoveries in science. The honors due to men of letters B. did not fail to acquire, having successively been made Lord Rector of Glasgow University, President of University College, London, Member of the Institute of France, Chancellor of the University of Edinburgh, and lastly, D.C.L. of Oxford.

Lord B. took a warm interest in legal and social reform. While not engaged in parliament, he resided chiefly at Cannes, in the south of France, where he died, May 7, 1868. His lordship married, in 1819, Mary Anne Eden, the granddaughter of a baronet in the county of Durham. The issue of this marriage was two daughters, who both died before reaching womanhood. The patent of the title to the peerage was extended to make it descend to the family of his brother. B. left a Memoir of his Life and Times, which was published in 3 vols. (1871).

BROU'GHTY-FERRY, a town of Forfarshire, on the Firth of Tay, 4 miles east of Dundee. Pop. (1871) 5817. It is connected with Ferry-Port-on-Craig, in Fifeshire, by a railway ferry over the firth, here a mile broad, which, before the opening of the Tay Bridge, formed the chief connection between Edinburgh and Fife with Dundee. It has cod and other white fisheries. Many Dundee merchants occupy fine villas at B.-F. On the shore stands an ancient castle, lately repaired as a defence for the Tay.

BROU'SSA, or BOU'RSA, the ancient *Prusa*, where the kings of Bithynia usually resided, situated in lat. 27° N., long. 40° E., at the foot of Mount Olympus, in Asia Minor. Prusa is said to have been built by Prusias, king of Bithynia, who waged war with Crœsus or Cyrus. Seifeddulat, of the race of Hamadan, took it in 336 of the Hegira, but it was retaken by the Greek emperor in 947 A.D. In 1356, Orcan, son of Othman, the second emperor of Turkey, captured it, and made it the capital of his empire, and it continued so until the taking of Constantinople by Mohammed II. in 1453.

B. is most pleasantly situated, facing a beautiful and luxuriant plain, covered for many miles with plantations of mulberry-trees. The city and suburbs are about six miles in circumference. The town is divided from the eastern suburb by a deep channel or vale, over which there are several bridges, one of them—with shops on each side—being 90 paces long and 16 broad. The streets are remarkably clean, and the bazaars very good, being supplied with European goods from Constantinople. The population of B. amounts to 73,000 souls, of whom about 11,000 are Armenians. It contains a great number of mosques, some of which are very fine buildings. The silks of B. are much esteemed in the European markets, and great quantities are exported every year to France, Constantinople, and Smyrna. The inhabitants manufacture a kind of silk, like satin, mostly striped, which is used for the under-garment of the oriental dress; also a material from silk and flax used chiefly for shirts; and a sort of gauze, called 'brunjuke,' which is much worn by the Turkish ladies for under-garments. A great quantity of British manufactured goods, such as Manchester 'twists,' 'gray calicoes,' 'prints,' 'zebras,' &c., are imported into B., the goods being landed at Constantinople, and thence conveyed overland to Broussa. It is the official residence of a Turkish Pasha, and the seat of a Turkish tribunal. B. is subject to frequent earthquakes. In ancient times, it was famous for its thermal baths, or 'royal waters,' as they were called, which still exist.

BROUSSAIS, François Joseph Victor, the founder of the school of medicine, was born at St. Malo, December 17, 1772, and in early life, after studying at Dinon, served for a time first in the navy, and then in the army. In 1820, he was appointed first professor at the military hospital of Val-de-Grace. In 1832, he became Professor of General Pathology and Therapeutics in the Faculty of Medicine in Paris, and afterwards was made a member of the Institute. He died at his country residence at Vitry, November 17, 1838. In 1841, a statue was erected to his memory in the court of Val-de-Grace. B.'s peculiar views are ably explained in his chief works—the *Histoire des Phlegmasies ou Inflammations Chroniques* (1808), and *Examen de la Doctrine Médicale généralement adoptée* (1816), which assert the following principles: that life is sustained only by excitation; that this excitation may be either too strong (*surexcitation*) or too weak (*adynamie*), the latter case, however, being far less frequent than the former. These abnormal conditions of surexcitation and adynamie at first manifest themselves in a specific organ of the body; but afterwards, by sympathy, are extended to other organs; that is, all diseases are originally *local*, and become *general* only by sympathy of the several organs. The organs most subject to disease are the

stomach and bowels, and therefore *gastro-enteritis* (inflammation of the stomach and intestines) is the basis of pathology; consequently, B. resorted to local phlebotomy—especially the application of numerous leeches to the region of the abdomen—as a remedy in fevers and various diseases. His theory and practice gained many adherents in France, who took the name of the 'Physiological School.' But a more exact knowledge of physiology has demonstrated that the views of B. were one-sided and exaggerated. Yet they have not been without use in pathology, as they have led to a more careful study of pathological anatomy and physiological sympathies, and to a more exact observation of the so-called specific morbid processes of which the existence was denied by B. and his followers. Montègre, *Notice Historique sur la Vie, les Travaux, et les Opinions de Broussais.*—His son, CASIMIR B., born 1803, professor at Val-de-Grace (1833), was a zealous adherent of the Broussais system, and is the writer of a work, *Hygiène-Morale,* based on phrenology.

BROUSSONE'TIA. See MULBERRY.

BROWN, CHARLES BROCKDEN, a celebrated American novelist, was born at Philadelphia, January 17, 1771. His early education was carried on under the care of Mr. Robert Proud, author of the *History of Pennsylvania.* Afterwards he studied for the law, but the license which he had already given to his imagination induced an unconquerable aversion to legal pursuits, and he consequently betook himself to literature. The French Revolution exercised on him, as on many other ardent spirits, a considerable influence; several of his writings at this period being penetrated with the new thoughts and sentiments which sprung out of that great convulsion. In 1798, he published *Wieland,* the first of his remarkable fictions; and in 1799, *Ormond, or the Secret Witness.* His next production was *Arthur Mervyn, or Memoirs of the Year* 1793—the fatal year of yellow-fever in Philadelphia. In 1801 appeared *Edgar Huntly, or the Adventures of a Sleep-walker,* 'a romance presenting a greater variety of wild and picturesque adventure, with more copious delineations of natural scenery, than is to be found in his other works.'—*Prescott.* This was followed in the same year by *Clara Howard,* and in 1804 by *Jane Talbot,* first printed in England. He died of consumption in 1810.

Besides the writings which have been enumerated, B. composed a number of political pamphlets, contributed to various literary magazines, and founded three or four periodicals himself. The author who exercised the greatest influence on the development of his genius was Godwin, whom he occasionally imitated, while Godwin himself, on the other hand, acknowledged his obligations to B., and warmly admired him. The most striking quality of his mind is its ingenuity, both imaginative and psychological. He invents incidents and analyzes feelings with remarkable subtlety, but his success is somewhat marred by his extravagant departure from the realities of everyday-life.

BROWN, JOHN, of Haddington, once the most popular, and still among the most revered, theological writers in Scotland, was born in 1722 at Carpow, near Abernethy, in Perthshire. Deprived of both his parents when only 11 years of age, he became assistant to a venerable and pious shepherd, named John Ogilvie, who tended his flock among the neighboring hills, and nursed the religious ardor of the boy's heart. B., however, aspired to be wise as well as good. His thirst for learning was insatiable, and the most romantic yet well-accredited stories illustrative of this are related by his biographers.

While still a friendless 'herd laddie,' he had made great progress in a self-acquired knowledge of Greek and Latin. The extent of his acquisitions, even at this early time, may be estimated from the fact, that the country-people round about believed he was in league with the devil, and that he had pledged his soul for unhallowed lore. At a later period of his life, 'he knew nine or ten languages, classical, oriental, and modern, and had amassed vast stores of Puritan, Scottish, and Dutch divinity.' After a brief career as a pedlar—an employment which English readers will understand from Wordsworth's *Excursion* was neither mean nor degrading—B. became a volunteer in a regiment of militia raised in Fifeshire during the rebellion of 1745, and in 1747, schoolmaster in the neighborhood of Kinross. During the vacations of his school, he studied philosophy and divinity under the inspection of the Associate Synod, and the superintendence of the Rev. Ebenezer Erskine and James Fisher. In 1750, he was ordained pastor of the Secession Church at Haddington. Perhaps a more faithful, industrious, and holy minister never labored in Scotland. David Hume was once prevailed upon to go and hear him, and the criticism of the great sceptic was: 'That old man preaches as if Christ were at his elbow.' Although self-educated, he had little of the narrowness which culture so obtained generally brings along with it; he corresponded on friendly terms with Episcopalians, and often expressed a warm affection for all true Christians. Although himself a sound Presbyterian, and a tolerably strict Calvinist, 'the love of the Lord' was his real and ultimate test of a man's orthodoxy. In 1758, B. published *Help for the Ignorant;* and in 1765, his famous *Christian Journal.* In 1768, he was appointed professor of divinity under the Associate Synod, and in the same year issued his valuable *Dictionary of the Holy Bible.* In 1771 appeared his *History of the Church from the Birth of the Saviour*—a work good enough for cottage reading; and in 1778, *The Self-interpreting Bible.* This last, B.'s *magnum opus,* has been amazingly popular in Scotland, and has been commended by high dignitaries of the Anglican Church. B. also issued a great variety of sermons, tracts, &c. He died on 19th June 1787.

BROWN, JOHN, D.D., son of the Rev. John Brown of Whitburn, who was the son of the preceding, was born 12th July 1784. He studied at Edinburgh University, and at the theological hall of the Secession Church. In 1806 he was ordained to the pastorate of a church in Biggar, a small town in Lanarkshire. In 1822 he was transferred to Rose Street Church, Edinburgh, and in 1829 to Broughton Place Church, in the same city. In 1834 he was appointed professor of pastoral and exegetical theology in connection with the Associate Synod. He died 13th October 1858. Dr. B. was a powerful and popular preacher, and a profound expositor of Scripture. Among his works are—*The Law of Christ respecting Civil Obedience; The Resurrection of Life;* and his scholarly *Expository Discourses on the Epistles of Peter, on the Epistle to the Galatians, and on the Epistle to the Romans.* See Dr. Cairns's Memoir (1860).

BROWN, JOHN, M.D., LL.D., author of *Rab and his Friends,* was the son of the foregoing, and was born at Biggar, 22d Sept. 1810. He studied medicine at Edinburgh University, and in 1832 established himself at Edinburgh as a physician. He was highly esteemed as a professional man, but it was as an essayist of rare insight, quaint fancy, humor, and tenderness, that he became well known to his fellow-citizens and to all English-speaking people. He contributed to various magazines, and in 1858 issued a first volume of collected essays, to which he gave the name of *Horæ Subsecivæ.* In 1882 the *Horæ* were extended and rearranged in three volumes, of which the first comprises *Locke, Sydenham,* and other papers. *Rab and his Friends,* a powerful but eminently simple tale of a Scottish carrier and his dog Rab, gives name to the second volume. This story, delightfully combining smiles and tears, pathos and humor, soon attained world-wide popularity, and has been frequently reprinted and translated. The third series of the *Horæ* is *John Leech and other Papers.* B., catholic, kindly, loving and beloved, died 11th May 1882. He was a Fellow of the Royal Society of Edinburgh, and had a civil list pension of £100 allotted to him in 1876.

BROWN, SAMUEL, M.D., son of Samuel Brown (the founder of itinerating libraries, and grandson of the Rev. John Brown of Haddington), was born on the 23d February 1817, and entered the university of Edinburgh in 1832. He took his degree as M.D. in 1839, and immediately surrendered himself to the magical fascination of chemistry. One idea possessed him to the close of his life—the possibility of reconstructing the whole science of atomics. He never, in spite of crushing failures in experiment, abandoned his early conviction that chemical elements, usually considered simple, might be transmuted into each other. In 1843, he delivered in Edinburgh four critical lectures on the atomic theory. During the same year, he became a candidate for the chair of chemistry in the university of that city; but having perilled his claims on the experimental success of his fatal theory, and being again doomed to disappointment, he withdrew his application, and devoted himself with a kind of mournful austerity, and with more than the earnestness of a medieval alchemist, to the solitary work of his laboratory. In 1850 appeared his *Tragedy of Galileo,* a volume which indicates, but does not embody, the finely imaginative and philosophical genius of its author. B. died of consumption 20th September 1856. His fugitive essays were collected and published after his death; and though for the most part too comprehensive in their intent, they enable the public to understand why he was held in admiration by men like Hamilton, Ferrier, De Quincy, Wilson, Carlyle, Hare, Jeffrey, and Chalmers.

BROWN, SIR GEORGE, a distinguished British general, born at Linkwood, near Elgin, Scotland, in August 1790, entered the army in 1806, became lieutenant in 1807, and was present in the latter year at the capture of Copenhagen. He served in the Peninsular War. At the battle of Talavera he was severely wounded, and at the storming of Badajoz was one of the forlorn-hope. He was appointed major, May 26, and lieutenant-colonel, September 29, 1814, in which year he embarked in Major-general Ross's expedition against the United States of America, and was wounded at the battle of Bladensburg. From February 6, 1824 to 1842, he commanded a battalion of the Rifle Brigade. He was made adjutant-general of the forces, April 1850, and lieutenant-general, 1851. In the Crimean war, 1854—1855, B. commanded the Light Division.

At the battle of Inkermann, November 5, 1854, he was severely wounded, and obliged to retire for a short time to Malta. In 1855 he was created a Knight Commander of the Bath. In the expedition

to the Sea of Azof, he commanded the British troops; and in the first unsuccessful attack on the Redan of Sebastopol, he had the chief command of the storming-party. He was gazetted April 3, 1856, 'General in the army for distinguished service in the field.' He was a Knight of Hanover, received the Turkish Order of the Medjidie of first-class in 1855; and the Grand Cross of the Legion of Honor, 1856. In 1860 he became commander-in-chief in Ireland, and in 1862 a privy-councillor. He died in 1865.

BROWN, THOMAS, a Scottish metaphysician, son of the Rev. Samuel Brown, was born in 1778 at the manse of Kirkmabreck, Kirkcudbrightshire. After being some time at school in England, he went to Edinburgh in 1792, and for several years attended the lectures of Playfair, Black, Robison, and Dugald Stewart. He began the study of law, but shortly abandoned it for medicine; and having taken his diploma of M.D. in 1803, he became (1806) the partner of Dr. Gregory in his large practice. But his strong bent was for literature and philosophical speculation. At the age of 18, he had published a refutation of Darwin's *Zoonomia;* was a member of an Academy of Physics, or society for 'the investigation of the laws of nature,' formed in 1797, and embracing the names of Erskine, Brougham, Leyden, Jeffrey, Smith and others; and contributed at the outset to the *Edinburgh Review*. In 1804 appeared his essay on *Cause and Effect*, in which he holds that there is nothing in a cause but the fact of immediate and invariabe antecedence to the change called its effect. Dugald Stewart, professor of moral philosophy in the university, being obliged, from bad health, to retire in 1810, got Dr. B. appointed assistant and successor, which office he continued to discharge till his death in 1820. He was popular as a professor; and his *Lectures*, published after his death, have gone through a great many editions, though of late they have somewhat fallen out of notice. He also wrote a good deal of poetry, which is now forgotten. Dr. B. attempted to overturn the psychological system of his predecessors Reid and Stewart, and to substitute a new and simplified scheme of mental phenomena. The greater part of this new philosophy was the production of his first session as professor, the writing of each lecture being begun on the evening previous to its delivery. A philosophic system thus improvised could not but be crude and inconsistent, however acute and imaginative its author might be. B.'s chief contribution to psychology is the establishment of a sixth or *muscular sense*.

BROWN, JOHN, M.D., founder of the Brunonian system of medicine, the son of a day-laborer, and himself first intended for a weaver, born in 1735, in Bunkle parish, Berwickshire, was educated at the grammer-school of Dunse, in which he was subsequently an usher. After studying medicine at the Edinburgh University, he become tutor to the children of the celebrated Dr. Cullen, and assistant in his university lectures. Conceiving himself slighted by Cullen, he commenced giving lectures himself upon a new system of medicine, according to which all diseases are divided into the sthenic, or those depending on an excess of excitement, and the asthenic, those resulting from a deficiency of it; the former to be removed by debilitating medicines, as opium, and the latter by stimulants, such as wine and brandy. His system gave rise to much opposition, but his partisans were numerous; for a time his opinions had some influence. In 1779, B. took the degree of M.D. at the university of St. Andrews, and in 1780 published his *Elementa Medicinæ*. He was also author of *Observations on the Old System of Physic*. In 1786, being overwhelmed with debt, he removed to London, where he died of apoplexy in 1788. His works, with a memoir by his son, Dr. William Cullen Brown, appeared in 1804 (3 vols. 8vo).

BROWN, ROBERT, an English clergyman, founder of the sect of Brownists, born in 1549, the son of Anthony Brown, Esq., of Folthorp, Rutlandshire, was educated at Cambridge, and was at first a preacher at Bennet Church, then a schoolmaster in Southwark, and a lecturer at Islington. In 1580 he began to attack the order and discipline of the Established Church, and soon after formed a distinct church on democratic principles at Norwich. Committed by Dr. Freake, bishop of that see, to the custody of the sheriff, he was released from prison through the influence of the lord-treasurer, Cecil, to whom he was nearly related. Having, in 1582, published a controversial work, entitled *The Life and Manners of True Christians*, with, prefixed, *A Treatise of Reformation without Tarrying for Any*, he was again arrested, but, through the lord-treasurer's intercession, again liberated. He afterwards formed several Congregationalist churches; but, with many of his followers, was obliged to take refuge in Holland. In 1589, he returned to England, reconciled himself to the Established Church, and became rector of a church near Oundle, Northamptonshire.

Of a very violent temper, he was, when 80 years old, sent to Northampton jail, for an assault on a constable, and died in prison in 1630. The Brownists continued, notwithstanding the defection of their leader, to subsist as a separate sect for some time, both in Holland (among the English there) and in England. In the former country, they were at last absorbed in, or reconciled to, the Presbyterian Church in 1701; in the latter, they may be said to have given birth to the Independents (q. v.), who rose into great importance in the 17th century.

BROWN, CAPTAIN JOHN, the leader of the Harper's Ferry (U. S.) insurrection (1859), designed to incite the slaves of the southern states of America to rebellion, was descended from a Puritan carpenter, one of the *Mayflower* emigrants, and was born at Torrington, Connecticut, in the year 1800. He intended to enter the ministry, but had to abandon his studies on account of weak sight, and subsequently became a wool-dealer. In 1854, having imbided an intense hatred of slavery, he went to Kansas, in order to vote, and, if need were, fight against the establishment of slavery in that territory. In many of the conflicts which ensued between the pro-slavery party from Missouri and the free settlers, B. played a prominent part, and in one of these he had a son killed, a circumstance which deepened his hostility against the Southern party. After the agitation in Kansas was settled by a general vote, B. traveled through the northern and eastern states, declaiming against slavery, and endeavoring to organize an armed attack upon it. In October 1859, at the head of 17 white men and 5 blacks, he commenced active hostilities by a descent upon Harper's Ferry, a town of some 5000 inhabitants, at the confluence of the Potomac and Shenandoah, and possessed of an arsenal containing from 100,000 to 200,000 stand of arms. The arsenal was easily captured, and 40 or 50 of the principal inhabitants were made prisoners; but instead of retreating at once to the mountains with arms and hostages, as his original design had been—meaning to exchange the hostages for slaves—B. lingered on in the town until the evening, by which time 1500 militiamen had arrived. Next day, an attack was made on his position, which, after some loss of life, was carried. B. was captured, and shortly after was tried for treason, and executed. He is described as a singularly brave and honest man.

BROWN, ROBERT, an eminent botanist, the son of an Episcopal clergyman, was born at Montrose, Scotland, December 21, 1773, and educated at Marischal College, Aberdeen. Having studied medicine at the university of Edinburgh, he became, in 1795, ensign and assistant-surgeon in a Scottish Fencible regiment, with which he went to Ireland. Devoting himself to the study of botany, he resigned his commission in 1800, and the following year was, on the recommendation of Sir Joseph Banks, engaged as naturalist in the expedition sent out under Captain Flinders for the survey of the Australian coast. On his return in 1805, he brought home nearly 4000 species of Australian plants, a large proportion of which were new to science. Soon after, he was appointed librarian to the Linnæan Society. To the *Transactions* of the Edinburgh Wernerian Society, and those of the Linnæan Society, he contributed memoirs on *Asclepiadeæ and Proteaceæ*, and published *Prodromus Floræ Novæ Hollandiæ et Insulæ Van Diemen's*, vol. i. 1810; a supplement to this work appeared in 1830, relating to the *Proteaceæ* only. He also wrote the *General Remarks, Geographical and Systematical on the Botany of Terra Australis*, attached to the narrative of Captain Flinders's expedition, 1814. His adoption of the natural system of Jussieu, the French botanist, led to its general substitution in place of the Linnæan method. B.'s numerous memoirs in Transactions of societies, and other contributions to botanical science, secured for universal approval the title conferred on him by Alexander von Humboldt of *Botanicorum facile Princeps*. In 1810, B. received the charge of the library and splendid collections of Sir Joseph Banks, which in 1827 were transferred to the British Museum, when he was appointed keeper of the botanical department in that establishment. In 1811, he was elected F.R.S.; in 1832, D.C.L. of Oxford; and in 1833 was elected one of the 18 foreign associates of the Academy of Sciences of the Institute of France. In 1839, the Royal Society awarded him their Copley medal for his *Discoveries during a Series of Years on the Subject of Vegetable Impregnation*. He was president of the Linnæan Society from 1849 to 1853. He died in London, June 10, 1858. A collected edition of B.'s works, in 5 vols. 8vo, has been published in Germany.

BROWN, WILLIAM, founder of the Free Public Library at Liverpool, born at Ballymena, Ireland, in 1784; was educated at Catterick, near Richmond, Yorkshire; and in his 16th year accompanied his parents to the United States. Employed in the counting-house of his father, who was engaged in the linen trade in Baltimore, in a few years he was admitted a partner. Returning to England in 1809, he established a branch of the business at Liverpool, and laid the foundation of one of the largest mercantile firms in the world. Embarking in the American trade, he became an extensive importer of cotton, and by his rare energy, quick business habits, and sterling integrity, soon became distinguished for the magnitude of his dealings. A liberal reformer, he took a prominent part in local and public affairs, and unceasingly promoted the education of the people. In 1844, he contested South Lancashire upon the Anti-Corn-Law League interest without success,

but was returned to parliament for that division of the county in 1846, and was subsequently three times re-elected. A series of letters in defence of free trade, which, in 1850, he contributed to the *Pennsylvanian* (Boston newspaper), attracted much attention. He was also an able advocate for the adoption of a decimal coinage. In 1857, he munificently subscribed £30,000 for the establishment of a Free Public Library at Liverpool, and the noble building erected for the purpose owes its existence entirely to his generosity. He died in 1864.

BROWN COAL, a mineral substance of vegetable origin, like common coal, but differing from it in its more distinctly fibrous or woody formation, which is sometimes so perfect that the original structure of the wood can be discerned by the microscope, whilst its external form is also not unfrequently preserved. In this state, it is ofted called *Wood Coal;* and it sometimes occurs so little mineralized, that it may be used for the purposes of wood, as at Vitry, on the banks of the Seine, where the wood-work of a house has been made of it.

From this to the most perfectly mineralized state, it occurs in all different stages. It is often brown or brownish black, more rarely gray. It burns without swelling or running, with a weaker flame than coal; emits in burning a smell like that of peat, and leaves an ash more resembling that of wood than of coal. Whereever it occurs in sufficient abundance, it is used for fuel, although very inferior to common coal. *Bovey Coal*, so called from Bovey Tracey, in Devonshire, where extensive beds of it occur, and where it has been long wrought, is B. C., and often exhibits the woody structure very beautifully. B. C. occurs in a number of other places in Britain, and more abundantly near Paris and in Liguria and Hanover, where it forms thick beds in alluvial deposits.—The *Surturbrand* (q. v.) of Iceland is regarded as a variety of it. *Jet* (q. v.) is also sometimes regarded as a variety of brown coal. Although bearing the name of coal, B. C. is rather a kind of *lignite* (q. v.) than of coal.

BROWN PIGMENTS, a term in art applied to those substances in which the three primary colors unite in unequal proportions, red being in excess. B. P. are chiefly mineral, and are used sometimes in a raw but usually in a burned state. The most important are bistre, asphaltum, umber, terra di sienna, Mars brown, Cassel earth, and brown madder.

BROWN SPAR, a name often given by mineralogists to certain varieties of Dolomite (q. v.), or magnesian limestone, of not unfrequent occurrence, distinguished by a brownish or reddish color, and a pearly lustre, upon account of which they are also sometimes called *pearl spar*.

BROWNE, Charles Farrar, an American humorist, better known as 'Artemus Ward,' was born in Waterford, Maine, in 1836,and graduated from the free village school into a printing-office —the American boy's college. As a printer's boy, he worked in all the principal towns in New England, until settled at Boston, where he began to write comic stories and essays. A roving disposition carried him to the West, and he was engaged as local editor in Toledo, and later in Cleveland, Ohio, where his letters from 'Artemus Ward, showman,' a pretended exhibiter of wax figures and wild beasts, first attracted general attention. In 1860, he became a contributor to *Vanity Fair*, a New York comic weekly paper; and being invited to lecture, soon became very popular and attractive. As a lecturer, in 1863, he visited California, making the overland trip, visiting Salt Lake City, the Mormon capital, and drawing crowds in every town he visited.

In 1864, he opened his illustrated lectures on California and Utah in New York with immense success; and in 1866, was induced to visit England, where he became a contributor to *Punch*, and gave his lectures on the Mormons in the metropolis, at the Egyptian Hall, Piccadilly. But while convulsing crowded audiences with laughter, he was wasting with pulmonary disease. Early in 1867, he went to Guernsey for a milder air, but with no benefit; and was about to embark for America, when he died at Southampton, March 6, 1867. He was tall, slender, with striking features, and a most amiable character, which attracted and attached to him many friends. By his will, after providing for his mother, leaving legacies to his friends, and his library to the best boy in the school of his native village, he left the bulk of his property in trust to Horace Greeley to provide an asylum for printers. His collected writings, which have had a wide circulation in America and England, are *Artemus Ward His Book*; *Artemus Ward among the Mormons; Artemus Ward among the Fenians*; and a posthumous collection and biography entitled *Artemus Ward in England*.

BROWNE, Thomas, antiquary and physician, was born in London, 1605. His father, a merchant, left him an ample fortune, and he was educated at Winchester and Oxford. He began the study of medicine, then traveled over France and Italy, and after taking the degree of M.D. at Leyden, returned and settled (1636) at Norwich, where he continued to practise as a physician. He was knighted in 1671 by Charles II., and died 1682. His chief works are: *Religio Medici* (1642), *Inquiries into Vulgar and Common Errors* (1646), and a *Discourse on Sepulchral Urns* (1648). He wrote also *The Garden of Cyrus, or the Quincunxial Lozenge;* besides a variety of tracts, published after his death. His writings are highly prized by many for their genial fancy, pleasing quaintness of style, and varied erudition.

BROW'NIE, a domestic spirit of the fairy order in the old popular superstitions of Scotland. The common tradition respecting the B. is, that he was a good-humored drudging goblin, who attached himself to farmhouses and other dwellings in the country, and occupied himself during night, when the family were in bed, in performing any humble kind of work that required to be attended to, such as churning, thrashing corn, &c.—a spirit not seen or spoken to, and only known by the obliging performance of his voluntarily undertaken labors—a most valuable adjunct to the domestic establishment, and unfortunately no longer obtainable by good housewives. In Cornwall, a goblin known as *Browny* is evoked to assist at the swarming of bees (Borlace's *Antiquities of Cornwall*). The resemblance of the Scotch B. to the *Robin Goodfellow* (q. v.) of the English, and the *Kobold* of the Germans, is also so conspicuous that we must necessarily refer the different fragmentary legends on the subject to one of the old superstitions generally prevalent in Europe.

BROWNING, Elizabeth Barrett, England's greatest poetess, was born near Ledbury, Herefordshire, in 1809. Her maiden name was *Barrett*. The culture which she received in her youth was of a kind far transcending the ordinary education even of 'ladies intellectual.' Classics, philosophy, and science were studied with enthusiasm and success. At a comparatively early period, she became a contributor to periodicals, and a series of articles on the Greek Christian poets indicated that she possessed both recondite learning and keen poetic insight. Her first important essay in authorship was a translation of the *Prometheus* of Eschylus in 1833. In 1838, appeared the *Seraphim, and Other Poems*, the external peculiarity of which was its endeavor to embody the ideas and sentiments of a Christian mystery in the artistic *form* of a Greek tragedy. Delicate health, arising from the rupture of a blood-vessel in the lungs, and the death by drowning of a favorite brother in the following year, compelled her to live in seclusion for a long time. At length her health was restored, and in 1846 she married Robert Browning (q. v.). himself a great poet. After their marriage, they resided chiefly in Italy, in whose welfare they were passionately interested. In 1850, Mrs. B. published her collected works, together with several new poems, among which was *Lady Geraldine's Courtship*. In 1851, appeared the *Casa Guida Windows*, a poem whose theme was the struggle made by the Tuscans for freedom in 1849. *Aurora Leigh*, her longest production, was published in 1856. *Poems before Congress* appeared in 1860. Her poetry is distinguished by its depth of feeling, by its true pathos, by its noble and generous sentiments. Apparently she poured forth her verse with dangerous facility; and there are few of her poems which would not be improved by the simple process of curtailment. But there is not a thought or a sentiment of the many she has so beautifully expressed which any one would wish expunged. No writer ever exerted a better, gentler, happier influence. She died in 1861.

BROWNING, Robert, a distinguished contemporary poet, born in the neighborhood of London in the year 1812, and educated at the London University. The drama of *Paracelsus*, which first brought him into notice, was published in 1836. In the following year appeared his tragedy of *Strafford*, which was brought out upon the stage, but proved unsuccessful, though Macready himself personated the hero. *Sordello* and *The Blot in the Scutcheon* also failed, through lack of vivid and impressive incident. *Pippa Passes* secured a greater measure of popular approbation. In 1855 B. published *Men and Women*, one of his greatest works, containing poems which for depth and subtlety of conception, profound analysis of the human mind in its most delicate and impassioned conditions, and abstract speculative insight, are unsurpassed in the English language. If, as some think, in vigor and brilliancy of thought he is above Tennyson, he is as far beneath him in melody of versification and artistic beauty of style. Often he shows a morbid love of obscurity, but he frequently exhibits a Shaksperian clearness of idea and emphasis of expression. Some of his *Dramatic Lyrics* are faultless. Among his other poems are *The Ring and the Book; Balaustion's Adventure* (1871); *Prince Hohenstiel-Schwangau* (1871); *Red Cotton Night-cap Country* (1873); *Aristophanes' Apology* (1875); *The Inn Album* (1875); *Pacchiarotto, with other Poems* (1876); *La Saisiaz: The Two Poets of Croisic* (1878); *Dramatic Idyls* (First and Second Series, 1879—1880.—The *Browning Society*, for the study of B.'s poetry, has branches at Oxford, Cambridge, and elsewhere.

BROWNS on porcelain are generally imparted by a mixture containing sulphate of iron. See Pottery.

BROWNS on cloth are communicated by arnotto (q. v.) and copperas, assisted by fustic sumach, peachwood, logwood, and alum. See DYEING.

BRSHESI'NY, an insignificant town of Poland, in the government of Piotrkov, 62 miles south-west of Warsaw, near the railway that connects Warsaw with Vienna and other places. Pop. 2060

BRUCE, the surname of a family illustrious in Scottish history, descended from Robert de Bruis, a Norman knight, who accompanied William the Conqueror to England in 1066, and died soon after. His younger son, Adam, who acquired large possessions in Yorkshire, left a son, Robert de Brus of Cleveland, a companion in arms of Prince David of Scotland, afterwards David I., from whom he received a grant of the lordship of Annandale, held by the tenure of military service. At the commencement of the war in England between Stephen and Matilda, niece of the king of Scots, Robert de B. adhered to the former, and renounced his allegiance to David, resigning his lands in Annandale to his son Robert. In 1138 he was sent by the barons of the north of England to negotiate with David, who had advanced in support of his niece's claims as far as Northallerton, Yorkshire.

In the battle of the Standard which followed, he took prisoner his son Robert, then fourteen years of age, who, as lord of Annandale, fought on the Scottish side. He died in 1141. His English estates were inherited by his eldest son, Adam, whose male line terminated in Peter de B. of Skelton, Constable of Scarborough Castle in 1271. Robert de B., 2d lord of Annandale, had two sons: Robert—who married a natural daughter of William the Lion, and died, without issue, before 1191—and William, whose son, Robert, 4th lord of Annandale, married Isobel, 2d daughter of David, Earl of Huntingdon and Chester, brother of William the Lion, and thus laid the foundation of the royal House of Bruce. He died in 1245.

BRUCE, ROBERT DE, fifth lord of Annandale, son of the fourth lord above mentioned, and the competitor with John Baliol for the crown of Scotland, was born in 1210. On the death of his mother, the Princess Isobel, in 1252, he did homage to Henry III. for her lands in England, and in 1255 was made Sheriff of Cumberland, and Constable of the castle of Carlisle. About the same time he was appointed one of the fifteen regents of Scotland, in the minority of Alexander III. In 1264, he led, with Comyn and Baliol, the Scottish auxiliaries to the assistance of the English monarch at the battle of Lewes, where he was taken prisoner, but released after the battle of Evesham, the following year. On the Scottish throne becoming vacant at the death, in 1290, of Margaret, the 'Maiden of Norway,' granddaughter of Alexander III., Baliol and Bruce claimed the succession, the former as great-grandson of David, Earl of Huntingdon, by his eldest daughter, Margaret; the latter as grandson, by his second daughter, Isobel. Edward I. of England, to whom the dispute was referred, decided in favor of Baliol, 19th November 1292. To avoid swearing fealty to his successful rival, B. resigned Annandale to his eldest son, Robert de B., Earl of Carrick. He died at his castle of Lochmaben, Dumfriesshire, in 1295, leaving three sons and a daughter.

BRUCE, ROBERT DE, Earl of Carrick, eldest son of the preceding, accompanied King Edward I. of England to Palestine in 1269, and was ever after greatly esteemed by that monarch. On his return to Scotland, he married, in 1271, Martha Margaret, Countess of Carrick, and in her right became Earl of Carrick. Following the example of his father, to avoid doing homage to Baliol, he resigned the lordship of Annandale to his eldest son, Robert, the future king of Scotland, then a minor. Retiring to England, he was, on the death of his father, in 1295, appointed Constable of the castle of Carlisle; and in the following year, when Baliol renounced the authority of Edward, and assisted by the Comyns, had recourse to arms, B. fought on the side of the English. After the battle of Dunbar, in which the Scots were defeated, and Baliol compelled to relinquish the sovereignty, he made application to Edward for the vacant crown, but was refused it. He died in 1304.

BRUCE, ROBERT, the most heroic of the Scottish kings, eldest son of the preceding, was born March 21, 1274. In his youth he favored the English interests, in the expectation, doubtless, of his father being preferred to the Scottish throne. In 1296, as Earl of Carrick, he swore fealty to Edward I. at Berwick, and the following year he renewed his oath of homage at Carlisle. Shortly after, he abandoned the cause of Edward, and with his Carrick vassals, joined the Scottish leaders in arms for the independence of their country. On the defeat of the Scots, a few months afterwards, at Irvine, B. made his peace with the English monarch. After Wallace's defeat at Falkirk, B. burned the castle of Ayr to the ground, to prevent its falling into the hands of the English, and retired into the recesses of Carrick. In 1299, the year after Wallace had resigned the regency, B., then in his 25th year, was admitted one of the four regents, who ruled the kingdom in the name of Baliol. In the three campaigns which subsequently took place, previous to the final subjugation of Scotland, B. continued faithful to Edward, and in 1305 was consulted in the settlement of the government. With John Comyn, called the Red Comyn, the nephew of Baliol, he appears to have entered into some agreement as to their rival claims to the throne. In an interview between them, in the church of the Minorite Friars, Dumfsies, February 4, 1305–6, a quarrel took place, and B. in a paroxysm of passion, stabbed Comyn with his dagger. Rushing out to his attendants, he exclaimed: 'I doubt I have slain the Red Comyn.' 'You doubt!' cried one of them; 'I mak sikker!' (i. e., sure), and running into the church with some others, slew Comyn and his brother, who attempted to defend him. B. hastened to Lochmaben Castle, assembled his vassals, and asserted his right to the throne. Two months after (March 27), he was crowned king at Scone. An English army, under the Earl of Pembroke, nominated by Edward governor of Scotland, took possession of Perth, and on the night of the 18th June, attacked B. in the Wood of Methven, compelling him to retreat into the wilds of Athole. At Dalry, near the head of Loch Tay, B. was attacked by Alexander, Lord of Lorn, chief of the Macdougals, husband of the aunt of the Red Comyn, and compelled to retire. Sending his queen and her ladies to Kildrummie Castle, Aberdeenshire, under the charge of Nigel Bruce and the Earl of Athole, he, with 200 followers, crossed Loch Lomond, and had recourse for subsistence to the chase. B. next took refuge in the little island of Rathlin, on the north coast of Ireland, where he remained all winter, and was supposed to be dead. In his absence, the English took the castle of Kildrummie, hanged Nigel Bruce and other chiefs who had defended it, and tore the queen and Princess Marjory from the sanctuary of St. Duthac, Ross-shire. All B.'s estates were confiscated, and himself and adherents excommunicated by the pope's legate at Carlisle. In the spring of 1307, with about 300 men, B. landed in Carrick, and at midnight surprised the English garrison in his own castle of Turnberry; but before a superior force he retired into the mountainous districts of Ayrshire. At Loudon Hill, May 10, 1307, he defeated the English under the Earl of Pembroke, and, three days after, overthrew another party under the Earl of Gloucester. In less than two years he wrested from the English nearly the whole of Scotland.

His authority being now established, in 1309 B. advanced to Durham, laying waste the country. The same year, Edward II. of England invaded Scotland, but was compelled to retreat from Edinburgh to Berwick-upon-Tweed. In the harvest of 1312, the Scots again invaded England, but unsuccessfully. B. now reduced the Isle of Man also. On his return, in the autumn of 1313, he found his brother, Edward Bruce, engaged in the siege of Stirling Castle, held by Sir Philip Mowbray for the English. A treaty was entered into, by which Mowbray bound himself to surrender it, if not relieved before 24th June following. This led to the memorable battle of Bannockburn, 24th June 1314, at which B. commanded in person. The English, under Edward II., amounting, it is said, to about 100,000 men, were totally routed, leaving 30,000 dead upon the field; while the Scots, numbering only 30,000, and 15,000 camp-followers, lost about 5000. In 1317, B. passed over to Ireland, to assist his brother, Edward, elected king of that country, and defeated the Anglo-Irish under the Baron of Clare; and in the spring of 1318 the Scots army invaded England by Northumberland. Another invasion of Scotland by the English king, who was compelled to retreat, was followed by B. again marching into England. After besieging Norham Castle, he defeated Edward once more at Biland Abbey, Yorkshire. A truce was, in consequence, ratified between the two kingdoms at Berwick, June 7, 1323, to last for 13 years. On the accession of Edward III., in 1327, hostilities recommenced; and the Scots being again victorious, a final treaty was ratified in a parliament at Northampton, March 4, 1328, recognizing the independence of Scotland, and B.'s right to the throne. His warfare was now accomplished, and suffering under the disease of leprosy, he spent the last two years of his life at Cardross Castle, on the northern shore of the Firth of Clyde. He died June 7, 1329, in his 55th year, and the 23d of his reign. His heart, extracted and embalmed, was delivered to Sir James Douglas, to be carried to Palestine and buried in Jerusalem. Douglas was killed fighting against the Moors in Spain, and the sacred relic of B., with the body of its devoted champion, was brought to Scotland, and buried in the monastery of Melrose. B.'s body was interred in the Abbey Church of Dunfermline; and, in clearing the foundations for a third church on the same spot in 1818, his bones were discovered. He was twice married: (1) to Isabella, daughter of Donald, tenth Earl of Mar—issue, a daughter, Marjory, wife of Walter the High Steward, whose son ascended the throne as Robert II.; and (2) to Elizabeth, daughter of Aymer de Burgh, Earl of Ulster—issue, one son, who succeeded him as David II., and two daughters.

BRUCE, EDWARD, king of Ireland, brother to the above, a chivalrous but rash and impetuous prince, was actively engaged in the struggle for Scotland's independence; and in 1308, after de-

feating the English twice, made himself master of Galloway. In 1315, the chieftains of Ulster tendered to him the crown of Ireland, on condition of his assisting them to expel the English from the island. With a small army of 6000 men, he embarked at Ayr, and reached Carrickfergus, May 25th of that year, accompanied by Sir Thomas Randolph, Earl of Moray, Sir John of Soulis, Sir John the Stewart, Sir Fergus of Ardrossan, and other Scottish knights of renown. His rapid victories soon made him master of the province of Ulster, and he was crowned king of Ireland, May 2, 1316, but was slain at the battle of Dundalk, October 5, 1317.

BRUCE, DAVID, son of King Robert Bruce, succeeded his father, in 1329, as David II., when only five years old. In terms of the treaty of Northampton, he had married, when four years old, Joanna, daughter of Edward II. of England, and on 14th November 1331 he was crowned with her at Scone. In 1333, the success of Edward Baliol and the English party obliged David's guardians to send him and his consort to France; but on the dispersion of Baliol's adherents, David returned to Scotland in 1341. He made three unsuccessful inroads into England, and on a fourth invasion, in 1346, was taken prisoner at the battle of Neville's Cross, near Durham, and conveyed to the Tower of London. Thence he was removed to Odiham, in Hampshire, and not released till 1357, when his ransom was fixed at 100,000 marks. His queen dying in 1362, he married Margaret Logie, a Scottish gentlewoman of singular beauty, whom he divorced in 1370. He had no issue; and in his latter years, he was engaged in several intrigues with England, with the view of excluding his nephew, Robert, the Stewart of Scotland, the next heir, from the throne. He died at Edinburgh Castle, February 22, 1371.

BRUCE, JAMES, a celebrated traveler, born at Kinnaird House, Stirlingshire, December 14, 1730, was the eldest son of David Bruce, Esq., of Kinnaird, and Marion Graham, of Airth. Educated at Harrow, he was sent, in the winter of 1747, to the university of Edinburgh, with the intention of studying law; but changing his views, he went to London, and having, in February 1754, married the daughter of a wine-merchant's widow, became a partner in the business. His wife dying within a year, he made a tour on the continent, and on his father's death in 1758, he succeeded to the estate of Kinnaird. In 1761 he retired from the wine-trade, and in 1763 was appointed consul-general at Algiers. He remained there about two years, studying the oriental languages, and acquiring the rudiments of surgery. He then went to Aleppo, where he took further instructions in the medical art, being resolved to travel in the character of a physician. In June 1768, he proceeded to Alexandria, and from Cairo set out on his famous journey to Abyssinia, which forms an epoch in the annals of discovery. Sailing up the Nile to Syene, he crossed the desert to Cosseir, and arrived at Jeddah in April 1769. After various detentions, he reached Gondar, the capital of Abyssinia, in February 1770; and on November 14 of that year, succeeded in reaching the sources of the Abawi, then considered the main stream of the Nile. This accomplishment of the chief object of his journey filled him with the greatest exultation. He remained about two years in Abyssinia, and returning by way of Sennaar and the desert of Assouan, after great hardship reached Alexandria, whence he embarked, March 1773, for Marseilles. In France he spent a considerable time, visiting the celebrated Count de Buffon, and other distinguished men, and in 1774 he returned to Scotland. In 1776, he married Mary, daughter of Thomas Dundas, Esq., of Fingask, by whom he had two sons and one daughter. His long-expected *Travels to Discover the Sources of the Nile, in the Years* 1768—1773, were published in 1790, in 5 large 4to vols., with plates and charts. The work contained such curious accounts of the manners and habits of the people of Abyssinia, that it startled the belief of many, and some of them were set down as fabrications. Among other doubters were De Tott in France, and Dr. Johnson in England. Modern travelers, including Salt, Pearce, Burckhardt, Belzoni, and others, have, however, fully confirmed his statements. B. died April 27,1794, at Kinnaird, of a fall down stairs.

BRUCE, MICHAEL, a minor Scottish poet, the son of a weaver, born at Kinnesswood, Kinross-shire, Scotland, March 27, 1746, was in his younger years, employed as a herd-boy. In 1762 he was sent to Edinburgh University to study for the ministry, and when not at college, was engaged as a village schoolmaster. He had all his life to struggle with poverty, and his frame being weak, melancholy took possession of his mind, and his constitution began visibly to decline. He died of consumption, July 6, 1767, aged 21. His poems, few in number, and of a tender and pathetic description, were published by the Rev. John Logan, his fellow-student and associate at college, at Edinburgh in 1770. His last composition was a touching elegy on his own approaching death.

BRU'CEA, a genus of shrubs somewhat doubtfully referred to one or other of the allied natural orders *Rutaceæ* (q. v.), *Simarubaceæ* (q. v.), and *Xanthoxylaceæ* (q. v.).—*B. antidysenterica*, or *ferruginea*, is an Abyssinian species, the leaves of which are said to be tonic, astringent, and useful in dysentery. Those of *B. Sumatrana*, a native of the Indian Archipelago, China, &c., possess the same medicinal properties. They are intensely bitter.—The Abyssinian species acquired a factitious importance in the beginning of the 19th c., from a mistaken belief that it produced the dangerous False Angostura Bark (see ANGOSTURA BARK), and in this belief the name *Brucine* (q. v.) was given to an alkaloid really produced by the Nux Vomica (q. v.) and other species of *Strychnos* (q. v.).

BRU'CHSAL, a town of the grand duchy of Baden, situated on the Salzbach, and on the railway between Heidelberg and Carlsruhe, 12 miles north-east of the latter place. B., which is a place of considerable antiquity, has three suburbs. The old castle of the prince-bishops of Speier, who took up their residence here early in the 11th c., is still standing, and in the church of St. Peter are some ancient tombs. B. has two prisons organized on a modified form of the Pennsylvanian system. Pop. (1875) 10,810, who were chiefly engaged in the wine trade.

BRU'CINE is one of the Alkaloids (q. v.) present in *Strychnos Nux Vomica* along with strychnine, &c. It is not so abundant as the strychnine, nor is it so poisonous. It is mainly characterized by giving a blood-red color with concentrated commercial nitric acid, and, indeed, the red color always yielded by nux vomica, and occasionally by strychnine, when treated with nitric acid, is due to the presence of brucine.

BRUCKENAU, a village of Bavaria, on the Sinn, 36 miles north-east of Würzburg. It is famous in connection with the baths of B., which are picturesquely situated in a beautiful part of the valley of the Sinn, about two miles west from the village. The grounds are tastefully laid out in gardens, and charming walks traverse the surrounding woods. The place is a favorite summer resort of the Bavarian court. B. has paper-mills. Pop. (1871) 1669.

BRUGES (Ger. *Brügge*), a city of Belgium, capital of the province of West Flanders, is situated in a fertile plain about 8 miles from the sea, with which it is connected by the three canals from Ghent, L'Ecluse, and Ostend, the latter admitting the largest sea-going ships. Lat. 51° 12′ N., long. 3° 14′ E. B. derives its name from its many bridges, all opening in the middle to admit of the passage of vessels. The ramparts surrounding the city are an agreeable promenade. The streets have a venerable and picturesque appearance, but they are greatly deserted, the population of the city being now scarcely a quarter of what it was during the middle ages. Among the most interesting buildings are the town-hall, with a lofty tower and a celebrated set of 48 bells; a Gothic senate-house, built about the close of the 14th c.; a court of justice, containing a famous carved chimney-piece of the date 1559; the church of Notre Dame, with its spire 450 feet high, its many valuable paintings, and a statue of the Virgin (said to be by Michael Angelo), for which Horace Walpole offered 30,000 florins, and its splendid monuments of Charles the Bold and his daughter Mary, wife of the Emperor Maximilian; the cathedral of St. Sauveur, not remarkable for its exterior, but containing paintings by eminent masters; St. John's Hospital, with celebrated pictures by Memling, &c. The Academy of Painting contains several fine pictures by J. van Eyck. B. has manufactures of woollen, linen, cotton, lace, leather, cordage, and tobacco; and distilleries, sugar and salt refineries, and ship-building yards. Railways connect B. with Ostend, Ghent, and other cities of Belgium and the continent. Pop. (1876) 45,097, of whom nearly a third are paupers. B. is a very ancient city. Here, it is said, St. Chrysolus preached the gospel as early as the 3d century. In the 7th c., B. was the capital of the surrounding district called Flanders, and before the conquest of England by the Normans, its commercial importance was established. In the beginning of the 13th c., it was the central mart of the Hanseatic League; and in the following century it may be said to have become the metropolis of the world's commerce. Commercial agents from 17 different kingdoms resided here, and no less than 20 ministers from foreign courts had mansions within its walls. Its population at this time amounted to upwards of 200,000. In 1488, the citizens rose in insurrection against the Archduke Maximilian, and with the harsh measures of repression which ensued, commenced the commercial decline of Brüges. Many of the traders and manufacturers, driven forth from their own country, settled in England, and from this time may be dated the beginning of English manufacturing superiority. In the 16th c., however, the tapestry of B. was still celebrated throughout Europe, and the famous Gobelin tapestry of Paris is said to owe its origin to a manufacturer of Brüges. The city was taken by the French in 1794, and soon after incorporated with the French empire; but in 1815 it became a part of the kingdom of the United Netherlands, and in 1830 of the Belgian monarchy.

BRUGG, or BRUCK, a village of Switzerland, in the canton of Aargau, on the right bank of the Aar, and near the mouth of the Reuss, about 9 miles north-east of Aarau. It is interesting as

occupying a part of the site of the ancient *Vindonissa*, the strongest fortress, as well as the most important settlement of the Romans in Helvetia; and also as the cradle of the House of Hapsburg, to whom, in early times, it belonged. The remains of the castle of Hapsburg, founded by Count Radbod of Altenburg in 1020, are still to be seen on a wooded height, about 2 miles from the village. Nearer, is the Abbey of Königsfelden, founded in 1310 by the wife and daughter of the Emperor Albert, who, two years before, was murdered on the spot by his nephew and others, for which a terrible revenge was taken on the relatives of the murderers. In the vaults beneath the abbey are interred many of the members of the Austrian royal family. High conical roofed towers guard the exit and entrance to B., which has a population of (1870) 1338. Zimmerman was a native of this place.

BRUHL, a town of Rhenish Prussia, about 9 miles south-southwest of Cologne, on the railway to Bonn. It is surrounded by old walls, and has a splendid château, erected in the early part of the 18th c. by the Elector Clement Augustus of Bavaria. There is also an ancient Franciscan convent, now converted into a seminary for Roman Catholic schoolmasters. After his banishment from France in 1651, Cardinal Mazarin took up his residence in Brühl. Pop. (1875) 3499.

BRUHL, Heinrich, Count von Bruhl, prime-minister of Augustus III., king of Poland, and Elector of Saxony, deserves a place in history as a signal example of an unworthy minister and venal statesman. He was born in 1700, at Weissenfels, and in early life entered, as a page, into the service of the Duchess of Sachsen-Weissenfels. His winning address and tact gained for him rapid promotion through several offices of state, until, in 1747, he became prime-minister to that idle and unpatriotic ruler, Augustus III. Never was a ruler more slavishly obeyed by a statesman. B. would follow the prince, as he strolled about smoking, without speaking a word for a whole day; or, when his majesty lazily inquired: 'Brühl, have you any money for me?' 'Yes, sire,' would be the constant reply; but in order to be able to give this answer as frequently as it was demanded, B. drained the coffers of the state, and burdened the country with debt. He, however, contrived to enrich himself, and to accumulate honors and titles. By Elizabeth of Russia, he was invested with the order of St. Andrew, and by Charles VI. of Austria, he was made a count of the empire.

He kept 200 servants, paid his body-guard better than Augustus did his, furnished the costliest table, possessed the finest wardrobe, and in short, maintained the most splendid establishment in the kingdom. 'Of all statesmen,' said Frederick II., 'Brühl has collected the greatest quantity of fine clothes, watches, lace, boots, shoes, and slippers!' The effect of B.'s reckless robbery of the national finances to gratify the dissolute Augustus and himself, made itself felt at the outbreak of the Seven Years' War, when the country could only furnish 17,000 men to oppose Frederick of Prussia, who surprised and captured the whole Saxon army in its camp at Pirna. Augustus and B. fled to Warsaw. When peace was concluded, they returned to Dresden, where Augustus died on the 5th Oct. 1763, and was followed by his worthless parasite, 28th Oct. B.'s palace is still one of the principal buildings in Dresden, and his library of 62,000 vols. forms a chief part of the Royal Library, Dresden.

BRUISE, or CONTUSION, signifies an injury inflicted by a blow or sudden pressure, in which the skin is not wounded, and no bone is broken or dislocated. Both terms, and especially the latter, are employed in surgery to include all such injuries in their widest range, from a black eye to a thoroughly crushed mass of muscle. In the slighter forms of this injury, as in ordinary simple bruises, there is no tearing, but only a concussion of the textures, the utmost damage done being the rupture of a few small blood-vessels, which occasions the discoloration that is always observed in these cases. In more severe contusions, the subjacent structures—muscles, connective tissues, vessels, &c.—are more or less ruptured, and in extreme cases, are thoroughly crushed, and usually become gangrenous. The quantity of blood that is extravasated mainly depends upon the size and number of the ruptured blood-vessels, but partly also on the nature of the textures of the injured part. Thus, a lax tissue, as that of the eyelids, favors the escape of blood into the surrounding parts. Moreover, the constitution of the patient has some influence, and many persons, especially (according to Mr. Paget, in his article on 'Contusions' in Holmes's *System of Surgery*, vol. i.) pallid, fatty, soft-skinned women, though suffering from no apparent disease, are subject to extravasations, and consequently to discolorations, very disproportionate to the injuries that cause them.

The most characteristic signs of a recent contusion are more or less Shock (q. v.), pain, swelling, and discoloration of the surface from effused blood (commonly known as *Ecchymosis*, q. v.). There is nothing special in the character of the shock, but it is worthy of notice that it is most severely felt in injuries of special parts—as the testes, the breasts, and the larger joints, which are often followed by remarkable general depression, faintness, loss of muscular power, and nausea. The immediate pain following the blow is succeeded by a feeling of numbness, which, after a varying time, unless the part is killed, gives place to a heavy, aching pain. Although some depression may usually be observed immediately after the infliction of the blow, swelling of the parts rapidly follows, as may be well seen in the case of a child receiving a blow on the head, or of the wale that rises after the lash of a whip. In lax parts, such as the eyelids, the swelling is often considerable, and may remain for a week or more; but in other parts, it usually subsides in two or three days. The discoloration of the skin consequent on blows is of a more or less purple tint, varying from black to crimson or pink. 'Blackness,' says Mr. Paget (*op. cit.*), 'usually indicating intense injury, is probably due to the extravasation of a large proportion of entire blood; crimson or pink tints, to the prevalence of a blood-stained fluid; blue, to the degrees in which blackness is veiled by the cuticle and skin, as the color of blood in veins is; and perhaps some of the shades of pink to the partial aëration of the blood by the penetration of air through the epidermis. After a variable time, proportionate to the severity of the injury, these colors fade out, passing most commonly through gradually lightening shades of brownish olive, green, and yellow.' The cause of these changes of color are not clearly known; as, however, the changes are not observed in bruises of parts removed from air and light, they are probably due to oxidation and actinic agency. When a severe bruise tends to a natural cure, and there is no inflammation or sloughing, the effused blood is generally absorbed, the liquid portion rapidly disappearing, while the blood-cells are more slowly removed. In some cases, it is probable that the effused blood becomes organized into vascular connective tissue, which takes part in the repair of the injured tissue. We need not follow the course of a bruise in which active inflammation with suppuration ensues, or in which sloughing takes place, as these complications must be treated according to the ordinary rules for those affections. There are, however, one or two ill consequences following partial recovery, which require notice.

Thus, in some organs, as the breast, abscess may ensue long after a blow; or a sensitive indurated lump may remain; or (more commonly) there may be long-continued pain, without change of texture; or, lastly, cancer may ensue. Blows on superficial bones, as those of the skull, are not unfrequently followed by very painful thickening of the periosteum; and a muscle violently struck may be paralyzed, and rapidly waste away; and constitutional diseases, such as gout and rheumatism, are well known to localize themselves with special severity in parts that have once been seriously bruised.

With regard to treatment, simple and not very severe bruises require little treatment but the rest necessary for the avoidance of pain; but the removal of the swelling and discoloration may be hastened by the application of various local stimulants, which seem to act by accelerating the circulation through the bruised part, and promoting the absorption of the effused fluid. Friar's balsam, compound soap liniment, or poultices made with the roots of black bryony beaten to a pulp, are popular remedies of this class. Mr. Paget regards the tincture of arnica as the best application. Where the skin is thick, it may be gently rubbed over the bruised part in an undiluted state; where the skin is thinner, it should be mixed with an equal bulk of water; or, which is probably better, it may be constantly applied as a lotion if diluted with five or six parts of water. Pugilists, who are probably better acquainted with ordinary bruises than any other class of men, are in the habit of removing the swelling of the eyelids that often naturally occurs during a prize-fight, to such an extent as to close the eyes, by at once puncturing the eyelids at several points with a lancet; and their favorite remedy for a black-eye or other bruise on the face is a fresh beef-steak applied locally, as a poultice. Bruises of a more severe nature, as when there is much breaking or crushing of the tissues, must, of course, at once be placed in the hands of a surgeon.—For further details on this subject, the reader is referred to Mr. Paget's excellent article, from which we have freely quoted.

BRUMAIRE (Lat. *bruma*, winter), a division of the year in the republican calendar of France. It includes the time from October 22 to November 20. The celebrated 18th B., which witnessed the overthrow of the Directory and the establishment of the sway of Napoleon, corresponds with November 9, 1799, of the Gregorian calendar.

BRUNCK, Richard François Philippe, one of the most ingenious critics and philologists of modern times, was born at Strasburg, December 30, 1729. He was educated under the Jesuits in Paris; but abandoned his studies, and for some time was engaged as a military commissary during the Seven Years' War. A professor in Giessen, with whom B. happened to lodge while the army was in winter-quarters, revived in him the love of classical studies. Returning to Strasburg, he devoted all his spare time to Greek, and soon distinguished himself as an able but adventurous

critic and emendator. His belief that all inaccuracies in ancient Greek writings were introduced by copyists, often led B. astray; but, since the revival of learning, few critics have done more for the progress of Greek literature. His first work, *Analecta Veterum Poëtarum Græcorum* (1772—1776), was followed by several editions of Anacreon (1778—1786), and editions of Apollonius Rhodius (1780) and Aristophanes (1781—1783), *Poëtæ Gnomici* (1784), Virgil (1785), and Sophocles (1786—1789). The last of these established a new era in the criticism of the tragic writers. The outbreak of the French Revolution interrupted B.'s studies. He ardently attached himself to the popular side. During the Reign of Terror, he was imprisoned, but was liberated after the downfall of Robespierre. His means, however, had been so much reduced, that he was compelled to sell his valuable library. From this time, 1801, he turned his attention from Greek to Latin literature, and published editions of Plautus and Terrence. He died June 12, 1803.

BRUNE, Guillaume Marie Anne, a French marshal of the first empire, was born at Brives-la-Gaillarde, 13th March 1763. His education brought him at an early period into connection with the men of the revolution. Along with Danton, he helped to establish the Cordeliers' Club. After the conquest of Belgium, he was sent as civil commissary to that country, but his warlike aspirations soon induced him to enter the military service. In 1797, he became brigadier under Napoleon in the army of Italy, and distinguished himself at Arcola and Rivoli, where he was made general of division and leader of the advance-guard.

Sent by the Directory to Switzerland in 1798, he executed his orders with brilliant success. In 1799, he was appointed to the command of the army of Holland, where he achieved the reputation of being one of the best generals of his age. He vanquished the Anglo-Russians at Bergen on the 19th of September 1799, and on the 19th of October, forced the Duke of York, commander-in-chief of the combined armies, to capitulate at Alkmaar, under humiliating circumstances. In 1803, he was named ambassador to the Ottoman Porte, and was received by Selim III. with great distinction. In 1804, he obtained the dignity of marshal, and in 1805 returned to France. Two years afterwards, B. became governor-general of the Hanseatic towns, and was charged with the conquest of Pomerania; but circumstances having occurred which unnecessarily excited the distrust of Napoleon, he was recalled, and his future services dispensed with. After the fall of the emperor, he declared for the Bourbons, but his offers were rejected, and, in consequence, he joined Napoleon after his return from Elbe. He was now made a peer, but the battle of Waterloo completely destroyed his prospects. He again made his submission, but was barbarously assassinated at Avignon, 2d August 1815, by the populace, who were infuriated against him on account of certain crimes laid to his charge, of which, however, he seems to have been entirely guiltless.

BRUNE ISLAND lies off the south part of the east coast of Tasmania, from which it is separated by D'Entrecasteaux Bay. It has a length of 32 miles, with a breadth varying from 1 to 6 miles; and its east or outside coast is indented by a bay, which takes it name from the *Adventure*, one of Cook's two vessels during his second voyage.

BRUNEL, Sir Mark Isambard, the celebrated engineer of the Thames Tunnel, son of an agriculturist, was born at Hacqueville, near Rouen, in France, April 25, 1769. He early showed an inclination for mechanics, and at school preferred the study of the exact sciences to the classics. In 1786, he became a sailor in the French navy. In the revolutionary period of 1793, having compromised himself by his political opinions, he escaped from Paris to the United States. His career as an engineer began in 1794, when he was appointed to survey for the canal which now connects Lake Champlain with the river Hudson at Albany. He afterwards acted as an architect in New York. On his return to Europe in 1799, he married the daughter of William Kingdom, Esq., Plymouth, and settled in England. A plan submitted by him to government for making block-pulleys for ships by machinery was adopted, and he was for many years employed in carrying it into execution in Portsmouth dockyard. He was also successful in the construction of other public works—in Woolwich arsenal and Chatham dockyard, &c. His most remarkable undertaking was the Thames Tunnel, formed beneath the bed of the river, and which, commenced in March 1825, was open to the public in March 1843. Assisted by his son, the subject of the next article, he for ten years pursued a course of experiments for employing carbonic acid gas as a motive power, but the cost of the machinery prevented its introduction as a substitute for steam. Among the less important of B.'s inventions, were machines for making wooden boxes; for ruling paper; for shuffling a pack of cards without using the hands; for the manufacture of nails; and for making seamless shoes for the army—the latter, tried for two years, was abandoned from economical motives. Elected a Fellow of the Royal Society in 1814, he was appointed Vice-president in 1832. He was knighted in 1841; and died, December 1849, in his 81st year.

BRUNEL, Isambard Kingdom, an eminent engineer, son of the preceding, born at Portsmouth, England, in 1806, was educated at the college of Henri Quatre, Caen, in France. He commenced practical engineering in 1826, under his father at the Thames Tunnel, and in the progress of that great work was often exposed to danger from the water breaking in and flooding the excavations, having more than once to save his life by swimming. He assisted in his father's experiments for making carbonic acid gas a motive power, and was designer and civil engineer of the *Great Western*, the first steamship built to cross the Atlantic; and of the *Great Britain*, the first ocean screw-steamer. The *Great Eastern*, the largest vessel ever built in the world, was erected under his sole direction. In 1833, B. was appointed chief-engineer to the Great Western Railway, and designed and constructed the whole of the tunnels, bridges, viaducts, and arches on this line, and extension branches. Among other docks at English seaports, in the improvement and construction of which he was engaged, may be mentioned the Bute docks at Cardiff, and the old North Dock at Sunderland. In 1842, he was employed by government to construct the Hungerford Suspension-bridge across the Thames at Charing Cross, London. In 1850—1853, he constructed the works of the Tuscan portion of the Sardinian railway. Made a Fellow of the Royal Society in 1830, he was chosen on the Council in 1844. He was also Vice-president of the Institution of Civil Engineers, and of the Society of Arts; a Fellow of the Astronomical, Geological, and Geographical Societies, and Chevalier of the Legion of Honor. He died suddenly, September 1859.

BRUNELLESCHI, Filippo, one of the greatest Italian architects, was born at Florence in 1377. He first learned the art of a goldsmith; next that of a sculptor; and finally dovoted himself to that of architecture. He also studied zealously both mechanical and mathematical science, and is reckoned the first who established, on a sound basis, the theory of perspective. When still a young man, B. went to Rome, where he acquired a profound knowledge of ancient architecture, the result of which was, that two ideas completely possessed his mind; the one was, to revive the ancient style of architecture; the other was, to make himself master of the mechanical knowledge of the ancient architects. In 1407 he returned to Florence. In 1420, it was proposed to complete the structure of the cathedral of Santa Maria del Fiore, founded in 1296, and now only wanting a dome. A great assembly of architects from all quarters was convened to determine how it might be practicable to cover the vast octangular area. While the debate was going on, B. was earnestly elaborating his own designs; but when he first came forward and proposed his plan, it was so ill-received, on account of its supposed absurdity, that B. was 'lifted off his legs, and carried out of the room.' He, however, obstinately persisted in explaining his scheme, and at last succeeded in convincing every one of its feasibility, The work was intrusted to him, and finished, with the exception of the lantern, with which he intended to crown the whole, but was prevented by his death in 1444. B's dome, measured diametrically, is the largest in the world, and served as a model to Michael Angelo for that of St. Peter's. Besides this *chef-d'œuvre*, B. executed several other great works, such as the churches of San Spirito and San Lorenzo, as well as the designs far the Pitti Palace, which originated the beautiful style of Tuscan palace-architecture in the 15th century.

BRUNI, Leonardo, a native of Arezzo, and hence called *Aretino*, was born in 1369. He merits notice as one of the most learned men who flourished during the epoch of the revival of Greek learning in Italy. He first studied law at Florence and Ravenna, but afterwards turned his attention to classical literature. He then went to Rome, where he filled several offices at the papal court. In 1414, he attended John XXII. to the council of Constance. On the deposition of that pope, he returned to Florence, where he was of service to the republic in several important matters. His *Historia Florentina* procured for him the rights of citizenship, and, at a later period, through the favor of a Medicean family, he was appointed state-secretary. He died 9th March 1444. Florence and Arezzo vied with each other in the splendor with which they celebrated his obsequies.

B. aided in advancing the study of Greek literature mainly by his literal translations into Latin of Aristotle, Demosthenes, Plutarch and others. Of his original works, which are very numerous, many have never been printed, and most are nearly forgotten. We may mention *Commentarius Rerum suo Tempore Gestarum* (Ven. 1476), *De Origine Urbis Mantuæ*, *De Romæ Origine*, *Epistolæ Familiares*, and *Vite di Dante e del Petrarca*.

BRUNN, a fortified city of the Austrian empire, capital of the government of Moravia, is beautifully situated, partly on the slope of a hill, and partly in a pleasant valley, at the confluence of the Schwarzawa and the Zwittawa, in lat. 49° 12′ N., and long. 16° 37′ E. Behind the city, on an eminence, is situated the castle of

Spielberg, formerly the citadel, but now used as a state-prison, and noteworthy as the place in which Silvio Pellico was confined from 1822 to 1830. Among the most interesting buildings of B. are the cathedral of St. Peter; St. James's Church, a Gothic edifice, with a tower 276 feet in height, and a valuable collection of ancient printed books; the Church of the Minorites; and the Augustine convent. There are also several fine palatial residences belonging to the old nobility. B. is one of the most important manufacturing towns in the Austrian dominions. Its woollens are specially celebrated, and it has also manufactures of cotton, silk, ribbons, yarns, glass, leather, soap, tobacco, and dye-stuffs. Pop. (Dec. 31, 1869) 73,771. Napoleon made B. his headquarters before the battle of Austerlitz.

BRU'NNEN, a village of Switzerland, in the canton of Schwyz, of which it forms the port, near the mouth of the Muotta, in the Lake of Lucerne. It is beautifully situated at the south-eastern bend of the lake, and is celebrated in history as the place where, in December 1315, the deputies of the Forest Cantons, who, eight years before, had formed a plan for the liberation of their country from the Austrian yoke, laid the basis of the Helvetic Republic.

BRUNNOW (Count), Ernest Phil. von, a Russian diplomatist, was born at Dresden, 1797, and studied at the university of Leipsic. At the time of the Congress of Aix-la-Chapelle, he entered the Russian service, and the ministers Nesselrode and Capo d'Istrias recognized at once his fitness for a diplomatic career. Among other posts, he attended the congresses of Troppau and Laybach, acted one year as secretary to the embassy in London, went to the congress of Verona, and then occupied for a time a high office in St. Petersburg. He was present, in a civil capacity, in the campaigns of 1828 and 1829 against the Turks. In the autumn of 1839, he was sent on a special mission to London, to take advantage of the unpleasant feeling between Great Britain and France for drawing the cabinets of St. Petersburg and London closer together, and in the following spring was accredited as permanent ambassador. In this capacity he soon acquired distinction as a diplomatist. After retiring from London on the outbreak of the war in 1854, he represented Russia in Frankfort, and along with Count Orloff, was sent to the conference of Paris, February 1856. Immediately after the treaty of peace had been concluded, he was sent on a special mission to London, to re-establish friendly relations between the courts of St. Petersburg and St. James's. He was afterwards appointed to the court of Prussia; but in 1858 he returned to his old place in London, where he was a great favorite. He represented Russia at the conferences in London in 1864 and 1871. In recognition of his services, he was raised by the emperor of Russia to the rank of count in April 1871. In 1874, he retired to Darmstadt, where he died in the following year.

BRUNO, Giordano, the precursor of the school of modern Pantheistic philosophers, was born at Nola, in the kingdom of Naples, about the middle of the 16th century. He entered, at an early age, the order of the Dominicans, but soon began to express his doubts in regard to the doctrines of Transubstantiation and of the Immaculate Conception, in consequence of which he was obliged to flee from his convent. Henceforth, his life was unsettled. In 1580, he went to Geneva, where he spent two years, but having excited the suspicion and dislike of the strict Calvinists of that city by his general scepticism, he judged it prudent to betake himself to Paris, where he delivered prelections on the 'Great Art' (Logic) of Raymond Lully. His disputes with the bigoted Aristotelians of the university of Paris compelled him, however, to leave France. He passed over into England, where he resided for two years in comparative quiet, enjoying the friendship of Sir Philip Sidney and the protection of the French ambassador, Michel de Châteauneuf de la Mauvissière. Here he composed his most important works, but at last, having incurred the displeasure of the clergy by his vehement denunciation of the Aristotelian philosophy, and other grave heresies, he returned to Paris in 1585. In 1586, he proceeded to the university of Marburg, where he matriculated; and to Wittenberg, where he became professor; but being asked to join the Lutheran communion, he refused. On his departure from the city, he pronounced an impassioned panegyric on Luther. After spending some time in Prague, Brunswick, Helmstadt, and Frankfort-on-the-Maine, he resolved to go back to Italy. He fixed his residence at Padua; but after a stay of two years, he went to Venice, where he was arrested by the officers of the Inquisition, and conveyed to Rome in 1598. He was now subjected for two years to persecution, in the vain hope that he would recant; but when all the endeavors of his enemies proved ineffectual, he was brought to the stake on the 17th February 1600, and burned as an obstinate heretic.

B.'s writings, of which the most valuable are composed in Italian, display throughout a strong, courageous, excitable soul, susceptible of deep enthusiasm, but vainly laboring to attain perspicacity. The *Cena delle Ceneri*, or Evening Conversations on Ash-Wednesday, is an apology for the Copernican astronomy; the *Spaccio della Bestia Trionfante*, or Expulsion of the Triumphant Beast (Par. 1584), is a satirical but somewhat heavy allegory in the style of the times. His greatest works are metaphysical, such as the *Della Causa Principio ed Uno* (On the One Sole Cause of Things), and the *Del Infinito Universo e Mondi* (On the Infinity of the Universe and of Worlds). The doctrine enunciated in these is Pantheistic. B. held that the infinite soul of God did not merely inhabit or pervade the universe, but that the universe was simply a manifestation of Him, and therefore itself divine. God was therefore, in the most literal and physical sense, all *in* all. B.'s philosophy, in later times, was quite unappreciated, and even neglected, until Jacobi drew public attention to it in his *Letters on the Doctrine of Spinoza*. Both Spinoza and Descartes were much indebted to Bruno. His influence is also discernible in the Pantheistic speculation of modern Germany. Original editions of B.'s works are very rare. Those in Italian were published by Wagner in 1830: some Latin ones by Gfrörer in 1836. See Bartholomès's *Bruno* (1846); Berti's *Vita di B.* (1868).

BRUNO, The Great, Archbishop of Cologne, and Duke of Lorraine, one of the most eminent men of his time, was born about 928 A.D. He was the third son of Henry the Fowler, and the brother of Otto I., Emperor of Germany. Baldrich, Bishop of Utrecht, and afterwards Israel Scotigena, and others, were his tutors. His surprising knowledge, sagacity, and eloquence secured for him an immense influence over the bishops and clergy, while, on the other hand, his liberality, meekness, and great earnestness of heart, won the affections and reverence of the laity. Summoned by Otto to the imperial palace, he quickly assumed an influential position among the chroniclers, poets, and philosophers of the court. At a later period, he was appointed Archbishop of Cologne, and Lord High Chancellor of the empire. He accompanied Otto to Italy in 951, and honorably distinguished himself by his fidelity to his brother, when Otto's own son, Conrad, and others of his kindred rebelled against him. As a reward, the emperor appointed him Duke of Lorraine. B. died at Rheims, 11th October 965. He wrote a commentary on the Pentateuch, and several lives of saints.

BRUNO, Saint, the founder of the Carthusian order of monks, was born at Cologne 1051, and received his earliest education in the school attached to the Collegiate Church of St. Cunibert. Subsequently, he studied at Rheims, where he distinguished himself so greatly, that Bishop Gervasius appointed him director of all the schools in his diocese. B., however, soon began to be troubled by the wickedness of his time, and, anxious to escape from what seemed to him the general pollution, he took refuge, along with six pious friends, in a desert place near Chartreuse, in the diocese of Grenoble. Here, in 1086, he founded one of the most austere of all the monkish orders, which received its name from the locality whence it had sprung. See Carthusians. B. and his companions had each a separate cell, in which they practised the severities of the rule of St. Benedict, keeping silence during six days of the week, and only seeing one another on Sundays, Pope Urban II., who was one of B.'s most eminent scholars, in 1089 summoned the saint to Rome. B. obeyed the call reluctantly, and steadily refused all offers of preferment. In 1094, he established a second Carthusian monastery, called La Torre, in a solitary district of Calabria, where he died in 1101. He was not canonized until 1628. B. left no written regulations for his followers. These first made their appearance in a complete form in 1581, and were enjoined on all Carthusians by Innocent IX.

BRU'NSWICK, Duchy of (Ger. *Braunschweig*), a state of Northern Germany, consisting of three larger and five smaller distinct parts, and lying mostly within lat. 51° 38′—52° 28′ N., and long. 9° 23′—11° 30′ E. Its entire area amounts to about 1425 square miles. Pop. in 1875, 327,493. For administrative purposes, B. is divided into six circles—viz., Brunswick, Wolfenbüttel, Helmstedt, Gandersheim, Holzminden, and Blankenburg. Of the three larger parts, the principal one, forming the circle of Wolfenbüttel, and including the capital, lies between Prussia and Hanover; the second, extending east and west from Prussia to the Weser, divides Hanover into two parts; and the third, forming the circle of Blankenburg, lies to the south-east between Hanover, Anhalt, and Prussia. The smaller parts are the isolated bailiwicks of Calvörde in the east, Thedinghausen in the west (not far from Bremen), and some very small demesnes in the Hanoverian boundaries. B. belongs mostly to the basin of the Weser, which serves as a boundary on the west. The surface is mostly mountainous, particularly in the southern portions of the country, but B. has nevertheless level tracts of considerable extent. The rivers, with the exception of the Weser, are comparatively unimportant, though advantage is taken of one or two for the transport of timber. The climate in the low lands resembles the general climate of Northern Germany; but in the Harz district it is so much colder, that harvest is generally a month later than in the plains.

The mines and quarries of B. produce marble, alabaster, limestone, gypsum, alum, iron, copper, lead, sulphur, and salt in large quantities, with some portions of gold and silver. Agriculture, which is carried on with intelligence and energy, constitutes the chief wealth of the duchy. The products include, beside the ordinary cereals, large quantities of leguminous plants, potatoes, tobacco, and hops. The pasture-land is extensive, and great attention is paid to the rearing of cattle, and especially to the breeding of sheep, wool being an important article of commerce. A large number of persons are employed in the cutting and preparation of timber. The chief manufactures of B. are of linen, stockings, woollen cloth, metals, porcelain, paper, sugar, glass, beer, &c.

The inhabitants are mostly Saxons, and, with the exceptions of about 3000 Reformed, 7000 Roman Catholics, and 1100 Jews, all adhere to the Lutheran Church. The people in the rural districts speak a very broad Low-German dialect; but good High-German is spoken by the educated classes. Education is well looked after by the government, which is a limited monarchy, the duke being head of the state, and his power restricted by the legislature, which is partly hereditary and partly elective. As a state of the German empire, B. has two votes in the Bundesrath (confederate council), and sends three deputies to the Reichstag or parliament.

The annual revenue of Brunswick in 1880 was given at 8,760,441 marks (£438,022), and just balanced the expenditure. In 1879 the public debt amounted in all to 86,736,972 marks (£4,336,848), of which a large portion was borrowed for the construction of railways. The civil list of the duke is not comprised in the budget, being paid out of a special fund consisting of the revenues of the state domains, which amount to 729,166 marks, and other receipts amounting to about 70,000 marks.

B. was included, as a part of Saxony, under the empire of Charlemagne. In 1235, B., with Lüneburg, was made a duchy under Otto, who died in 1252, and was succeeded, in 1267, by his son, Albrecht, founder of the older line of Wolfenbüttel. John, another son of Otto, was the founder of the older Lüneburg line, which became extinct with William of Lüneburg in 1369. In 1569, Henry, who styled himself Duke of Brunswick-Lüneburg-Dannenberg, founded the new House of Brunswick-Wolfenbüttel; and his brother William founded the new line of Brunswick-Lüneburg, which, in 1815, became the kingdom of Hanover. See HANOVER.

BRUNSWICK, the capital of the duchy of Brunswick, is situated on the Oker, in a level and fertile district, in lat. 52° 46′ N., and long. 10° 4′ E. B., which is a very old place, is supposed to have been first walled about the 9th c., by Bruno, Duke of Ostfalen. But Henry the Lion, in the 12th c., so greatly beautified and extended the city that he may be almost said to be its founder. In the 13th c., B. became a member of the Hanse League, and soon attained considerable commercial prosperity, but its importance declined with the decay of the League. The town is most irregularly built, with narrow and crooked streets, but possesses the advantages of good causeways and an abundant supply of water. The cathedral—in which are preserved some interesting relics brought by Henry the Lion from the Holy Land—with the churches of St. Martin, St. Catharine, and St. Andrew, with its steeple 316 feet high, are among the principal buildings. In the museum, are some interesting antiquities and works of art by Jan Steens, Albert Dürer, Holbein, Rembrandt, Raphael, Guido, Ruysdael, Michael Angelo, and Benvenuto Cellini. The industry of B. consists chiefly in manufactures of woollen and linen, chicory, beet-sugar, tobacco, *papier-mâché*, lackered wares, &c. Its great annual fair, founded in 1498, is important. The old fortifications of B. have been demolished, and their site converted into pleasant promenades. A fine avenue of linden-trees leads to the duke's palace, an imposing edifice, built in 1869. Pop. (1875) 65,938.

BRUNSWICK, NEW. See NEW BRUNSWICK.

BRUNSWICK BAY, on the north-west coast of Australia, in long. 125° E., and about lat. 15° S. It receives Prince Regent River.

BRUNSWICK BLACK is a varnish employed for coating over coarsely finished iron grates, fenders, &c. It is mainly composed of lamp-black and turpentine, and when applied with a brush, quickly dries, and leaves a shining jet-black surface.

BRUNSWICK GREEN is a pigment used in the arts, and consisting of the hydrated chloride and oxide of copper ($CuCl,3CuO,4HO$). It may be prepared (1) by acting upon metallic copper with common salt and diluted sulphuric acid, (2) by acting upon metallic copper with moistened sal-ammoniac, or (3) by mixing sulphate of copper and common salt into a paste with water. It is found native at Atacama, in Peru, in the form of a green sand, hence the name Atacamite (q.v.).

BRUSH TURKEY. See MOUND BIRD in AM. SUPP.

BRU'SSELS (Fr. *Bruxelles*), the capital of Belgium, is situated on the small river Senne, a tributary of the Dyle, in lat. 50° 51′ N., and long. 4° 21′ E. It communicates with Antwerp and the Baltic Sea, by means of the Scheldt canal, and railways connect it with Germany, France, and Holland, as well as with all the principal towns of Belgium. The city is built partly on the side of a hill, and partly on a fertile plain; and though some of the streets are so steep that they can be ascended only by means of stairs, B. on the whole, may be pronounced one of the finest cities in Europe. The Upper Town, situated on the side of the hill, is the newest and most fashionable, and is the residence chiefly of the great and wealthy. The king's palace, public offices, chief hotels, and mansions of foreign ministers are here. It is also much more healthy than the Lower Town, which, stretching along the canal and the Senne, is greatly subject to fogs. But the latter, with its numerous handsome old buildings, formerly belonging to the Brabant nobility, but now occupied by merchants and traders, has a fine picturesque appearance, while some of its public edifices are unrivalled as specimens of Gothic architecture. This part has also several noble churches, but it is now wholly given over to trade. French is spoken in the upper part of B.; but in the lower, Flemish is prevalent, and in one quarter the Walloon dialect is spoken. The English language, owing to the large number of English who reside in B. for economy, is also very common. The walls which formerly surrounded B. have been removed, and their place is now occupied by pleasant Boulevards, shaded by alleys of trees, extending several miles.

The *Allée Verte*—a double avenue along the Scheldt canal—forms a splendid promenade, and leads toward the palace of *Laeken*, the suburban residence of the royal family, three miles north of the city. Besides the fine park in the Upper Town, covering an area of some seventeen acres, ornamented with fountains and statues, and surrounded by the king's palace, the 'Palace of the Prince of Orange,' the Chamber of Representatives, and other buildings, B. has several other squares or places, among which the most noteworthy are—the *Place Royale*, with its colossal monument of Godfrey of Bouillon; the *Grand Place*, in which is situated the Hôtel de Ville, a splendid Gothic structure, erected in the beginning of the 15th c. with a pyramidal tower 364 feet high, surmounted by a statue of St. Michael, the patron saint of B., and where, in 1568, the patriot counts, Egmont and Horn were beheaded by order of the Duke of Alba; and the *Place des Martyrs*, where a memoral has been erected to those who fell here in the revolution of 1830. Among the churches of B., the largest and finest is the cathedral of St. Gudule, which dates from the 12th c., and is built in the pointed Gothic style, with two towers of more modern date, rising on each side to a height of 264 feet, many richly painted windows, a pulpit considered the master-piece of Verbruggen, and monuments of the Dukes of Brabant and other distinguished persons. In the *Palais des Beaux Arts* is the picture-gallery, containing the finest specimens of the Flemish school of painting; the public library with its 234,000 volumes, and its 20,000 MSS., collected by the Dukes of Burgundy—MSS. interesting and valuable not only for their contents, but for the beautiful miniature paintings with which the scholars of Van Eyck adorned them. The Observatory is well equipped. The new *Palais de Justice* is one of the most magnificent buildings in Europe. The University, founded in 1834, has four faculties in law, medicine, mathematical and physical science, and belles-lettres, and a special school of pharmacy attached. It has also numerous charitable and benevolent institutions; and is the seat of the provincial government of South Brabant, as well as of the general government of the kingdom. This is one of the chief centers of the industry of the country. Its lace is particularly famous. Of the esteemed carpets which pass under the name of B. carpets, only a few are manufactured here, most of those of Belgic make being produced at Tournai. It has also manufactures of damask, linen, ribbons, paper, jewelry, hats, soap, porcelain, mathematical and musical instruments, &c. Carriage-building is also an important branch of industry. Printing and lithographic establishments are numerous; and about a dozen newspapers, of which the *Indépendance Belge* has a European reputation, are published daily. Pop. in 1876, 161,816, with suburbs, 348,180.

As early as the 8th c., we find B. (*Bruchsella*), then probably a villa of the Frank kings, mentioned in old chronicles, and that a church existed here in 966 is proved by a deed of the Emperor Otho I. Under Charles V., B. was made the court-residence in the Netherlands, and became afterwards, under Philip II., the chief arena of the revolution, and of the atrocities committed by the Duke of Alba and the Inquisition. B. suffered greatly in the war of Spain against Louis XIV.—in whose reign it was bombarded by Marshal Villeroi and upwards of 4000 buildings destroyed—and in that of Austria against Louis XV.; but still more from the continual prevalence of party animosities caused by the policy of Austria. Under the mild rule of Maria Theresa, B. flourished greatly, and in this time, many of its best institutions and public buildings were founded. In 1789 occurred the Brabant revolution under Joseph II.; and scarcely had Austrian rule been re-estab-

lished, after a brief time of independence, when B. fell into the hands of the French, 1792. After other changes of fortune, B., with the other parts of Belgium, was incorporated with the kingdom of the Netherlands in 1815, and so remained until the revolution of 1830, by which it became the capital of the independent kingdom of Belgium.

BRUSSELS CARPETS. See CARPETS.

BRUSSELS SPROUTS, one of the many cultivated varieties of *Brassica oleracea* (see BRASSICA and CABBAGE), distinguished by producing, in the axils of the leaves, little clusters of leaves which close together and form miniature cabbages. These are used, like other greens of this species, for the table, and are very delicate. The plant is cultivated much in the same way as cabbage or kale, requiring, however, less space than most of the varieties. It may be planted in shady situations, or between the rows of crops, such as peas, beans, scarlet-runners, &c., which are to be removed from the ground in autumn. The sprouts are fit for use chiefly in winter and spring. The stem sometimes attains a height of four feet, and the head resembles a small imperfectly bolled savoy; but there is a subvariety with shorter stems, preferable for many situations. In some places, it is customary to remove the head early in winter, in order to promote the development of the lateral shoots in spring; but if the head is allowed to remain, the plant becomes taller, and new shoots are formed as the lower ones are removed. The seed is sown in February or March. Seed is very generally imported from Belgium, as this vegetable is said to degenerate in Britain. Its use has of late rapidly extended, and none of the many varieties of the species to which it belongs is better deserving of cultivation.

BRUTUS, LUCIUS JUNIUS, figures in the legendary history of early Rome, as the hero who overturned the monarchical, and established the republican form of government. The legend runs that he was the son of a rich Roman. On his father's death, Tarquin the Proud took possession of the property, and put an elder brother to death, and B. himself only escaped the same fate by feigning idiocy (hence the name *Brutus*, stupid). The oracle of Delphi foretold that he should govern in Rome. Remembering his own wrongs, and gifted with the strength and wisdom of one who was fulfilling the decrees of fate, B., when the foul rape committed by one of the royal family upon Lucretia had shocked the people, convoked them, placed himself at their head, and drove the kings from Rome. He is said to have been then elected one of the two first consuls (509 B.C.). That his character as a stern old Roman hero might be complete, the legend adds that he sacrificed to the new republic his own sons, detected in a conspiracy to restore the monarchy; and that at last he fell in mortal combat repelling an attack led on by one of the sons of Tarquin. Little more, however, can be said to be established upon sufficient historical evidence with regard to B., than that there existed a person of that name who held high office in Rome at a very early period.

BRUTUS, MARCUS JUNIUS, born 85 B.C., appears to have spent the early years of manhood in exclusive devotion to literary pursuits, and not to have taken part in the political dissensions agitating Rome till he had attained a mature age. When the civil war broke out between Pompey and Cæsar, he sided with the former; but after the battle of Pharsalia, made his submission to the latter, and, in the following year, was appointed governor of Cisalpine Gaul. On returning to Rome, he divorced his wife, in order to marry Portia, the daughter of Cato, of whose principles in politics he professed to be a disciple. The influence of Cassius prevailed upon him to join the conspiracy which ended in the murder of Cæsar. The efforts of B. to retain popular favor afterwards being unavailing to counteract the effects of the eloquence of Antony, he was forced to leave first Rome and then Italy. The remainder of his life was spent partly in Athens, partly in Asia Minor, and partly as the leader of a marauding force which maintained itself by plundering the inhabitants of the eastern shores of the Adriatic. Defeated by Antony and Octavianus (Augustus) at Philippi (42 B.C.), he terminated his life by falling upon his sword.

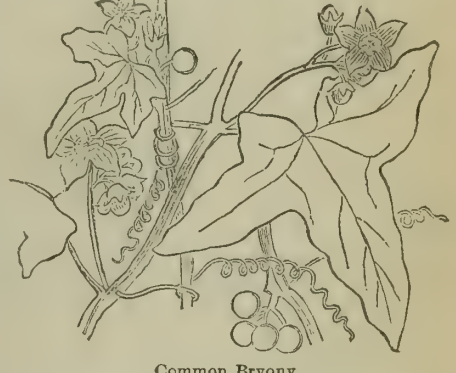
BRUX, a town of Bohemia, situated on the Bila, about 14 miles north of Saatz. In his vicinity are extensive coal mines, and the famous mineral springs of Püllna and Seidlitz, from which the inhabitants of B. prepare a considerable quantity of salts. Pop. (Dec. 31, 1869) 6102.

BRUYÈRE, JEAN LA. See LABRUYERE.

BRYANT, JACOB, an eminent English scholar, was born at Plymouth in 1715. He was educated at Eton and King's College, Cambridge, where he took his degree of M.A. in 1744. In 1756 he became private secretary to the Duke of Marlborough, and accompanied his Grace to the continent. Substantial proofs of the duke's esteem raised him above the region of pecuniary cares, and enabled him to devote his whole life to letters. He died 14th November, 1804. Among his numerous publications, may be mentioned: *Observations and Inquiries relating to various Parts of Ancient History* (Cambridge, 1767); *A New System or Analysis of Ancient Mythology* (1774—1776); *Vindiciæ Flavianæ* (a defence of Josephus's testimony in regard to Christ), (1780); *Treatise on the Authenticity of the Scriptures and the Truth of the Christian Religion* (1792); *A Dissertation concerning the War of Troy, &c.* (1796); *The Sentiments of Philo-Judæus concerning the Logos* (1797); and a variety of Dissertations on the Difficult Passages of Scripture (1803). B. was a man of great and varied learning, but his intellect, although acute, was neither philosophical nor comprehensive enough to enable him to handle in a satisfactory manner the important questions on which he wrote.

BRYANT, WILLIAM CULLEN, a distinguished American poet and journalist, was born in Hampshire, Mass., November 3, 1794. At the early age of 10, he published translations from some of the Latin poets; at 13, he wrote a terse and vigorous political poem, entitled *The Embargo;* and at 18, he composed his *Thanatopsis*, a poem full of beauty. In 1815 he was admitted to the bar, and for ten years practised with diligence and success. In 1825 he removed to a more congenial sphere, and in association with a friend, established *The New York Review*, to which he contributed many of his best poems. In 1826 he became principal editor of *The Evening Post*, the leading democratic paper of New York, which he conducted with a manliness and purity of tone that might be imitated by his professional brethren with great advantage to the character of the press. The first collected edition of his poems appeared in 1832. They were soon after republished in Britain, and were regarded as the highest efforts, up to that time, of the American Muse. In 1842 he published *The Fountain, and other Poems.* B. visited Europe in 1834, and several times afterwards, and records his observations in *Letters of a Traveler in Europe and America.* In 1858 appeared a new edition of his poetical works, and in 1869, a metrical translation of the *Iliad* followed in 1871 by that of the *Odyssey.* He afterwards engaged in writing a *History of the United States.* Although the popularity of B.'s writings has been eclipsed by those of Longfellow and Poe, they have yet a large circle of readers and admirers. B. died 12th June, 1878.

BRY'ONY (*Bryonia*), a genus of plants of the natural order *Cucurbitaceæ*, distinguished by triadelphous stamens, with distinct anthers, a trifid style, and a few-seeded fruit destitute of hard rind. The stems climb by means of lateral tendrils, the leaves are angular or 3–5-lobed, and the flowers campanulate, 5-partite, unisexual, and generally yellow. The COMMON BRYONY (*B. dioica*), the only British species, is frequent in hedgerows in England, but is not indigenous to Scotland. It has cordate palmate leaves, axillary bunches of flowers, and red berries about the size of a pea. It abounds in a fetid and acrid juice. The root is perennial, very large, white and branched, has a repulsive smell, and is acrid, purgative, and emetic. *B. alba*, common in the middle parts of Europe, possesses similar properties. The root of both is applied topically to bruises, and was formerly very much in use as a purgative. It is now again much employed in homœopathic practice. A decoction made of 1 lb. of the fresh root is said by Withering to be 'the best purge for horned cattle.' It contains a bitter extractive, called *Bryonine*, to which it seems to owe its properties. The young shoots of both species are, however, so free from acrid and dangerous qualities, that they may be used as pot-herbs.—The roots of other species of the genus are also acrid and purgative; but it is said that the root of *B. Abyssinica*, when cooked, is eaten without danger.—BLACK BRYONY (*Tamus communis*) is a plant of a different natural order (*Dioscoreaceæ*, q. v.). The genus is distinguished by an inferior ovary and succulent fruit. Black B. has long twining stems, cordate undivided leaves, greenish flowers, and red berries. Its roots are very large and fleshy, black externally. The berries are unwholesome, and the whole plant is acrid, the roots so much so as to have been formerly employed for stimulating plasters. But the young suckers, in which the acrid principle is not much developed, are eaten in Greece as asparagus, after careful boiling with change of water, as are also those of *T. Cretica*. The plant is common in most parts of Europe, and is found in England, in hedges and thickets.



Common Bryony.

BRYOPHY'LLUM (Gr. *bryon*, moss, and *phyllon*, a leaf), a genus of plants of the natural order *Crassulaceæ* (q. v.). *B. caly-*

cinum, a succulent shrubby plant, a native of the Moluccas, with quinate or almost pinnate leaves, oblong deeply crenulated leaflets, and panicles of large pendulous greenish-yellow flowers, is not unfrequent in British hot-houses, being regarded as an object of interest, upon account of its producing buds on the edges of the leaves more frequently than almost any other plant. These buds are capable of forming independent plants. The curious mode of propagation is found also in the Bog Orchis (*Malaxis paludosa*), a plant of a very different natural order. See BUD and LEAF.

BRYOZO'A. See ZOOPHYTES.

BRY'UM (Gr. *bryon*, moss), a genus of Mosses (q. v.) distinguished by a terminal fruit-stalk, a double *peristome* (see MOSSES)—the outer one of 16 teeth, the inner a membrane cut into 16 equal segments—and a dimidiate *calyptra*. The species are very numerous, and many of them are natives of Britain. They are all small, their stems short, and their leaves forming little rosettes, from the center of which the fruit-stalk springs. They very generally grow in dense patches, on wet rocks, wet earth, the bark of trees, &c., beautifully clothing them with bright green.

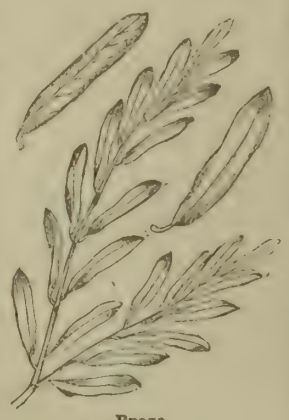
Bryum Longicollum:
a, Sterile shoots with leaves; *b*, fertile plant, showing the *spore-case* and its stalk; *c*, the spore-case or capsule, magnified; *d*, the *calyptra*, magnified; *e*, the top of the spore-case or capsule, showing the double *peristome*, magnified.

BRZESC LITE'WSKI, a walled town of Russia, in the government of Grodno, about 108 miles south from the city of the same name. Being advantageously situated on the right bank of the Bug, it has an extensive trade. It was the scene of a battle between the Russians and Poles in 1794. Pop. (1878) 22,132.

BRZE'ZAN, a town of Galicia, situated on the Zlota-Lipa, about 54 miles S.E. of Lemberg. It has an old castle and a gymnasium, and manufactures of linen, sail-cloth, and leather. Pop. (1869) 9290.

BUA'CHE, or GARDEN ISLAND, an island of Western Australia, near the mouth of Swan River, in lat. 32° 10′ S., and long. 115° 40′ E. Though measuring only 6 miles by 1, it is yet important as sheltering from the open ocean the deep and spacious anchorage of Cockburn Sound, which flows between it and the mainland of the colony.

BU'AZE, a South African plant, of which the botanical characters and relations are not yet known, but which is likely to prove of importance on account of its fibre. Dr. Livingstone found it growing in large quantities in the Maravi country, north of the Zambesi; but he could not procure any specimen in flower or fruit, and Dr. Hooker did not recognize the specimens of branches and leaves. It is not cultivated, and the only use to which it is put by the natives is to afford threads for stringing beads on; but Dr. Livingstone thinks its fibre stronger and finer than flax, and says that a firm thread of it feels like catgut in the hand, and would rather cut the fingers than break.



Buaze.

BU'BALUS, BU'BALIS, or BU'BALÉ (*Antilope Bubalus*), supposed to be the *Bubalus* of the ancients—although that name is now generally appropriated to the buffalo (q. v.)—a species of antelope, of that section of the genus which is characterized as *bovi*-form or ox-like. The Arabic name is Bekker-el-Wash, which signifies wild ox. It is an animal about the size of a large stag, with very ox-like head and muzzle—the head, however, remarkably long; the horns about as long as the head, surrounded by a succession of thickened rings, curved so as to resemble somewhat the sides of a lyre, the points directed backward. The general color is yellowish brown, but the tail is terminated by a black tuft. The B. is an animal of rather coarse appearance, very destitute of the gracefulness of the typical antelopes. It inhabits Barbary, and occasional wanderers make their way to the banks of the Nile. It is figured on the monuments of ancient Egypt. It is gregarious in its habits. It is said to be easily domesticated. The most nearly related species to this, of other antelopes known, is the KAAMA (q. v.) of South Africa.

Bubalis.

BUBA'STIS, a goddess of the Egyptians, was, in their mythology, the child of Isis and Osiris, and the sister of Horus. She was identified by the Greeks with Artemis (Diana), though upon what grounds is unknown, as the best information with regard to her is, that she was the goddess who presided over pregnancy and childbirth. The chief temple erected to B. was at Bubastis (q. v.). B. is represented on monuments as having the head of a cat, an animal which was sacred to her.

BUBA'STIS (the *Pi-beseth* of Scripture, and modern *Tel Basta*), a ruined city of Egypt, about 14 miles north of Belbeys, in lat. 30° 36′ N., and long. 31° 33′ E. B. derived its name from the Egyptian goddess Bubastis, in whose honor a temple was erected here, which, if not so large and magnificent as some Egyptian temples, was, according to Herodotus, one of the most beautiful, and vast numbers of persons were wont to make annual pilgrimages to it. Nothing but some stones of the temple, which are of the finest red granite, now remain. There are some other ruins, and mounds of great extent, consisting chiefly of the remains of brick-houses and heaps of broken pottery.

BUBBLE, as a term, is defined by Blackstone as an unwarrantable undertaking by unlawful subscriptions, subjecting the parties who originate and put them in operation to the penalties of *præmunire* (q. v.). The *South-sea Company* (q. v.) was a terrible example of such a bubble.—The BUBBLE ACT is the name given to the 6 Geo. I. c. 18, 'enacted,' says Blackstone, 'in the year after the infamous South-sea project had beggared half the nation,' and which public fraud the act was intended to punish. But it was repealed by the 6 Geo. IV. c. 91, which at the same time left such companies to be dealt with by the common law.

BU'BBLE SHELL. See BULLA.

BU'BO, an inflammatory tumour, seated in the groin or the armpit.

BU'BO. See OWL.

BUCCANEE'RS, a celebrated association of piratical adventurers, who, from the commencement of the second quarter of the 16th c., to the end of the 17th, maintained themselves in the Caribbean seas, at first by systematic reprisals on the Spaniards, latterly, by less justifiable and indiscriminate piracy. The name is derived from the Caribbee *boucan*, a term for preserved meat, smoke-dried in a peculiar manner. From this the French adventurers formed the verb *boucaner* and the noun *boucanier*, which was adoped by the English; while singularly enough, the French used in preference, the word *flibustier* (see FILLIBUSTERS), a corruption of our 'freebooter.' The B. were also sometimes called 'Brethern of the Coast.' The arrogant assumption by the Spaniards of a divine right—sanctioned by the pope's bull—to the whole New World, was not, of course, to be tolerated by the enterprising mariners of England and France; and the enormous cruelties practised by them upon all foreign interlopers, of which the history of that time is full, naturally led to an association for mutual defence among the adventurers of all other nations, but particularly among the English and French. The fundamental principles of their policy—for they, in course, of time, formed distinct communities—were close mutual alliance, and mortal war with all that was Spanish. Their simple code of laws bound them to a common participation in the necessaries of life; locks and bars were proscribed as an insult to the general honor; and every man had his comrade, who stood by him when alive, and succeeded to his property after his death. The principal center of their wild and predatory life was for some time the island of Tortuga, near St. Domingo. When they were not hunting Spaniards, or being hunted themselves, the chief occupation and means of subsistence was the chase. From the flesh of wild cattle they made their

'boucan;' their skins and tallow they sold or bartered to Dutch and other traders. The history of these men embraces, as may be supposed, narratives of cruelty and bloodshed unsurpassed in the annals of crime. It has, however, not a few stories of high and romantic adventure, of chivalrous valor, and brilliant generalship.

Among the 'great captains' whose names figure most prominently in the records of bucaneering, were the Frenchmen Montbars, surnamed by the terrible title of 'The Exterminator;' his countrymen, Peter of Dieppe, surnamed 'The Great'—as truly, perhaps, as others so distinguished—and L'Olonnais, Michael de Busco, and Bartolomeo de Portuguez, Mansvelt, and Van Horn. Pre-eminent, however, among them all was the Welshman, Henry Morgan, who organized fleets and armies, took strong fortresses and rich cities, and displayed throughout the bold genius of a born commander. He it was that led the way for the B. to the Southern Ocean, by his daring march in 1670 across the Isthmus of Panama to the city of that name, which he took and plundered after a desperate battle. This brilliant but most unscrupulous personage was knighted by Charles II., and became deputy-governor of Jamaica. A higher subordination of the love of gold to the passion for dominion in him, might probably have made him Emperor of the West Indies, some dream of which seems at one time to have occupied his mind. In 1680 and 1689, extensive bucaneering expeditions were made to the Pacific, even as far as the coasts of China, of which the best record is preserved in the lively pages of William Dampier, himself an important partner in these bold adventures. The war between France and Britain, after the accession of Willaim III., dissolved the ancient alliance of the French and English bucaneers. After the peace of Ryswick, and the accession of the Bourbon Philip V. to the Spanish crown (1701), they finally disappeared, to make way for a race of mere cut-throats and vulgar desperadoes, not yet utterly extinct. The last great event in their history was the capture of Carthagena in 1697, where the booty was enormous.—See the *Histories* of Burney and Thornberry, Dampier's *Voyages* and the *Narratives* of Wafer, Ringrove, and Sharp.

BUCCA'RI, or BAKAR, a free port of Austrian Croatia, on an inlet of the Gulf of Quarnero, 5 miles east-south-east from Fiume. It is beautifully situated on the slope of a hill, and has a small but very good and safe harbor. The linen manufacture is carried on here, and ship building is actively prosecuted; but the inhabitants are principally sailors and fishermen. The tunny fishery is the chief fishery of this part of the Adriatic. The vine is extensively cultivated in the neighborhood of B., and good wine is made. Pop. (1869) 2116.

BUCCINA'TOR (from Lat. *buccinare*, to sound a trumpet), the name of a muscle, situated in the substance of the cheeks; it is so called, because, when the cheeks are distended with air, the contraction of the B. muscles forces it out.

BUCCI'NO, a town of South Italy, in the province of Salerno, pleasantly situated on the Botta, which at this point is crossed by an old Roman bridge, about 14 miles east from Campagna. In its vicinity are quarries yielding fine marble. Pop. (1872) 6049.

BU'CCINUM. See WHELK.

BUCCLEU'CH. The Scotts, Dukes of B., are one of the oldest and most distinguished families in Scotland. The family traces its descent from Sir Richard le Scott, in the reign of Alexander III. (1249—1285); but the ancestor who first becomes historically conspicuous is Sir Walter Scott of Branxholm and B., a brave and powerful chieftain on the border. B., which from this early period was destined to be associated with the family title, is a lonely estate in the vale of Rankleburn, at the head of Ettrick, Selkirkshire. The Sir Walter alluded to flourished in the reign of James V., and on some incidents in his life, his great namesake founded the *Lay of the Last Minstrel*. Sir Walter fought bravely at the battle of Pinkie, 1547, and was slain in an encounter with Sir Walter Kerr of Cessford in the streets of Edinburgh, 1552. He was succeeded by his grandson, Sir Walter Scott of B., a knight 'wise, true, and modest,' who was succeeded by his only son, who bore the same name. This Sir Walter is celebrated for his military exploits on the border, not the least daring of his enterprises being the rescue of one of his attendants, Kinmont Willie, from the castle of Carlisle. (See *Minstrelsy of the Scottish Border*.) For his services to the state, in which is to be reckoned his carrying away of large numbers of the border marauders to foreign wars, he was raised to the peerage, 1606, as Lord Scott of Buccleuch. Dying in 1611, he was succeeded by his only son, Walter, who, in 1619, received an elevation in the peerage, as Lord Whitchester and Eskdale, and Earl of Buccleuch. Through his son Francis, the second earl, the family, by a grant, acquired the extensive domain of Liddlesdale, formerly belonging to the House of Bothwell; also, by purchase, large territories in Eskdale; and in 1642, the barony of Dalkeith from the Morton family.

Francis left only two daughters, the eldest of whom dying without issue, the titles and estates went to her sister, Anne, who, in 1663, was married to James, Duke of Monmouth, an illegitimate son of Charles II. In 1673, this pair were created Duke and Duchess of B., Earl and Countess of Dalkeith, &c. After a marriage of twenty-two years, the unhappy duke, on a charge of rebellion, was tried and beheaded, 1685; the duchess, however, retaining her honors, title, and estates, as in her own right. The Duke left a family of four sons and two daughters. The duchess afterwards married Lord Cornwallis, by whom she had a son and two daughters, and died in 1732, at Dalkeith House, where she had occasionally resided in princely splendor. James, her eldest surviving son, predeceased his mother, and his son, Francis, by the death of his grandmother, succeeded to the title of Duke of Buccleuch. Notwithstanding the connection with the son of Charles II., the family still preserved the surname of Scott. Duke Francis, in 1743, obtained a restoration of his grandfather Monmouth's Earldom of Doncaster and Barony of Tynedale, and was hence a British peer. In 1720, he married a daughter of James, second Duke of Queensberry, and by this fortunate connection, a portion of the Queensberry estates, along with the dukedom, merged in the family of B. in 1810. Henry, third Duke of B., born 1746, was the greatest and most estimable of his family. He had for his tutor and friend Dr. Adam Smith, and his beneficent talents were directed towards the improvement of his extensive estates in the south of Scotland. The amelioration of the soil, the planting of trees, the making of roads, the improving of the breed of sheep, and the social elevation of his numerous tenantry, uniformly engaged his attention. He died in 1812, and was succeeded by his eldest son, Charles, fourth duke, who dying in 1819, was succeeded by his son, Walter Francis, born 1806, who bears the title of Duke of B. and Queensberry, Marquis of Dumfriesshire, Earl of Drumlanrig, B. Sanquhar, Dalkeith, &c., in the peerage of Scotland; and Earl of Doncaster, &c., in the peerage of England. His eldest son, William Henry, takes the courtesy title of Earl of Dalkeith. The duke, like his grandfather, is noted for the improvement of his estates, which in Scotland are situated in Mid-Lothian, Dumfriesshire, Roxburghshire, Selkirkshire, Peeblesshire, Lanarkshire, and stewartry of Kirkcudbright; his farms everywhere being noted for their good steadings and thriving tenantry.

As an heritor, the number of churches and school-houses which the duke has been concerned in building is very considerable. He has one small possession in Fife—the island of Inchkeith (q. v.). The greatest public improvement ever executed in Scotland by an individual at his own private cost, was carried out by the Duke of B., at vast expense. We allude to the creation of the deep-water harbor and port of Granton, on the Firth of Forth, two miles from Edinburgh. The Duke of B. was one of the chief patrons of church livings in Scotland, but waived all claim to compensation when patronage was abolished in 1874. The duke is lord-lieutenant of Midlothian and Roxburghshire, and captain of the Queen's body-guard in Scotland.

BUCE'NTAUR, the name of a ship which acquired much celebrity in Venice at the time when that state was a flourishing republic. A bucentaur was known as early as the end of the 12th c.; and a vessel of the same name was burnt when the French took Venice more than six centuries afterwards; but it is not certain whether this was the same vessel, maintained by being repeatedly patched up with new ribs and planking. The B. is described as having been a galley, about 100 feet long by 21 in extreme breadth; on a lower deck were 32 banks or rows of oars, manned by 168 rowers; and on an upper deck was accommodation for the illustrious visitors who occasionally came on board. The whole of the fittings were of the most gorgeous character. Although propelled mainly by oars, there were 40 mariners employed in other ways to manage the galley. The B. was employed only once a year, when the Doge 'married the Adriatic.' A splendid water procession was formed, with the Doge and the chief notables in the B. and other distinguished persons in gondolas and feluccas; and when the vessels arrived at the mouth of one of the channels opening into the Adriatic, the Doge dropped a ring into the water, using the words: 'We wed thee with this ring, in token of our true and perpetual sovereignty.' This singular ceremony, which took place on Ascension Day, arose out of an honor or privilege conferred by the pope on the Doge in 1177, consequent on a splendid victory gained by the Venetians over the Emperor Frederick Barbarossa.

BUCE'PHALUS (Greek, meaning 'ox-head'), the name of the favorite charger of Alexander the Great, was probably also the name of a peculiar breed of horses in Thessaly. According to tradition, Alexander in his boyhood was the first to break in the steed B., and thus fulfilled the condition stated by an oracle as necessary for gaining the crown of Macedon.—The town BUCEPHALIA, on the river Hydaspes, in India, was founded near the grave of Bucephalus, which died during Alexander's Indian expedition.

BUCER, MARTIN, one of the church reformers of the 16th c., was born, 1491, at Schlettstadt, in Alsace. His real name was *Kuhhorn*

(cow-horn), but in accordance with the fashion of his time among scholars, he changed it into its Greek equivalent; Bucer being derived from *bous*, an ox, and *keras*, a horn. At the age of 14, he entered the order of Dominicans. At the suggestion of his superior, he went to Heidelberg to study theology, devoting his attention, however, at the same time to the Greek and Hebrew languages. While young, he was appointed chaplain to the Elector of the Palatinate. An acquaintance with the works of Erasmus had already inclined B. toward Protestantism, and his views were confirmed by the influence of Luther at the Heidelberg disputations in 1518. Following the example given by Luther at the Diet of Worms (1521), B. became one of the boldest and most decided of the German reformers. In 1523, he went to Strasburg, where he introduced the doctrines of the Reformation. In the disputes between Luther and Zwingli, he adopted a middle course, and endeavored to make reconciliation between them; but his view of the sacraments, which approached that of Zwingli, exposed him to Luther's harsh reprobation. At the Diet of Augsburg, where he conducted himself with great circumspection and moderation, he generally accorded with the Lutheran views; but, along with other Strasburg theologians, declined to subscribe to the proposed confession of faith, and afterwards drew up the *Confessio Tetrapolitana*. An agreement, however, was subsequently entered into between B. and the Lutherans, and as a disciple of Luther, he appeared at the religious conference of the Reformers held at Leipsic. In consequence of his refusal to sign the *Interim*—a temporary creed drawn up by order of the Emperor Charles V.—B. found his situation irksome in Germany, and therefore accepted the invitation of Archbishop Cranmer (1549), and came to England to teach theology at Cambridge, and assist Paul Fagius and others in forwarding the Reformation. His modesty, blameless life, and great learning gained many friends in England; but his labors were soon interrupted by death, February 27, 1551. His remains were interred in a church at Cambridge with great solemnity; but during the reign of Mary, his bones, with those of Fagius, were taken from their graves, and burned in the market-place.

His constant attempts to express himself in language agreeable both to Luther and Zwingli, induced in him at times an obscure, ambiguous, and elusive kind of thought, to which, perhaps, Bossuet refers when he stigmatizes B. as 'the great architect of subtleties.' B. was, of course, exposed to many censures and scandals by the assiduous malice of the Roman Catholic theologians, whose fertile imaginations during the Reformation period were exclusively devoted to the manufacture of indecent calumnies; but by Protestant writers he has been highly commended, and by some has been ranked above even Luther and Melanchthon. His best work is a translation and exposition of the Psalms, which he published under the pseudonym Aretinus Felinus (Strasburg, 1529). Hubert intended to edit the whole of B.'s writings in ten volumes, but only one volume appeared (Basel, 1577).

BU'CEROS. See HORNBILL.

BUCH, LEOPOLD VON, one of the most celebrated of German geologists, was born at Stolpe, in Prussia, in 1774 or 1777, and received instructions under Werner at the Mining Academy, Freiberg. He afterwards traveled in pursuit of his favorite science, through all the states of Germany, through Scandinavia as far as the North Cape, and through several parts of Great Britain, France, and Italy, visiting the Canary Islands in 1815. His chief writings are—*Geological Observations during Travels in Germany and Italy* (1802—1809), a *Physical Description of the Canary Islands* (1825), *Travels in Norway and Lapland* (1810), and essays *On the Jura in Germany* (1839), and *On the Mountain Systems of Russia* (1840), with several monographs on Ammonites (1832), and other fossils. He was also the author of an excellent geological chart of Germany and its neighboring states, published in 42 plates (2d ed., Berlin, 1832). He died in Berlin, March 4, 1853. B. has been described by an eminent scientific man as 'the only geologist who has attained an equal fame in the physical, the descriptive, and the natural history departments of his science. In all these, he has been an originator and a discover.'

BU'CHAN, the north-east district of Aberdeenshire, consisting of about a fourth of the county, lying between the Ythan and the Doveran. Its surface is undulating, the highest points being Mormond Hill in the north, 742 feet, and Dudwick Hill in the south, 562 feet. Portions of the coast are bold and precipitous, especially for a few miles east of the Doveran mouth, where Troup Head is 600 feet high, and south of Peterhead, where the coasts rise from 70 to 100 feet. Among the rocks five miles south of this town are the famous Bullers of B., a huge vertical well in the granite margin of the sea, 50 feet diameter, and 100 feet deep, into the bottom of which the sea rushes by a natural archway, and, in storms, dashes up the sides with great violence.

The eastern parts of B. consist chiefly of granite and gneiss, and the western of clay-slate and old red sandstone. The chief seats of population are Peterhead, Fraserburgh, Macduff, and Turriff. B. contains several so-called Druid circles, as well as the remains of the Abbey of Deer, and of several castles belonging to the Comyns, who held the earldom of B., but forfeited their title and property in 1309.

BUCHAN-NE'SS, the easternmost promontory of Scotland, in the north-east of Aberdeenshire, three miles south of Peterhead, in lat. 57° 28′ N., and long. 1° 46′ W. A light-house, 130 feet high, with a revolving light, has been erected here. It may be stated that the low rocks at Peterhead stretch a little further east than the Buchan-ness. In the sea off the B. lie the Buchan Deeps, a great trough 50 to 90 fathoms deep, and 25 miles broad, and stretching south nearly as far as the Bell-rock. Outside lie the Long Forties, a bank at the depth of 35—45 fathoms, and 10—20 miles broad.

BUCHANAN, GEORGE, one of the most learned men of the 16th c., and a distinguished poet and historian, was born of poor parents at Killearn, in the county of Stirling, in February 1506. He was sent to the university of Paris by his uncle, who died two years afterwards, leaving B. without the means of prosecuting his studies. He returned home, served in one campaign against the English, and entered St. Andrews University in 1524, where, in the following year, he took his degree of B.A. In 1526 he went to Paris, and became a student in the Scots College there. He subsequently obtained a professorship in the college of St. Barbe, but returned to Scotland about 1537. During his residence on the continent, B. adopted the tenets of the reformed faith. A satire entitled *Somnium*, exposing the Franciscans, brought down upon him the wrath of the priests; and he had resolved upon seeking safety in his old college at Paris, when King James V. took him under his protection, and intrusted him with the education of one of his illegitimate sons. At the request of the king B. wrote another and more pungent satire against the monks, entitled *Franciscanus*, increasing their anger, and rousing especially the bitter hatred of the powerful Cardinal Beaton, who, after a time, procured B.'s arrest, and even went so far as to offer the king money for his life. Though to James was entirely due the publication of the offensive satire, he did not interfere to protect the poet, who, however, contrived to effect his escape to Paris. After spending some years at Bordeaux and Paris in tuition, he accompanied the learned Portuguese, Govea, to the university of Coimbra, in Portugal, as one of his associates.

After the death of Govea, B. was arrested as a heretic, and was for some time detained in a monastery, where he began his splendid Latin metrical version of the Psalms. In 1551, being restored to liberty, he went to England; but soon afterwards went to Paris. About 1560, he returned to Scotland, where he made an open confession of Protestantism. His reputation as a scholar gained for him a good reception at the court of the young queen, Mary, whose classical tutor he became. But his religious and political principles attached him to the party of the Regent Moray, by whose influence he was appointed Principal of St. Leonard's College, in St. Andrew's University, in 1566. In the following year, he was chosen Moderator of the General Assembly—a very high honor for a layman. The doings of Mary, which scandalized the Scottish public, disgusted her tutor also, and he accompanied the Regent Moray to England, in order to give evidence against her before the commissioners appointed by Elizabeth to inquire into her guilt. His *Detectio Mariæ Reginæ*, laid before these functionaries, was industriously circulated by the English court. In 1570, B. was appointed tutor to the young king, James VI. (afterwards James I.), who owed to him all the erudition of which in later life he was so vain. No considerations of the future position of his pupil were allowed to interfere with B.'s treatment of him, which was strict, if not even stern; and in dedicating his *De Jure Regni apud Scotos* to the young monarch in 1579, he warned him against favorites with a freedom remarkable not only in a subservient but in any age. In 1570, B. was appointed director of Chancery, which he soon resigned, and in the same year was made keeper of the Privy Seal, an office which he retained until within a short time of his death. The latter years of his life were devoted to the composition of his *History of Scotland* (published 1582). He died thirty days after its publication, on the 28th September 1582, and was buried in Greyfriars Churchyard, Edinburgh. As a scholar, B. was unrivalled in his age; and he wrote Latin poetry 'with the purity and elegance of an ancient Roman.' He was alike humorous, sarcastic and profound. His *History*, written in Latin, is remarkable for the richness, force, and perspicuity of its style, though it has been found fault with for the partiality of its narration of contemporary events; and two years after the author's death, it, as well as *De Jure Regni*, &c., was condemned by the Scottish parliament, and every person possessed of copies was ordered to surrender them within 40 days, in order that they might be purged of 'the offensive and extraordinary matters' they contained. Two collected editions of B.'s works have been published—one by Ruddiman in 1715, 2 vols. folio; and another by Burman, Leyden, in 2 vols. quarto, in 1725. The translations that have yet appeared are far from doing justice to the original.

BUCHANAN, JAMES, a distinguished American statesman, was born in Franklin county, Pennsylvania, April 13, 1791. He was educated at Dickenson College, adopted the profession of the law, and, in 1814, was elected a member of the Pennsylvania House of Representatives. In 1820, he was chosen a member of Congress, and remained so till March 4, 1831. In May of that year, he was nominated ambassador to Russia. He returned to the United States in 1834, and soon after was elected a member of the Senate; he was re-elected in December 1836, and 1843. Appointed by President Polk, in March 1845, secretary of state, he held that office till the close of Polk's presidency. Ambassador to England in 1854, B. resigned that post the following year, and in 1856 was elected President of the United States. His administration was, on the whole, popular. He was in favor of the maintenance of slavery, but when the civil war broke out he warmly embraced Lincoln's policy. He died June 1, 1868.

BU'CHANITES, an extraordinary sect of fanatics, which sprang up in the west of Scotland in 1783, but has now become extinct. The founder of the sect was Mrs. or Lucky Buchan, born in Banffshire in 1738, of humble parentage. Her maiden name was Elspeth Simpson. She early fell into habits of vice, but with her licentiousness were combined a sort of religious fervor and extreme Antinomian opinions. In 1782, being resident in Glasgow with her husband, a potter, who ultimately divorced her, she became acquainted with the Rev. Hugh White, minister of the Relief congregation in Irvine, a weak vain man and coarse declamatory preacher, who adopted her opinions, for which he was deposed by his presbytery, and began along with her to found a new sect in Irvine. Popular tumults arose, which led to her expulsion from the town in May 1784. Mr. White and his wife, with other devoted adherents, male and female, accompanied her, regarding her as a divinely commissioned person, and expecting her to lead them to the place where Christ was speedily to appear again on earth. She was addressed as 'Friend Mother in the Lord,' and among other more blasphemous pretensions, gave herself out to be the woman mentioned in Rev. xii., White being represented as the 'man-child' whom she had brought forth.

She and her followers traveled towards Nithsdale, and found a resting-place in a barn at New Cample, near Thornhill, where they afterwards built for themselves a house of one apartment with a loft, in which they all dwelt, supported chiefly by the money of the more wealthy of their number. A few additional persons joined them. They lived in expectation of being translated to heaven without death; and on one occasion, after a fast of extraordinary duration, by which many of them were reduced to a very spectral condition, were led out by their prophetess to a hill-top to be immediately taken up, but returned disappointed. After this, dissensions began to arise among them; and some, recovering from their infatuation, left the society. Their expected heaven was one of mere sensual delights; and it is now sufficiently ascertained that they lived in unrestrained sexual intercourse—for they condemned marriage as unworthy of Christians—and that they systematically practised infanticide. Yet they were protected from the outbreakings of popular indignation, and no investigation was made by the authorities. On the failure of their means of subsistence, they took a farm in a moorish part of the stewartry of Kirkcudbright; and those who remained of them accumulated by their industry the means of purchasing a small property, on which was built the first house of the village of Crocketford, where they finally became extinct, the last of them surviving till 1846, full even in his old age of the strange delusions of his youth, and preserving in his house the bones of Lucky Buchan, which were buried with him in his grave.—See *The Buchanites from First to Last*, by Joseph Train. (Edin. 1846).

BUCHARE'ST, BUKHARE'ST, or BUKHORE'ST, the chief city of Walachia, and capital of Rumania, in a rich and extensive plain on the Dumbovitza, a tributary of the Argish, in lat. 44° 26′ N., and long. 26° 5′ E. The town is for the most part meanly built, and the streets are very irregular and generally unpaved. There are, however, some handsome hotels; and the churches are numerous and many-spired, giving to the place a picturesque appearance. The prince's palace, a large structure in the center of the town, has no claim to architectural beauty. The number of cafés and gambling tables is excessive; and altogether B. has the unenviable reputation of being the most dissolute capital in Europe. The *corso*, or public promenade, is a miniature Hyde Park. B. is the entrepôt for the trade between Turkey and Austria, the chief articles of commerce being grain, wool, salt, honey, wax, building-timber, and cattle.

It has some small manufactures of woollen cloths and carpets. B. has at various times suffered considerably at the hands of the Russians, and is remarkable as the place where in 1812 a treaty was concluded between Turkey and Russia, by which the former ceded to the latter the province of Bessarabia and a portion of Moldavia; Russia waiving her claim to all other territories she had conquered. This treaty also defined the Pruth as the boundary-line between the two empires. During the Crimean campaign, B. was successively occupied by Russians, Turks, and Austrians. Pop. (1866) 141,754; (1875) estimated at 250,000.

BUCHEZ, PHILIPPE BENJAMIN JOSEPH, a French physician, writer, and President of the National Assembly in 1848, was born in 1796 at Matagne la Petite, in the department of Ardennes, and studied medicine in Paris, 1815. He became involved in several plots against the Bourbons, was active in the conspiracy of the French Carbonari (q. v.), and supported the doctrines of St. Simon (q. v.); but, after editing for some time the communist journal *Le Producteur*, he separated from his colleagues. Curiously enough, during all his active career of underhand politics, he was prosecuting his learned studies, and in 1825, published a *Précis Elémentaire d'Hygiène*, besides editing the *Journal des Progrès des Sciences et Institutions Médicales*. After the revolution, 1830, B. established and conducted the journal *L'Européen*, the organ of Neo-Catholicism; and in concert with M. Roux Lavergne, began a republican history of the French Revolution. All his writings are marked by original views and arguments in favor of the belief in human progress. After the February revolution, 1848, B. was made President of the National Assembly; but by his want of energy during the disturbance of May 15, he incurred the censure of all parties. On the inauguration of the Empire, B. returned to his studies. He died in 1866.

BUCK, a name sometimes distinctively appropriated to the male of the FALLOW DEER (q. v.), the female of which is a *Doe*. But the term B. is often applied to the male of other species of deer, as of the ROEBUCK (q. v.), although never to that of the Red Deer (see DEER), which when mature, is a STAG or a HART.

BU'CKBEAN, or MARSH TRE'FOIL (*Menyanthes trifoliata*), a plant of the natural order *Gentianeæ* (q. v.), the only known species of its genus, widely distributed in all the colder parts of the northern hemisphere, and common in Britain. It has been described as 'perhaps the most beautiful' of all British plants. It grows in marshy places, its creeping root-stocks (or rhizomes) and densely matted roots often rendering boggy ground firm. The leaves are alternate, like those of the trefoils or clovers, and are supported on pretty long stalks.

The flower-stalk bears a compound raceme of 10—20 white flowers, externally tipped with red. The calyx is 5-parted; the corolla funnel-shaped with a spreading 5-lobed limb, shaggy on the inner surface, with thick fleshy hairs. The fruit is a one-celled, two-valved capsule. The leaves are destitute of smell, but very bitter. From them is prepared a valuable bitter extract, which has long been used in cases of dyspepsia and disorders of the bowels, and which was also formerly employed in intermittent fevers. An infusion is also sometimes used, and sometimes the dried and powdered leaves. The whole plant seems to possess the same bitter and tonic properties. It is sometimes used in Germany as a substitute for hops. The root-stock, however, which is black and jointed, contains a considerable quantity of a kind of starch, which is separated form the bitter substance, and used as food in some of the northern parts of Europe.

Buckbean.

BU'CKEYE. See HORSE CHESTNUT.

BU'CK-HOUND, a hunting-dog once common in Britain when buck-hunting was a most fashionable amusement, but of which few packs now exist. The B. resembles a dwarf STAG-HOUND (q. v.), and possesses great strength and perseverance. Bucks are, however, often hunted by other kinds of hounds.

BUCKINGHAM, DUKE OF, GEORGE VILLIERS, the favorite of James I. and Charles I. of England, third son of Sir George Villiers, was born at his father's seat of Brookesley, Leicestershire, August 20, 1592. Knighted in April 1616, and sworn a gentleman of the bedchamber on January 1, 1617, he became Master of the Horse and a Knight of the Garter. Created the same year Baron of Whaddon and Viscount Villiers, and in January following Earl of B., and sworn of the privy-council, he was next made a Marquis, and appointed Lord-admiral of England, Chief-justice in Eyre of parks and forests south of the Trent, Master of the King's Bench Office, High Steward of Westminster, and Constable of Windsor Castle. In 1620, he married the daughter of the Earl of Rutland,

the richest heiress in the kingdom. In 1623, while negotiations were in progress with the Spanish court for a marriage between the Infanta and the Prince of Wales, afterwards Charles I., B. persuaded the latter to go himself to Madrid and prosecute his suit in person.

The ultimate failure of the negotiations has been ascribed to B.'s arrogance. In his absence he was created a Duke, and on his return nominated Lord-Warden of the Cinque Ports, and Steward of the Manor of Hampton Court. By his advice, James declared war against Spain. On the accession of Charles I., in 1625, B maintained his ascendency at court, but after the ill-fated expedition against Cadiz, he became odious to the nation, and was saved from impeachment only by the king's dissolving parliament. The treaty for the marriage of Charles with the Princess Henrietta of France was concluded by him, but he was not allowed to return to Paris, in consequence of his audacity in lifting his eyes to the French queen. In 1627, with an armament of 100 sail and 7000 soldiers, he appeared before Rochelle, then in possession of the Huguenots, who refused him admission within the harbor. His troops then made an ill-conducted descent on the neighboring Isle of Rhé, and returned to England beaten and disgraced. He soon after undertook a second expedition to Rochelle, and proceeded to Portsmouth for embarkation, when he was assassinated by a discontented subaltern-officer, named Felton, August 23, 1628, in his 36th year.

BUCKINGHAM, 2d Duke of (George Villiers), a brilliant but profligate nobleman, son of the preceding, was born at Wallingford House, Westminster, January 30, 1627, and studied at Cambridge. On the outbreak of the civil wars, he served in the royal army; his estates were confiscated by the parliament, and he took refuge on the continent. He attended Charles II. into Scotland, and after the battle of Worcester, in 1651, went again into exile. Returning secretly into England, he married, in 1657, the daughter of Lord Fairfax, the parliamentary general, to whom his forfeited estates had been assigned. Arrested by Cromwell, and committed to the Tower, he was afterwards removed to Windsor Castle, but released on the abdication of Richard Cromwell. At the Restoration, he recovered his estates, and was made Master of the Horse, and sworn of the privy-council. He was mainly instrumental in the fall of the chancellor, Clarendon, whom he made an object of ridicule to the king, and was one of Charles's confidential ministers, who from the initial letters of their titles, were called 'the Cabal.' Engaging in 1666 in some treasonable practices for effecting a change in the government, he was deprived of all his offices at court, but on his submission, soon recovered them.

In 1670, he was sent ambassador to France, and was employed on some other embassies. He was elected chancellor of the university of Cambridge in 1671. Supporting the nonconformists in 1674, he opposed the Test Act, and was deeply engaged in the Popish Plot. After Charles's death, in 1685, B. retired to his manor of Helmsley, in Yorkshire, and amused himself with the chase. He died at Kirkby-Moorside, April 16, 1688, and was interred in Westminster Abbey. The manufacture of glass and crystal is said to have been introduced into England from Venice by him. B. was the author of several stage-plays, of which the best is *The Rehearsal*, a comedy; *A Satire against Mankind;* and some poems.

BUCKINGHAM, James Silk, a modern traveler and popular lecturer, the son of a farmer, born in 1786, at Flushing, near Falmouth, Cornwall; when a boy, went to sea, and made several voyages to Lisbon. After years of unsettled and wandering life, he, in 1816, established a journal at Calcutta,, but the boldness of his censures on the Indian government led to his expulsion from the presidency of Bengal. His lectures, on his return to England, against the East India Company monopoly, and in support of opening the trade to China, tended greatly to direct public attention to the subject. In London, he established *The Oriental Herald*, and *The Athenæum*, now the leading weekly literary journal. Subsequently, he traveled through the United States, and from 1832 to 1837 was M. P. for Sheffield. He was projector and secretary of the British and Foreign Institute, literary club, 1843—1846; and president of the London Temperance League, 1851. B. was the author of numerous works of travel on the continent, in the east, and in America. He was engaged on his autobiography, two volumes of which were published before his death, which took place June 30, 1855.

BUCK'INGHAM, the old county town of Buckinghamshire, in the north part of the shire, is situated on the Ouse—which flows round the town, and has three bridges. B. is 61 miles north-west of London by rail. It returns one member to parliament. Pop. (1881) 6859. Bobbin lace is the chief manufacture, but it is on the decline. B. is a place of considerable antiquity. Edward the Elder fortified it in 978, and the Danes captured it in 1010. The Earls of Buckingham built a castle here soon after the Norman conquest. Edward III. made it a staple for wool. Here Catharine of Aragon received the news of the battle of Flodden, and Charles I. had his head-quarters in B. for a few days in 1644.

BU'CKINGHAMSHIRE, a south-midland county of England, its greatest length being about 54 miles, its average breadth 18, and total area 738 square miles. The plastic clay tertiary strata occupy the southern parts of the county, which is finely diversified with hill and dale, wood and water. To the north is a broad chalk-band, including the Chiltern range of chalk-hills, which enter from Oxfordshire, and stretch across the county in a north-east direction into Bedfordshire, partly covered with heath and wood, and near Ivinghoe and Wendover, above 900 feet high. Sloping north from these hills, and crossed by narrower bands of greensand and oolite, is the extensive and very fertile vale of Aylesbury, watered by the Thame. The chief rivers are the Thames, bordering the county on the south-west, the Ouse, Ousel, Colne, and Thame, the latter two falling into the Thames. The Grand Junction Canal, and the Great Western and North-Western Railways, intersect the county on the east and south. The climate of Bucks is mild and healthy; the soil is mostly good, chalk and clay predominating. About half the county is under tillage, the rest in meadows and pasture. The agriculture is not equal to the capabilities of the land, which is often overcropped and exhausted. The farms are generally small, averaging 200 acres. The cottages are generally good. Wheat and beans are the principal crops. The chief diary product is butter, of which four to five millions of pounds are annually sold, chiefly in London. In the vale of Aylesbury, fattening of cattle is extensively carried on; the sheep are noted for their fine and heavy fleeces; and large numbers of ducks are reared for metropolitan consumption. Of the total area of 467,132 acres, 405,899 were cultivated in 1880, 50,391 being under wheat crops. Beech and oak are the chief timber-trees, but box and juniper are also grown. The chief manufactures are paper, straw-plait, and thread-lace. B. returns 8 members to parliament—3 for the county, and 5 for the boroughs. The chief towns are Aylesbury, Buckingham, Marlow, and Wycombe. B. contains some Roman and British remains, as traces of Watling, Ickneld, and Akeman Streets or Ways. The chief ecclesiastical ruins are those of Missenden and Notley Abbey, the latter of which has been converted into farm buildings. There are many examples of early English and decorated architecture. The Church of Chetwode, near Buckingham (13th c.), contains some very fine examples of ancient glass-staining. Many events of historical interest occurred in this country.

It was the scene of contest in the civil wars of Stephen and John. At Chalfont St. Giles, Milton finished his *Paradise Lost*, and at Horton, he wrote *L'Allegro*. At Hampden lived the great patriot of that name; Waller was proprietor of Beaconsfield Manor; Atterbury was born at Milton; Stoke Poges Churchyard suggested Gray's *Elegy*, and is the place of his burial; at Olney, Cowper lived; at Gregories, near Beaconsfield, Burke died and was buried; Scott, the biblical commentator, was rector of Aston Sandford; Herschel's great telescope still stands at Slough, where he made most of his important discoveries; and at Stowe is a magnificent mansion—one of the finest in England, alike for extent, architecture and beauty of site. Pop. (1871) 175,879; (1881) 176,277.

BUCKLAND, Francis Trevelyan, a son of the Rev. Dr. Buckland (q. v.), born at Christ Church College, Oxford, December 17, 1826. He was educated at Winchester School, and at Christ Church College, Oxford. He devoted himself to the study of medicine; and after being house-surgeon of St. George's Hospital, London, was appointed assistant-surgeon to the 2d Life-guards in 1854, retiring in 1863. From his boyhood, he manifested an enthusiastic delight in natural history, especially when it could be applied practically to the cultivation of useful quadrupeds, birds, or fish, in which study he was encouraged and guided by his father. He contributed largely to the *Times*, *Field*, *Queen*, *Land and Water*, which he started along with Mr. W. Pfennell, and of which he was editor, &c. He was also the author of *Curiosities of Natural History* (1857; 2d series, 1860; 3d series, 1866); *Fish-hatching* (1863); *Logbook of a Fisherman and Zoologist* (1876); *Natural History of British Fishes* (1881); and *Notes and Jottings from Animal Life* (1882); also editor of a new edition of his father's Bridgewater Treatise (1858); and of *White's Selborne* (1876). B. was first secretary of the Acclimatization Society. He was an acute observer, and his writings on subjects of natural history in great part exhibit the results of fresh and original observations, which his sprightly style exhibits in a most interesting manner. For the greater part of a lifetime he took a great interest in fish-culture, and his advice on these subjects was sought by the Governments of Russia, Germany, France, America, and the colonies. He also, at his own cost, established under the Science and Art Department, South Kensington, a 'Museum of Economic Fish-culture.' In 1867, B. was appointed inspector of salmon fisheries for England and Wales; in 1870, special commissioner on the salmon fisheries of Scotland; and in 1877, on the Scotch herring

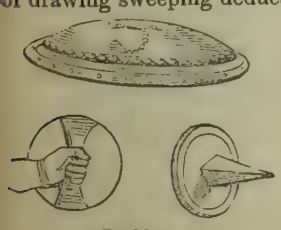
fisheries. B. died Dec. 19, 1880. He was not a follower of the new school of naturalists, and dissented from the conclusions of Darwin.

BUCKLAND, WILLIAM, D.D., a distinguished geologist, whose labors tended greatly to the advancement of science, was born at Axminster, Devonshire, England, in 1784. Educated at Winchester and Oxford, he was appointed, in 1813, Reader in Mineralogy in Oxford University. The same year, he was elected a Fellow of the Geological Society, and he was twice its president. In 1818, he became Reader in Geology at Oxford, and was elected Fellow of the Royal Society. In 1822, he received the Copley medal, for an account of an assemblage of fossil teeth and bones of 22 different animals, discovered in a cave at Kirkdale, Yorkshire; and in 1823, he published a treatise founded on it, entitled *Reliquiæ Diluvianæ, or Observations on Organic Remains, attesting the Action of a Universal Deluge*, a theory which he afterwards saw cause to modify. In 1825, B. was appointed a canon of Christ Church, Oxford. In 1827, he was chosen a member of the Council of the Royal Society; in 1832, he was elected president of the British Association at Oxford, its second meeting; and in 1836, he published his Bridgewater Treatise, *Geology and Mineralogy considered with Reference to Natural Theology* (2 vols. 8vo). To the Transactions of the Geological Society he contributed many valuable papers; and his sketch of the structure of the Alps, in the *Annals of Philosophy*, is esteemed one of the most interesting of his geological writings. In 1845, he was made Dean of Westminster, and in 1847 a trustee of the British Museum. Under his great and continuous labors to benefit others, his mental faculties gave way some years before his death, which took place August 14, 1856.

BUCKLA'NDIA, a magnificent and beautiful evergreen tree of the natural order *Hamamelideæ* (see WITCH-HAZEL), a native of the mountains. It grows unbranched to the height of 40 feet, the trunk sometimes 21 feet in girth at 5 feet from the ground. The foliage is thick, bright, and glossy. The timber is not valuable. Dr. Hooker thinks that this tree would probably succeed in the mild climate of the west of England.

BUCKLE, HENRY THOMAS, an author who attained a sudden notability in 1857 by the publication of the first volume of a work entitled *The History of Civilization in England*. He was born at Lee, in Kent, November 24, 1823, and was for a very short time at Dr. Holloway's school in Kentish-Town, near London. No other school and no university claims credit for his education, which nevertheless was in the highest degree liberal. An easy fortune, and a large library, enabled Mr. B. to gratify, without any sort of impediment or restraint, an all-absorbing love of letters. After bringing out a second volume of his work in 1861, he undertook a journey to the East, in order to restore his health and extend his knowledge. Having spent the winter in Egypt, he went over the desert to Syria, caught typhus fever by the way, and died at Damascus, May 1862.

B.'s plan involved, before tracing the particular history of English civilization, a general consideration of the progress of those European countries, England, France, Germany, Scotland, Spain, and America, in which the elements of modern civilization are originally found. The two volumes published are occupied with this preliminary examination, which they do not even complete. His objects, however, are clear. They are (1.) to discover what is the essential spirit of a nation's history apart from particular men and events, and (2.) to trace out the causes of the progress which has been made in England and France. Under the first head, B. endeavors to show that the spirit or character of a people is dependent on material circumstances, such as soil, climate, food, aspect of nature, and the like, and to be sought for in these; under the second head occurs the theory, the vigorous application of which by B. has startled and offended many readers—viz., that the progress of society depends upon scepticism; that the retarding force is credulity; and that the excessive 'protection' exercised by governments, the nobility, the church, &c., over the 'people,' has dwarfed and held back the spirit of freedom and civilization. These, and other positions, are defended by B. with great ingenuity and lucidity of argument and expression, and have been admitted, even by his opponents, to contain much sound truth. He is accused—perhaps not unjustly—of being often one-sided, and of drawing sweeping deductions from an imperfect survey of the facts. He is said to have been one of the best chess-players in the world. See his *Miscellaneous and Posthumous Works*, edited by Miss Helen Taylor; and the *Life and Writings of B.*, by A. H. Huth (1880).



Bucklers.

BU'CKLER, in old armor, was a kind of shield worn on the left arm. The bucklers worn by the *hastati*, or spearmen, among the ancient Romans, were about 4 feet long, by 2½ in width, made of boards, covered on the inside with linen and sheepskin, and on the outside with iron-plate. In the middle ages, the B. was round, oval, or square in shape, and was frequently made of wicker-work or of hide, strengthened by metal-plates.

BU'CKLES, metal instruments, consisting of a rim and tongue, used for fastening straps or bands in dress and harness. The use of B., instead of shoe-strings, was introduced into England during the reign of Charles II. They soon became very fashionable, attained an enormous size (the largest being called Artois buckles, after the Comte d'Artois, brother of the king of France), and were usually made of silver, set with diamonds, and other precious stones. In the latter half of last century the manufacture of B. was carried on most extensively in Birmingham, there being at one time not less that 4000 people employed in that town and its vicinity, who turned out 2,500,000 pairs of B. annually, at the average value of 2*s.* 6*d.* per pair. When the trade was at its height, however, fashion changed, and in 1791 we find buckle-makers petitioning the Prince of Wales for sympathy, on the ground that the introduction of shoe-strings had nearly ruined their trade. The prince promised to assist them as far as he could, by wearing B. himself, and enjoining his household to do the same; but fashion was too strong even for him, and B. became almost extinct. The opportunity, however, as is remarked by a writer in *Notes and Queries* for 1854, 'which buckles afford of ornament and expense has preserved them as a part of the court-dress; and of late years they have appeared a little in private society. They are generally, though not always, worn when a prince of the royal family is of the party; and at the king's private parties, although the rest of the dress be that usually worn, buckles are almost indispensable.' Large shoe-buckles, of silver or other metal, are still worn by the clergy of several continental countries, as part of their ordinary costume.

BU'CKSKIN is a fanciful name for a heavy-made, strong-twilled woollen fabric, for trouserings—highly milled to about the usual width for such goods—27 inches; and cropped and finished, with the pile or nap so shorn as to show the texture through it.

BUCKSTONE, J. B., a distinguished comedian and dramatic writer, was born in the suburbs of London, in 1802. Preferring the excitement of the stage to the monotony of an attorney's office, he sought and soon found an opportunity in a provincial town for the display of his theatrical abilities. After a probation in the country, he appeared at the Surrey Theater in 1823, and his success was so unequivocal, that he was soon engaged by the 'management' of the Adelphi Theater, where he continued for many years as leading low comedian.

He afterwards played at the Haymarket and Drury Lane Theaters, of the former of which he was lessee from 1853 till 1878. He died 31st October 1879. B.'s acting was not more noted for its comicality and humor, which never degenerates into vulgarity, than for its distinct appreciation of the peculiar traits in each individual character he assumed. In all his delineations there was the same broad general effect, but the details of each were wrought out with great care and minuteness. B. was also a prolific dramatic author, and of the 150 pieces he is said to have written for the stage, several have been highly popular. Among the best known are—*The Green Bushes, The Flowers of the Forest, Luke the Laborer, The Wreck Ashore, The Rough Diamond, Good for Nothing, the Irish Lion*, and *The Alarming Sacrifice*.

BU'CKTHORN (*Rhamnus*), a genus of shrubs or small trees of the natural order *Rhamnaceæ* (q. v.), distinguished by a bell-shaped 4–5-cleft calyx, which divides around the middle after flowering, the upper part falling away, and the base remaining and adhering to the fruit; which is globose, and sometimes succulent, sometimes rather dry or spongy, with 2–4 stones. The petals are sometimes wanting. Some of the species are dicœcious, some hermaphrodite. They are numerous, and natives of most of the tropical and temperate regions of the world.—The COMMON BUCKTHORN (*R. catharticus*) is a deciduous shrub or low tree, frequent in England and in other parts of Europe and the north of Asia. The leaves are ovate, crenate, and bright green; the branches spiny; the flowers small, yellowish-green, and densely clustered; male and female flowers on separate plants; the berries about the size of peas, globular, bluish-black, nauseous and violently purgative. They were formerly used in medicine, but now more rarely, and only in the form of a syrup prepared from their juice. They supply the *Sap Green* (q. v.) or Bladder Green of painters. The bark af-

Alder Buckthorn (*Rhamnus frangula*).

fords a beautiful yellow dye. The B. is sometimes planted for hedges, but is of too straggling a habit.—The ALDER BUCKTHORN, or BERRY-BEARING ALDER (*R. frangula*), is also a native of Britain, and is frequent in woods and thickets throughout Europe. It is a shrub, rarely a small tree, with spineless branches, oval entire leaves, and small, whitish, axillary flowers, which are in general somewhat clustered. The bark of the twigs is gray, and has a very disgusting smell and a nauseous bitter taste.

It was formerly used in medicine, along with that of the last species, and has recently been recommended in many quarters as a remedy for intermittent fevers. It contains principally an acrid bitter extractive, a volatile oil containing hydrocyanic acid, and a yellow coloring matter called *Rhamnin*. The berries are small and black, and violently purgative. It is objected to their use in medicine that much sickness and thirst attend it. The charcoal of the wood is light, and is used for the preparation of gunpowder. The bark, leaves, and berries are used for dyeing; the bark for dyeing yellow, and with preparations of iron, black; the unripe berries to dye wool green and yellow; the ripe berries to dye it bluish-gray, blue, and green. The flowers are peculiarly grateful to bees.—DYER'S BUCKTHORN (*R. infectorius*) is a low shrub, abundant in the south of Europe, whose unripe fruit yields a brilliant yellow dye. The berries and inner bark of *R. tinctorius*, a native of Hungary, are also used in dyeing; and the berries of *R. saxatilis*, a procumbent shrub, growing amongst rocks as far north as Switzerland. The *French Berries*, *Avignon Berries*, or *Yellow Berries* of dyers are the fruit of *R. infectorius*, *R. saxatilis*, *R. amygdalina* (or *oleoides*), and *R. Clusii*.—The SEA BUCKTHORN is a shrub of a different genus and order. See SALLOW-THORN.

BU'CKU, a name common to several small shrubs of the genus *Barosma* (formerly included in *Diosma*), natives of the Cape of Good Hope, the leaves of which are used in medicine—sometimes in the form of a powder, more generally of an infusion or a tincture—particularly on account of their powerful operation on the urinary organs, as in chronic inflammation of the bladder, urinary calculus, &c. They are also used in dyspepsia, rheumatism, and dropsy; and are stimulant and antispasmodic, diuretic, diaphoretic, and tonic. They generally appear in commerce mixed with stalks and fruit. They are smooth, leathery, and shining, more or less crenated or serrated, and are much covered with pellucid dots, which are glands filled with a strongly smelling yellowish volatile oil. The strong odor of B. leaves is generally regarded as disagreeable, but the Hottentots perfume themselves with them. They have a warm taste, resembling that of mint.—The genus *Barosma* belongs to the natural order *Rutaceæ*, and is distinguished by regular flowers with 5 petals, 5 fertile and 5 abortive scale-like stamens, anthers bearing a minute terminal gland, and a 5-lobed ovary. The species principally yielding the B. leaves of the shops are *B. serratifolia*, *B. crenata*, *B. crenulata*, and *B. venusta*.

BU'CKWHEAT (*Fagopyrum*), a genus of plants of the natural order *Polygoneæ* (q. v.), or according to many botanists, a subgenus of *Polygonum*, distinguished by the central embryo, and by racemes of flowers grouped in panicles. COMMON B. (*Fagopyrum esculentum*, or *Polygonum Fagopyrum*) is a native of the basin of the Volga, the shores of the Caspian Sea, and many parts of Central Asia, from which it is said to have been introduced by the Moors into Spain, and thence to have extended over Europe, in many parts of which, and in some places in Britain, it is now naturalized. Another account represents it as having been brought to Europe by the Crusaders. In France, it is called *Blé Sarrasin*, or Saracen wheat. It is cultivated on account of the farinaceous albumen of its seeds, which are used, as grain, for food of man and cattle. It is upright, branched, 1—3 feet in height; the leaves are between heart-shaped and arrow-shaped, the flowers pale-red, the seed (nut) black and triangular, the angles even (not toothed). The resemblance of this seed in form to the beech-nut is supposed to be the reason of the German name *Buchweizen* (beech-wheat), from which the English name is derived. B. is a very common crop in some parts of Europe, and of the United States of North America; but is seldom sown in Britain, except as food for pheasants. It requires continued dry weather in autumn for profitable harvesting, and this in the climate of Britain cannot well be reckoned on. In Germany, B. is much valued as a crop, particularly for moor-lands and other poor soils. In Bretagne, also, it is extensively cultivated as wheat. It yields very abundantly, and requires little attention and little manure. Forty bushels or more per acre may be expected, weighing 46 or 48 lbs. per bushel; and notwithstanding the resemblance of the seed to grain in its qualities and uses, wheat or any other cereal crop, generally succeeds well after B., if care has been taken to keep the land clear by tilling. The seed is most frequently used in the shape of groats, or made into pottage, and in the United States thin cakes are very often made of it. It is very nutritious, containing about 10 per cent. of gluten and 52 per cent. of starch, besides about 6 per cent. of gum and sugar. It is said to be as good as barley for fattening cattle, and better for horses than oats. But as the seed is covered with a very hard rind or thin shell, it must always be shelled before being given to cattle.

Poultry are very fond of it. Beer is sometimes brewed from it, and it yields a spirituous liquor of good quality; indeed, it is frequently used in gin-distilleries. As green fodder, the herbage of the plant is said to be more nutritious than clover; but it acts as a narcotic on sheep. Bees delight in its flowers, and in some parts of the United States it is sown on this account. In America the seed is usually sown broadcast over the land which has been ploughed in autumn or early spring, and well scarified or harrowed. About a bushel and a half of seed is required when sown broadcast, but a bushel is sufficient if drilled with a machine. In the latter case it should not be sown in narrower drills than one foot apart, but two feet is recommended as being better for the succeeding crop, as the wider intervals can be properly cultivated. It should not be sown in England before the middle of May, as the least frost is injurious. When the lower seeds are ripe it should be mown, as they are easily shed out if allowed to stand too long. When bread made from B. forms the principal food of the people, it is thought to have an injurious action on the brain. As a supplementary article, however, it is a favorite among all classes where it is raised.—TARTARIAN B. (*F.* or *P. Tataricum*) is distinguished by the toothed edges of the seeds and its more vigorous growth. It is hardy, and adapted for cold situations. It is a native of Siberia. It is very productive, but the seed falls out when ripe more readily than that of the common species; and the flour is darker colored, and somewhat bitter.—NOTCH-SEEDED B. (*F.* or *P. emarginatum*) is said to be a native of China. Its seeds are larger than those of Common B., and their angles are winged. When grown in Britain, many of its flowers are generally abortive.—PERENNIAL B. (*F.* or *P. cymosum*) is a native of Nepaul, very vigorous in its growth, but producing, at least in Britain, comparatively little seed.—The triangular black seed of Climbing B. or Blackbine (*F.* or *P. Convolvulus*), familiar to every one who has eaten oatmeal cakes or porridge, greatly resembles B., but is smaller. The plant—a very common weed in gardens and cornfields in Britain—also exhibits much similarity, notwithstanding its different habit and twining stem.—DYER'S B. is *Polygonum tinctorium*. See POLYGONEÆ.

BUCO'LIC, a term derived from the Greek, meaning 'belonging to herdsmen,' and equivalent to the Latin term *Pastoral*. See PASTORAL POETRY.

BU'CZACZ, a town of the Austrian Empire, in Galicia, 30 miles east-north-east of Stanislawow, on the Stripa, a considerable affluent of the Dniester. A treaty of peace between the Poles and the Turks was signed here in 1672. Pop. (1880) 9970.

BUD (*gemma*), in Botany, that part of a plant which contains the rudiments of leaves or flowers prior to their development. Buds are distinguished into *leaf-buds* and *flower-buds*, the former producing leaves, and having a power of extension into a branch; the latter producing flowers only, and ordinarily destitute of this power of extension. The different parts of the flower being regarded, however, as *leaf-organs* or altered leaves (see FLOWER), the flower-bud may be regarded as merely a modified leaf-bud; and it is well-known that by treatment which checks the luxuriant growth of a plant, it may be caused to produce flower-buds where only leaf-buds could otherwise have been expected to appear—a physiological fact, of which advantage is taken in various ways by gardeners, as by removing portions of the bark and even of the woody part of the stem, root-pruning, confining the roots in a flower-pot, &c. Buds usually appear in the axils of leaves, the terminal bud of a branch being no exception to this rule; and there is no leaf without one or more buds in its axil, although many never pass beyond the most rudimentary state. See BRANCH. In cold and temperate climates, buds are formed about midsummer, beginning to appear as soon as the young branch which bears them has itself been properly developed, and are generally covered with scales and often also coated with resinous matter, by which their tender contents are protected from the severity of winter; but in the trees of warm climates, the protection of scales is generally wanting. Within the leaf-bud, the future leaves may be discovered, often very curiously folded or rolled up, and the different forms and positions which the leaves assume in the bud, are very characteristic of different kinds of plants.

This is called the *vernation* (q. v.) of leaves, and is analogous to the *æstivation* (q. v.) of flowers. The buds of exogenous plants originate in cellular prolongations of the medullary rays bursting through the bark; those of endogenous plants are in communication with the cellular matter which lies between the bundles of woody tissue in the stem; and buds elongate into branches by the addition of new cellular matter to the extremity. Leaf-buds are capable of subsisting when separated from the parent plant and placed in favorable situations, developing themselves into new plants with the most exact correspondence in their characteristics to the parent plant; and of this gardeners avail themselves in the

process of *budding* (q. v.), and in various ways for the propagation of plants. Some plants propagate themselves by a natural detachment of buds (*bulbils* or *bulbelts*), modified into a character analogous to that of *bulbs* (q. v.); and bulbs themselves may indeed be regarded as subterranean leaf-buds with thickened scales. The *eyes* of the potato are also subterranean leaf-buds, the tuber being regarded as a thickened subterranean stem; and all plants with subterranean stems produce subterranean leaf-buds, sending above ground only herbaceous annual shoots, as Asparagus, the Banana, &c. Buds may be produced in exogenous plants from the extremity of any medullary ray, and may be made to spring from a leafless part of the stem by an incision, the effect of which is to direct greater supply of sap to the part immediately beneath it. In a few plants buds are produced on the edges, or even on the surface of leaves. In consequence of their power of independent existence, buds have been looked upon by some physiologists as distinct organized beings congregated in the tree or plant, a view of which involves exaggeration, and therefore error. Flower-buds can not be used for budding, or otherwise for propagation of the plant, but when removed from their original stock, always die.

Leaf-bud.

• Some of the lowest animals propagate themselves by buds (*gemmation*), and many of the zoophyte systems or polypidoms extend in this manner. See GEMMATION, REPRODUCTION, POLYPI, and ZOOPHYTES. And see the article BUDDING.

BU'DA (Slavonic, *Bu'din;* German *O'fen*), a city of Hungary, forming with Pesth (with which it is united by a magnificent suspension-bridge) the capital of the country, is situated on the right bank of the Danube, about 130 miles south-east of Vienna, in lat. 47° 29′ N., and long. 19° 3′ E. B. has a highly picturesque appearance, being built round the Schlossberg (Castle-hill) in the form of an amphitheater, in the midst of a district covered with vineyards. Crowning this center hill or rock, which has an elevation of 485 feet above the sea, is the citadel; the palace in which are preserved the royal insignia of Hungary; and an old Gothic church. Behind, and towering above the rock, rises the Blocksberg, strongly fortified, with a precipitous face to the Danube, the slopes of the other sides being occupied with houses. B. has many educational and charitable institutions; and a fine observatory crowns the Blocksberg. It has some celebrated hot sulphur springs, with a temperature of 117° 5′ F., from which it derives its German name, Ofen (Oven). Three of the baths erected by the Turks are still in a perfect state of preservation, and are much frequented by the common people. B. has some manufactures of silk, velvet, woollen, cotton, leather, and gunpowder; and cannon and type foundries; but its chief trade is in wine, of which it produces between four and five millions of gallons annually. This is known as the 'Ofenerwein,' and is of excellent quality. Pop. (1869) 53,998. B. is a place of great antiquity but its importance dates from 1240, when the fortress was erected on the Schlossberg. During the inroads of the Turks, it was regarded as the key of Christendom. It was captured by Solyman the Magnificent in 1526, but retaken in the following year by Ferdinand I., king of Bohemia. In 1541, it was again taken by Solyman, who introduced into it a garrison of 12,000 janizaries; and it remained in the possession of the Turks until 1686, when it was captured by the Duke of Lorraine. B. and Pesth (q. v.) were in 1872 incorporated with one another, the official name being the compound *Budapest*, of which the pop. in 1880 was 359,821.

BUDAO'N, BUDAUN, or BUDAYOON, a town of India, 140 miles north-west of Lucknow, giving its name to a British district of the Rohilcund division of the lieutenant-governorship of the North-west Provinces. It is situated in 28° 2′ N. lat., and 79° 11′ E. long. Its population was officially ascertained in 1872 to amount to 33,322. It was occupied by the mutineers and a body of liberated prisoners from Bareilly, June 1, 1857. The Europeans escaped by flight. It was captured by General Whitelock, April 19, 1858, and the rebels in this quarter was soon afterwards entirely subdued.—The district of Budaon contains an area of 2005 sq. m., and a pop. (1872) of 934,348, of which nearly six-sevenths are Hindus, and the remainder mostly Mussulmans. The district is a level, fertile tract on the Ganges and tributaries of it, of which the chief is the Ramgunga.

BUDÆUS (the Latinized form of *Guillaume Bude*) one of the greatest French scholars of his age, was born in Paris in 1467. He studied there and at Orleans. His works on philology, philosophy, and jurisprudence display extensive learning, but the two best known are the *De Asse et Partibus ejus* (Paris, 1514), which contains a very thorough investigation into ancient coins; and the *Commentarii Linguæ Græcæ* (Paris, 1519), which greatly advanced the study of Greek literature in France, and is still held in high estimation by classical scholars. B.'s knowledge of Greek was particularly good. His style both in Latin and French is nervous, but harsh, and abounds in Greek constructions. His abilities were manifested not only in literature, but in public business. Louis XII., twice sent him to Rome as ambassador; and Francis I. also employed him in several negotiations. At B.'s suggestion, Francis founded the *Collége de France*, and was also persuaded to refrain from prohibiting printing, which the bigotted Sorbonne had advised in 1533. During his life, B. held several important offices. He was Royal Librarian, Maître des Requêtes, and Provost of Paris. He died 23d August 1540. A collected edition of his works appeared at Basel in 1557. B. was suspected of leaning towards Calvanism. Certain circumstances render this highly probable. In his correspondence with his friend Erasmus, he repeatedly expresses his contempt for monks and ignorant ecclesiastics, and on one occasion terms the doctors of the Sorbonne 'prating sophists.' Besides, what is perhaps even more conclusive, shortly after his death, his widow and several members of his family went to Geneva, and openly abjured Catholicism.

BU'DDHISM, BUDDHA. The religion known as Buddhism (from the title of 'The Buddha,' meaning 'the Wise,' 'the Enlightened,' acquired by its founder) has existed now for 2460 years, and may be said to be the prevaling religion of the world. In Hindustan, the land of its birth, it has now little hold, except among the Nepaulese and some other northern tribes; but it bears full sway in Ceylon, and over the whole Eastern Peninsula; it divides the adherence of the Chinese with the systems of Confucius and Lao-tse, claiming perhaps two-thirds of the population; it prevails also in Japan (although not the established religion); and, north of the Himalayas, it is the religion of Tibet (where it assumes the form of Lamaism), and of the Mongolian population of Central Asia, and extends to the very north of Siberia, and even into Swedish Lapland. Its adherents are estimated at 400 millions —more than a third of the human race. Yet, till near the middle of this century, nothing was known in Europe respecting the nature and origin of this world-religion, beyond the vaguest notices and conjectures. About the year 1828, Mr. B. H. Hodgson, British resident at the court of Nepaul, where Buddhism prevails, discovered the existence of a large set of writings in the Sanscrit language, forming the national canonical books. These books have since been found to be the texts from which the Buddhist scriptures of Tibet, Mongolia, and China must have been translated. The books of the Ceylon Buddhists are in the language called Pali; and though not translations of the Nepaulese standards, they are found to agree with them in substance, and to be only another and somewhat later version of the same traditions. Translations from the Ceylon standards are used by the Buddhists of Burmah and Siam. Copies of the Sanscrit books of Nepaul, having been sent by Mr. Hodgson to the Asiatic Societies of London and Paris, engaged the attention of the eminent Oriental scholar, Eugène Burnouf, who published in 1844 his *Introduction to the History of Buddhism;* and this book may be said to have been the beginning of anything like correct information on the subject among the western nations.

The most diverse opinions had previously prevailed as to the time and place of the origin of Buddhism. Some looked upon it as a relic of what had been the original religion of Hindustan, before Brahmanism intruded and drove it out; a relic of a widespread primeval worship, whose ramifications it was endeavored to trace by identifying Buddha with the Woden of the Scandinavians, the Thoth or Hermes of the ancient Egyptians, and other mythological personages. Others held that it could not be older than Christianity, and must have originated in a blundering attempt to copy that religion—so striking are the many points of resemblance that present themselves. Although the means are still wanting of giving a circumstantial history of Buddhism, the main outline is no longer doubtful.

Oriental scholars now concur in fixing the date of its origin about the beginning of the 6th c. B.C., and in making it spring up in the north of Hindustan. Acccording to the Buddhist books, the founder of the religion was a prince of the name of Siddhartha, son of Suddhodana, king of Kapilavastu, which is placed somewhere on the confines of Oude and Nepaul. He is often called Sakya, which was the name of the family, and also Gautama, the name of the great 'Solar' race of which the family was a branch. The name Sakya often becomes Sakya-muni (*muni*, in San., means 'solitary,' and is allied to Gr. *monos*, the root of 'monk'), in allusion to the solitary habits assumed by the prince. To Gautama is frequently prefixed *Sramana*, meaning *ascetic*. Of the names, or rather titles, given to Siddhartha in his state of perfection, the most important is the *Buddha*,* which is from the root *budh*, to know, and according to Wilson, means properly, 'he to

*There is a confusing variety in the modes in which this name is spelled by European writers. S. Hardy, in his *Manual of Buddhism*, gives more than fifty forms that have come under his notice. Some of the more common are: Bud, Bod, Buth, Budh, Boodh, Bhood, Budo, Buddow, Boutta, Poota, Poth, Pot. The Chinese, owing to the meagreness of their articulations, seem to have been unable to come nearer to the real sound than Fo, Foe, or Fohi; from the same cause, they convert Brahma into Fan.

whom the truth is known:' it is indicative of the leading doctrine of his system. Others are—'The Blessed' (Bhagavat); 'the Venerable of the World;' 'the Bodhisatva,' the import of which will be afterwards explained. The history of this person is overlaid with a mass of extravagant and incredible legend; and at least one eminent Orientalist, Professor H. H. Wilson, thinks it still doubtful whether the Buddha was an actual historical personage, and not rather an allegorical figment. Agreeing that the doctrine was introduced about the time assigned, he thinks it more likely that it originated with a school formed of persons of various castes, comprising even Brahmans. But by Oriental authorities generally, the Buddha is received as the actual personal founder of the religion that goes by his name.

Assuming that the Buddha was a real person, and that there is a basis of fact under the mass of extravagant fable with which he is surrounded, the history of Buddhism may be thus briefly outlined: The Prince Siddhartha gives early indications of a contemplative, ascetic disposition; and his father, fearing lest he should desert his high station as Kshatriya (see HINDUISM and CASTE) and ruler, and take to a religious life, has him early married to a charming princess, and surrounded with all the splendor and dissipation of a luxurious court.

Twelve years spent in this environment only deepen the conviction, that all that life can offer is vanity and vexation of spirit. He is constantly brooding over the thought that old age, withered and joyless, is fast approaching; that loathsome or racking sickness may at any moment seize him; that death will at all events soon cut off all present sources of enjoyment, and usher in a new cycle of unknown trials and sufferings. These images hang like Damocles' swords over every proposed feast of pleasure, and make enjoyment impossible. He therefore resolves to try whether a life of austerity will not lead to peace; and, although his father seeks to detain him by setting guards on every outlet of the palace, he escapes, and begins the life of a religious mendicant, being now about 30 years old. To mark his breaking off all secular ties, he cuts off the long locks that were a sign of his high caste; and as the shortened hair turned upwards, he is always represented in figures with curly hair, which induced early European writers to consider him as of Ethiopian origin. He commences by studying all that the Brahmans can teach him, but finds their doctrine unsatisfactory. Six years of rigorous asceticism are equally vain; and resolving to return to a more genial life, he is deserted by his five disciples, and then undergoes a fierce temptation from the demon of wickedness. But no discouragement or opposition can divert Sakya-muni from the search after deliverance. He will conquer the secret by sheer force of thinking. He sits for weeks plunged in abstraction, revolving the causes of things. If we were not born, he reflects, we should not be subject to old age, misery, and death; therefore, the cause of these evils is birth. But whence comes birth or continued existence? Through a long concatenation of intermediate causes, he arrives at the conclusion that ignorance is the ultimate cause of existence; and therefore, with the removal of ignorance, existence and all its anxieties and miseries would be cut off at their source. Passing through successive stages of contemplation, he realizes this in his own person, and attains the perfect wisdom of the Buddha. The scene of this final triumph received the name of Bodhimanda (the seat of intelligence), and the tree under which he sat was called Bodhidruma (the tree of intelligence), whence Bo-tree. The Buddhists believe the spot to be the center of the earth. Twelve hundred years after the Buddha's death, Hiouen-Thsang, the Chinese Pilgrim, found the Bodhidruma—or a tree that passed for it—still standing. Although the religion of Buddha is extinct in the neighborhood, there are, about 5 miles from Gaya Proper, in Bahar, extensive ruins and an old dagoba, or a temple, which are believed to mark the place. Near the temple there flourished, in 1812, a peepul-tree, apparently 100 years old, which may have been planted in the place of the original Bo-tree.

Having arrived at the knowledge of the causes of misery, and of the means by which these causes are to be counteracted, the Buddha was now ready to lead others on the road to salvation. It was at Benares that he first preached, or, in the consecrated phrase, 'turned the wheel of the law;'* but the most important of his early converts was Bimbisara, the sovereign of Magadha (Bahar), whose dynasty continued for many centuries to patronize the new faith. During the forty years that he continued to preach his strange gospel, he appears to have traversed a great part of Northern India, combating the Brahmans, and everywhere making numerous converts. He died at Kusinagara (in Oude), at the age of 80, in the year 543 B.C.; and his body being burned, the relics were distributed among a number of contending claimants, and monumental tumuli were erected to preserve them. See TOPES.

*From a too literal understanding of this phrase have arisen, probably, those praying-wheels, or rather wheels for meditation, seen standing before Buddhist monasteries in Tibet and elsewhere. The doctrines of Buddha are inscribed on the wheel, which is then set in motion by a windlass, or even by horse power. The individual monks have portable ones, with which they perform their devotions wherever they may happen to be.

The most important point in the history of Buddhism, after the death of its founder, is that of the three councils which fixed the canon of the sacred scriptures and the discipline of the church. The Buddha had written nothing himself; but his chief followers, assembled in council immediately after his death, proceeded to reduce his teachings to writing. These canonical writings are divided into three classes, forming the Tripitaka, or 'triple basket.' The first class consist of the *Soutras*, or discourses of the Buddha; the second contains the *Vinaya*, or discipline; and the third the *Abhidharma*, or metaphysic. The first is evidently the fundamental text out of which all the subsequent writings have been elaborated. The other two councils probably revised and expanded the writings agreed upon at the first, adding voluminous commentaries. As to the dates of the other two councils, there are irreconcilable discrepancies in the accounts; but at all events the third was not later than 240 B.C., so that the Buddhist canonical scriptures, as they now exist, were fixed two centuries and a half before the Christian era. The Buddhist religion early manifested a zealous missionary spirit; and princes and even princesses, became devoted propagandists. A prince of the royal house of Magadha, Mahindo, carried the faith to Ceylon, 307 B.C. The Chinese annals speak of a Buddhist missionary as early as 217 B.C.; and the doctrine made such progress, that in 65 A.D. it was acknowledged by the Chinese emperor as a third state religion. The Chinese Buddhists have always looked on India as their 'holy land;' and, beginning with the 4th c. of our era, a stream of Buddhist pilgrims continued to flow from China to India during six centuries.

Several of these pilgrims have left accounts of their travels, which throw a light on the course of Buddhism in India, and on the internal state of the country in general, that is looked for in vain in the literature of India itself. See HIOUEN-THSANG. As to the spread of Buddhism north of the Himalayan mountains, we have the historical fact, that a Chinese general, having about the year 120 B.C. defeated the barbarous tribes to the north of the Desert of Gobi, brought back as a trophy a golden statue of the Buddha.

A prominent name in the history of Buddhism is that of Asoka, king of Magadha, in the 3d c. of our era, whose sway seems to have extended over the whole peninsula of Hindustan, and even over Ceylon. This prince was to Buddhism what Constantine was to Christianity. He was at first a persecutor of the faith, but being converted—by a miracle, according to the legend—he became its zealous propagator. Not, however, as princes usually promote their creed; for it is a distinguished characteristic of Buddhism, that it has never employed force, hardly even to resist aggression. Asoka showed his zeal by building and endowing viharas or monasteries, and raising topes and other monuments over the relics of Buddha and in spots remarkable as the scenes of his labors. Hiouen-Thsang, in the 7th c. of our era, found topes attributed to Asoka from the foot of the Hindu Kush to the extremity of the peninsula. There exist, also, in different parts of India, edicts inscribed on rocks and pillars, inculcating the doctrins of Buddha. The edicts are in the name of King Piyadasi; but Orientalists are almost unanimous in holding Piyadasi and Asoka to be one and the same. Not a single building or sculptured stone has been discovered in continental India of earlier date than the reign of this monarch, whose death is assigned to 226 B.C. A remarkable spirit of charity and tolerations runs through these royal sermons. The 'king beloved of the gods' desires to see the ascetics of all creeds living in all places, for they all teach the essential rules of conduct. 'A man ought to honor his own faith only; but he should never abuse the faith of others. . . . There are even circumstances where the religion of others ought to be honored, and in acting thus, a man fortifies his own faith, and assists the faith of others.'

For the glimpses we get of the state of Buddhism in India, we are indebted chiefly to the accounts of Chinese pilgrims. Fahian, at the end of the 4th c., found some appearances of decline in the east of Hindustan, its birthplace, but it was still strong in the Punjab and the north. In Ceylon, it was flourishing in full vigor, the ascetics or monks numbering from 50,000 to 60,000. In the 7th c.—that is, 1200 years after the death of the Buddha—Hiouen-Thsang represents it as widely dominant and flourishing, and patronized by powerful rajahs.

Its history was doubtless more or less checkered. The Brahmans, though little less tolerant than the followers of Buddha, seem to have been in some cases roused into active opposition; and some princes employed persecution to put down the new faith.

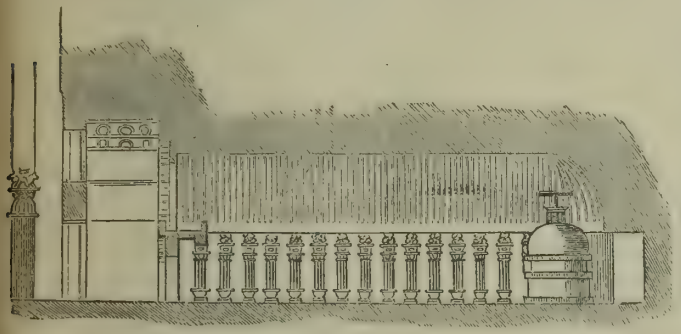
It was probably during the first four or five centuries of our era, and as a result of persecution, that Buddhists, driven from the great cities, retired among the hills of the west, and there constructed those cave-temples which, for their number, vastness, and elaborate structure, continue to excite the wonder of all who see them. There are reckoned to be not fewer than 900 Buddhist excavations still extant in India, nearly all within the presidency

of Bombay. How the destruction of the Buddhist faith in Hindustan came about—whether from internal corruption, or the persecution of powerful princes, adherents of the old faith—we are utterly in the dark. But it is certain that from the time of Hiouen-Thsang's visit, its decay must have been rapid beyond precedent; for about the 11th or 12th c., the last traces of it disappear from the Indian peninsula.

What, then, is the nature of this faith, which has been for so long, and is still, the sole light of so many human beings? In answering this question, we must confine ourselves here to a brief outline of the intellectual theory on which the system is based, and of the general character of its morality and ritual observances, as they were conceived by the founder and his more immediate followers; referring for the various forms which the external observances have assumed to the several countries where it is believed and practised. See BURMAH, CEYLON, CHINA, JAPAN, LAMAISM.

Buddhism is based on the same views of human existence, and the same philosophy of things in general, that prevailed among the Brahmans. It accepts without questioning and in its most exaggerated form, the doctrine of the transmigration of souls, which lies at the root of so much that is strange in the Eastern character.

For a particular account of this important doctrine or notion, which seems ingrained in the constitutions of Eastern minds, and without a knowledge of which no phase of thought or feeling among them can be understood, the reader is referred to TRANSMIGRATION; while the peculiar cosmogony or system of the universe with which it is associated, and which is substantially the same among Hindus and Buddhists, will be described under HINDUISM. It is sufficient here to say, that, according to Buddhist belief, when a man dies, he is immediately born again, or appears in a new shape; and that shape may, according to his merit or demerit, be any of the innumerable orders of being composing the Buddhist universe—from a clod to a divinity. If his demerit would not be sufficiently punished by a degraded earthly existence—in the form, for instance, of a woman or a slave, of a persecuted



Section of Buddhist Cave-temple at Karli—from Fergusson's *Handbook of Architecture*.

or a disgusting animal, of a plant, or even of a piece of inorganic matter—he will be born in some one of the 136 Buddhist hells, situated in the interior of the earth. These places of punishment have a regular gradation in the intensity of the suffering and in the length of time the sufferers live, the least term of life being 10 millions of years, the longer terms being almost beyond the powers of even Indian notation to express. A meritorious life, on the other hand, secures the next birth either in an exalted and happy position on earth, or as a blessed spirit, or even divinity, in one of the many heavens; in which the least duration of life is about 10 billions of years. But however long the life, whether of misery or of bliss, it has an end, and at its close the individual must be born again, and may again be either happy or miserable—either a god or, it may be, the vilest inanimate object.* The Buddha himself, before his last birth as Sakyamuni, had gone through every conceivable form of existence on the earth, in the air, and in the water, in hell, and in heaven, and had filled every condition in human life. When he attained the perfect knowledge of the Buddha, he was able to recall all these existences; and a great part of the Buddhist legendary literature is taken up in the narrating his exploits when he lived as an elephant, as a bird, as a stag, and so forth.

The Buddhist conception of the way in which the quality of actions—which is expressed in Pali by the word *Karma*, including both merit and demerit—determines the future condition of all sentient beings, is peculiar. They do not conceive any god or gods as being pleased or displeased by the actions, and as assigning the actors their future condition by way of punishment or of reward. The very idea of a god, as creating or in any way ruling the world, is utterly absent in the Buddhist system.

God is not so much as denied; he is simply not known. Contrary to the opinion once confidently and generally held, that a nation of atheists never existed, it is no longer to be disputed that the numerous Buddhist nations are essentially atheist; for they know no beings with greater supernatural power than any man is supposed capable of attaining to by virtue, austerity, and science; and a remarkable indication of this startling fact is to be seen in the circumstance, that some at least of the Buddhist nations—the Chinese, Mongols, and Tibetans—have no word in their languages to express the notion of God. The future condition of the Buddhist, then, is not assigned him by the Ruler of the universe; the 'Karma' of his actions determines it by a sort of virtue inherent in the nature of things—by the blind and unconscious concatenation of cause and effect. But the laws by which consequences are regulated seem dark, and even capricious. A bad action may lie dormant, as it were, for many existences; the taint, however, is there, and will some time or other break out. A Buddhist is thus never at a loss to account for any calamity that may befall himself or others.

Another basis of Buddhism is the assumption, that human existence is on the whole miserable, and a curse rather than a blessing. This notion, or rather feeling, is, like transmigration, common to Buddhism and Brahmanism, and is even more prominent in Buddhism than in the old faith. It is difficult for a European to conceive this state of mind, or to believe that it can be habitual in a whole people; and many signal errors in dealing with the Indian nations have arisen from overlooking the fact. The cause would seem to lie chiefly in the comparatively feeble physical organization of Easterns in general. With a vigorous animal vitality, there is a massive enjoyment in mere bodily existence sufficient to drown a large amount of irritation and suffering, leaving life still sweet and desirable; while the spontaneous activity attending this vigor, makes it a pleasure instead of a pain to contend with and conquer difficulties.

The Indian, on the contrary, even when he looks robust, has little intensity of animal vitality; and therefore, bodily existence, in itself, has to him little relish. Tedium of life, it is well known, arises more from negative than positive sources; and it requires but little bitter added to make his cup disgusting. So far, again, from finding activity a source of enjoyment, exertion is painful, and entire quiescence is, in his eyes, the highest state of conceivable enjoyment. When to this we add that want of security and peace, and that habitual oppression of the many by the few, with all the attendant degredation and positive suffering, which may be considered the normal state of things in the East, need we wonder that to men so constituted and so circumstanced, life should seem a burden, a thing rather to be feared than otherwise? The little value that Hindus set upon their lives is manifested in many ways. The punishment of death, again, has little or no terror for them, and is even sometimes coveted as an honor. For, in addition to the little value of their present existence, they have the most undoubting assurance that their soul, if dislodged from its present tenement, will forthwith find another, with a chance, at least, of its being a better one.

In the eyes, then, of Sakya-muni and his followers, sentient existence was hopelessly miserable. Misery was not a mere taint in it, the removal of which would make it happy; misery was its very essence. Death was no escape from this inevitable lot; for, according to the doctrine of transmigration, death was only a passage into some other form of existence equally doomed. Even the heaven and the state of godhead which form part of the cycle of changes in this system, were not final; and this thought poisoned what happiness they might be capable of yielding. Brahman philosophers had sought escape from this endless cycle of unsatisfying changes, by making the individual soul be absorbed in the universal spirit (Brahm); Gautama had the same object in view—viz., exemption from being born again; but he had not the same means of reaching it. His philosophy was utterly atheistic, like that of the original Sankhya school of philosophy, whose views he chiefly borrowed, and ignored a supreme God or Creator; it did not leave an impersonal Spirit of the universe into which the human soul could be absorbed. Gautama sees no escape but in what he calls NIRVANA, the exact nature of which has been matter of dispute. According to its etymology, the word means 'extinction,' 'blowing out,' as of a candle; and most Orientalists are agreed that in the Buddhist scriptures generally it is equivalent to annihilation. Even in those schools which attempt to draw a distinction, the distinction is of the most evanescent kind. See NIRVANA.

The key of the whole scheme of Buddhist salvation lies in what Gautama called his Four Sublime Verities. The first asserts that pain exists; the second, that the cause of pain is desire or attachment—the meaning of which will appear further on; the third, that pain can be ended by Nirvana; and the fourth shows the way that leads to Nirvana. This way to Nirvana consists in eight

* One legend makes Bhagavat, in order to impress upon the monks of a monastery the importance of their duties, point to a besom, and, by his supernatural insight, reveal to them that it had once been a novice, who had been negligent in sweeping the hall of assembly; the walls and pillars, again, he told them, had once existed as monks, who soiled the walls of the hall by spitting upon them.

things: right faith, right judgment, right language, right purpose, right practice, right obedience, right memory, and right meditation. In order to understand how this method is to lead to the proposed end, we must turn to the metaphysical part of the system contained in the 'concatenation of causes,' which may be looked upon as a development of the second 'verity'—namely, that the cause of pain is desire—or rather, as the analysis upon which that verity is founded. The immediate cause of pain is birth, for if we were not born, we should not be exposed to death or any of the ills of life. Birth, again, is caused by previous existence; it is only a transition from one state of existence into another. All the actions and affections of a being throughout his migrations leave their impressions, stains, attachments adhering to him, and the accumulation of these determines at each stage the peculiar modification of existence he must next assume. But for these adhesions, the soul would be free; not being bound down to migrate into any determinate condition of life, it would follow that it need not migrate at all. These adhesions or attachments, good and bad, depend upon desire, or rather, upon affection of any kind in the soul towards the objects; as if only what moved the soul to desire or avoidance could leave its impress upon it. We thus arrive at desire—including both the desire to possess, and the desire to avoid—as one link in the chain of causes of continued existence and pain. Beyond this the dependence of the links is very difficult to trace; for desire is said to be caused by perception, perception by contact, and so on, until we come to ideas. Ideas, however, are mere illusions, the results of ignorance or error, attributing durability and reality to that which is transitory and imaginary. Cut off this ignorance, bring the mind into a state in which it can see and feel the illusory nature of things, and forthwith the whole train vanishes; illusory ideas, distinction of forms, senses, contact, perception, desire, attachment, existence, birth, misery, old age, death!

Morality and Religious Observances.—The eight parts or particulars constituting the theoretical 'way' (to Nirvana), was developed by Gautama into a set of practical precepts enjoining the various duties of common life and of religion. They are all ostensibly intended as means of counteracting or destroying the chain of causes that tie men to existence and necessitate being born again, especially that most important link in the chain constituted by the attachments or desires resulting from former actions; although the special fitness of some of the precepts for that end is far from being apparent. It is is easy to understand how the austerities that are prescribed might subdue the passions and affections, and lessen the attachment to existence; but how the exercise of benevolence, of meekness, of regard to truth, of respect to parents, &c., on which Gautama laid so much stress, should have this effect, it is difficult to conceive. Luckily for the Buddhist world, Gautama's moral nature was better than his logic, or rather than the perverse assumptions from which his logic starts; and as he felt strongly—what all men have felt more or less—that these things are essentially right and good, he takes it for granted that they must contribute to what was in his eyes the chief good—escape from existence, or Nirvana. In delivering his precepts, the Buddha considers men as divided into two classes—those who have embraced the religious life (*Sramanas*), and those who continue in the world, or are laymen. These last are considered as too much attached to existence to feel any desire or have any hope of emancipation, at least at this stage. But there are certain precepts which it is necessary for all to obey, that they may not bring greater misery upon themselves in their next births, and rivet the bonds of existence more indissolubly. There are ten moral precepts or 'precepts of aversion.' Five of these are of universal obligation—viz., not to kill; not to steal; not to commit adultery; not to lie; not to be drunken. Other five are for those entering on the direct pursuit or Nirvana by embracing the religious life: to abstain from food out of season—that is, after mid-day; to abstain from dances, theatrical representations, songs, and music; to abstain from personal ornaments and perfumes; to abstain from a lofty and luxurious couch; to abstain from taking gold and silver. For the regular ascetics or monks, there are a number of special observances of a very severe kind. They are to dress only in rags, sewed together with their own hands, and to have a yellow cloak thrown over the rags. They are to eat only the simplest food, and to possess nothing except what they get by collecting alms from door to door in their wooden bowl. They are allowed only one meal, and that must be eaten before mid-day. For a part of the year, they are to live in forests, with no other shelter except the shadow of a tree, and there they must sit on their carpet even during sleep, to lie down being forbidden. They are allowed to enter the nearest village or town to beg food, but they must return to their forest before night.

Besides the absolutely necessary 'aversions and observances' above mentioned, the transgression of which must lead to misery in the next existence, there are certain virtues or 'perfections' of a supererogatory or transcendent kind, that tend directly to 'conduct to the other shore' (Nirvana). The most essential of these are almsgiving or charity, purity, patience, courage, contemplation, and knowledge. Charity or benevolence may be said to be the characteristic virtue of Buddhism—a charity boundless in its self-abnegation, and extending to every sentient being. The benevolent actions done by the Buddha himself, in the course of his many millions of migrations, were favorite themes with his followers. On one occasion, seeing a tigress starved and unable to feed her cubs, he hesitated not to make his body an oblation to charity, and allowed them to devour him. Benevolence to animals, with that tendency to exaggerate a right principle so characteristic of the East, is carried among the Buddhist monks to the length of avoiding the destruction of fleas and the most noxious vermin, which they remove from their persons with all tenderness.

There are other virtues of a secondary kind, though still highly commendable. Thus, not content with forbidding lying, the Buddha strictly enjoins the avoidance of all offensive and gross language, and of saying or repeating anything than can set others at enmity among themselves; it is a duty, on the contrary, especially for a sramana, to act on all occasions as a peacemaker. Patience under injury, and resignation in misfortune, are strongly inculcated. Humility, again, holds a no less prominent place among Buddhist graces than it does among the Christian. The Buddhist saints are to conceal their good works, and display their faults. As the outward expression of this sentiment of humility, Gautama instituted the practice of confession. Twice a month, at the new and at the full moon, the monks confessed their faults aloud before the assembly. This humiliation and repentance seems the only means of expiating sin that was known to Gautama. Confession was exacted of all believers, only not so frequently as of the monks. The edicts of Piyadasi recommend a general and public confession at least once in five years. The practice of public confession would seem to have died out by the time of Hiouen-Thsang's visit to India.

Such are the leading features of the moral code of the Buddha, of which it has been said, that 'for pureness, excellence, and wisdom, it is only second to that of the Divine Lawgiver himself.' But the original morality of Buddhism has, in the course of time, been disfigured by many subtilties, puerilities, and extravagances, derived from the casuistry of the various schools of later times; just as the casuistry of the Jesuits, for instance, perverted many of the precepts of Christianity. The theory on which the Buddha founds his whole system gives, it must be confessed, only too much scope to such perversions; for, on that theory, truth is to be spoken, self to be sacrificed, benevolence to be exercised, not for the sake of the good thus done to others, but solely for the effect of this conduct on the soul of the actor, in preparing him for escape from existence. To teach men 'the means of arriving at the other shore,' was another expression for teaching virtue; and that other shore was annihilation. On this principle, the Buddhist casuist can, like the Jewish, render of none effect the universal law of charity and the duty of respecting and aiding parents, on which the Buddha laid such stress. Thus, a Bikshu—that is, one who has engaged to lead a life of self-denial, celibacy, and mendicancy, and is thus on the high road to Nirvana—is forbidden to look at or converse with a female, lest any disturbing emotion should ruffle the serene indifference of his soul; and so important is this, that 'if his mother have fallen into a river, and be drowning, he shall not give her his hand to help her out; if there be a pole at hand, he may reach that to her; but if not, she must drown.'—*Wilson.*

Contemplation and science or knowledge (i. e., of the concatenation of causes and effects) are ranked as virtues in Buddhism, and hold a prominent place among the means of attaining Nirvana. It is reserved, in fact, for abstract contemplation to effect the final steps of the deliverance. Thought is the highest faculty of man, and, in the mind of an Eastern philosopher, the mightiest of all forces. A king who had become a convert to Buddhism is represented as seating himself with his legs crossed, and his mind collected; and 'cleaving with the thunderbolt of science, the mountain of ignorance,' he saw before him the desired state. It is in this cross-legged, contemplative position that the Buddha is almost always represented—that crowning intellectual act of his, when, seated under the Bo-tree (q. v.), he attained the full knowledge of the Buddha, saw the illusory nature of all things, broke the last bonds that tied him to existence, and stood delivered for evermore from the necessity of being born again, being considered the culmination of his character, and the highest object of imitation to all his followers.

'Complete' Nirvana or extinction cannot, of course, take place till death; but this state of preparation for it, called simply Nirvana, seems attainable during life, and was, in fact, attained by Gautama himself. The process by which the state is attained is called *Dhyana*, and is neither more nor less than ecstasy or trance, which plays so important a part among mystics of all religions. The individual is described as losing one feeling after another, until perfect apathy is attained, and he reaches a region 'where there are neither ideas, nor the idea of the absence of ideas!'

The *ritual* or *worship* of Buddhism—if worship it can be called—is very simple in its character. There are no priests, or clergy, properly so called. The *Sramanas* or *Bikshus* (mendicants) are simply a religious order—a kind of monks, who, in order to the more speedy attainment of Nirvana, have entered on a course of greater sanctity and austerity than ordinary men; they have no sacraments to administer or rites to perform for the people, for every Buddhist is his own priest. The only thing like a clerical function they discharge, is to read the scriptures or discourses of the Buddha in stated assemblies of the people held for that purpose. They have also everywhere, except in China, a monopoly of education; and thus in Buddhist countries education, whatever may be its quality, is very generally diffused. In some countries, the monks are exceedingly numerous; around Lhassa in Tibet, for instance, they are said to be one-third of the population. They live in *viharas* or monasteries, and subsist partly by endowments, but mostly by charity. Except in Tibet, they are not allowed to engage in any secular occupation. The vow is not irrevocable. This incubus of monachism constitutes the great weakness of Buddhism in its social aspect. Further particulars regarding Buddhist monks and monasteries, as well as the forms of Buddhist worship generally, will be given when speaking of the countries where the religion prevails. See LAMAISM.

Colossal Gautama near Amarapura, Burmah.

The adoration of the statues of the Buddha and of his relics, is the chief external ceremony of the religion. This, with prayer and the repetition of sacred formulas, constitutes the ritual. The centers of the worship are the temples containing statues, and the topes or tumuli erected over the relics of the Buddha, or of his distinguished apostles, or on spots consecrated as the scenes of the Buddha's acts. The central object in a Buddhist temple, corresponding to the altar in a Roman Catholic church, is an image of the Buddha, or a dagoba or shrine containing his relics. Here flowers,* fruit, and incense are daily offered, and processions are made with singing of hymns. Of the relics of the Buddha, the most famous are the *teeth* that are preserved with intense veneration in various places. Hiouen-Thsang saw more than a dozen of them in different parts of India; and the great monarch Ciladitya was on the eve of making war on the king of Cashmere for the possession of one, which, although by no means the largest, was yet an inch and a half long. The tooth of the Buddha preserved in Ceylon, a piece of ivory about the size of the little-finger, is exhibited very rarely, and then only with permission of the English government—so great is the concourse and so intense the excitement. See CEYLON.

There appears at first sight to be an inconsistency between this seeming worship of the Buddha, and the theory by which he is considered as no longer existing. Yet the two things are really not irreconcilable; not more so, at least, than theory and practice often are. With all their admiration of the Buddha, his followers have never made a god of him. Gautama is only the last Buddha—the Buddha of the present cycle. He had predecessors in the cycles that are past (twenty-four Buddhas of the past are enumerated, and Gautama could even tell their names); and when, at the end of the present cycle, all things shall be reduced to their elements, and the knowledge of the way of salvation shall perish with all things else; then, in the new world that shall spring up, another Buddha will appear, again to reveal to the renascent beings the way to Nirvana.

Gautama foretold that Mitraya, one of his earliest adherents, should be the next Buddha† (the Buddha of the future), and he gratified several of his followers with a like prospect in after-cycles. The Buddha was thus no greater than any mortal may aspire to become. The prodigious and supernatural powers which the legends represent him as possessing, are quite in accordance with Indian ideas; for even the Brahmans believe that by virtue, austerities, and science, a man may acquire power to make the gods tremble on their thrones.

The Buddha, then, is not a god; he is the ideal of what any man may become; and the great object of Buddhist worship is to keep this ideal vividly in the minds of the believers. In the presence of the statue, the tooth, or the footprint, the devout believer vividly recalls the example of him who trod the path that leads to deliverance. This veneration of the memory of Buddha is perhaps hardly distinguishable, among the ignorant, from worship of him as a present god; but in theory, the ritual is strictly commemorative, and does not necessarily involve idolatry, any more than the garlands laid on the tomb of a parent by a pious child. See TOPE.

The prayers addressed to the Buddha are more difficult to reconcile with the belief in his having ceased to exist. It is improbable, indeed, that the original scheme of Buddhism contemplated either the adoration of the statues of the Buddha, or the offering of prayers to him after his death. These are an after-growth—accretions upon the simple scheme of Gautama, and in a manner forced upon it during its struggle with other religions. For, a system of belief that seeks to supplant other systems, finds itself enticed to present something to rival and outdo them, if possible, in every point. Even the Christian church, in the middle ages, adopted with this view many of the rites and legends of paganism that were quite inconsistent with its own character; merely casting over them a slight disguise, and giving them Christian names. Prayer, too, is natural to man—an irrepressible instinct, as it were, and had to be gratified. And then the inconsistency in uttering prayers when there is no one to hear or answer, glaring as it appears to us, is by no means great to the Eastern mind. Prayers, like other sacred formulas, are conceived less as influencing the will of any superior being to grant the request, than as working in some magical way—producing their effects by a blind force inherent in themselves. They are, in short, mere incantations or charms.

Even the prayers of a Brahman, who believes in the existence of gods, do not act so much by inclining the deity addressed to favor the petitioner, as by compelling him through their mysterious potency—through the operation of a law above the will of the highest gods. The Buddhist, then, may well believe that a formula of prayer in the name of 'the Venerable of the world' will be potent for his good in this way, without troubling himself to think whether any conscious being hears it or not.

The element in Buddhism which more than any other, perhaps, gave it an advantage over all surrounding religions, and led to its surprising extension, was the spirit of universal charity and sympathy that it breathed, as contrasted with the exclusiveness of caste. In this respect, it held much the same relation to Brahmanism that Christianity did to Judaism. It was, in fact, a reaction against the exclusiveness and formalism of Brahmanism—an attempt to render it more catholic, and to throw off its intolerable burden of ceremonies. Buddhism did not expressly abolish caste, but only declared that all followers of the Buddha who embraced the religious life were thereby released from its restrictions; in the bosom of a community who had all equally renounced the world, high and low, the twice-born Brahman and the outcast were brethren. This was the very way that Christianity dealt with the slavery of the ancient world. This opening of its ranks to all classes and to both sexes—for women were admitted to equal hopes and privileges with men, and one of Gautama's early female disciples is to be the supreme Buddha of a future cycle—no doubt gave Buddhism one great advantage over Brahmanism. The Buddha, says M. Müller, 'addressed himself to castes and outcasts. He promised salvation to all; and he commanded his disciples to preach his doctrine in all places and to all men. A sense of duty extending from the narrow limits of the house, the village, and the country, to the widest circle of mankind, a feeling of sympathy and brotherhood towards all men, the idea, in fact of humanity, were first pronounced by Buddha.' This led to that remarkable missionary movement, already adverted to, which, beginning 300 B.C., sent forth a succession of devoted men, who spent their lives in spreading the faith of Buddha over all parts of Asia.

In the characteristic above mentioned, and in many other respects, the reader cannot fail to remark the striking resemblance that Buddhism presents to Christianity, and this in spite of the perverse theory on which it is founded. So numerous and surprising are the analogies and coincidences, that Mrs. Speir, in her book on *Life in Ancient India*, 'could almost imagine that before God planted Christianity upon earth, he took a branch from the luxuriant tree, and threw it down to India.'

It would be superfluous to attempt here any formal refutation of the religion of the Buddha. To the readers of this work, the fundamental errors of the theory will be apparent enough. By

* The quantity of flowers used as offerings is prodigious. A royal devotee in Ceylon, in the 15th c., offered on one occasion 6,480,320 flowers at the shrine of the tooth. At one temple it was provided that there should be offered 'every day 100,000 flowers, and each day a different flower.'

† One who is on the way to become a supreme Buddha, and has arrived at that stage when he has only one more birth to undergo, is styled a *Bodhisatva* (having the essence of knowledge): a mere candidate for Nirvana is an *arhat* (venerable).

giving prominence to the extravagances and almost inconceivable puerilities and absurdities with which the system has been overloaded, it would have been easy to make it look sufficiently ridiculous. But this is not to depict, it is to caricature. It is only too common for Christian writers to treat of heathen religions in such fashion. The only fair—the only *true* account of any religion, is that which enables the reader to conceive how human beings may have come to believe it and live by it. It is this object that has been chiefly kept in view in this meagre sketch of a vast subject. See Oldenberg's excellent treatise, *Buddha* (1881; Eng. transl. 1882); Spence Hardy's *Manual of Buddhism;* Koeppen's great work, *Die Religion des Buddha* (1857); *Buddhism*, by Rhys Davids (1879); Saint-Hairle's *Le Bouddha;* Max Müller *On Buddhist Nihilism;* and the works of Eitel, Schlagintweit, and Alabaster on Chinese, Tibetan, and Siamese Buddhism respectively.

BUDDING, sometimes called INOCULATION, is an operation analogous to GRAFTING (q. v.), or indeed may be regarded as merely a peculiar mode of grafting, in which a leaf-bud is used as a graft instead of a young shoot. It is generally preferred for trees which are apt to throw out much gum when wounded, as the plum, cherry, peach, apricot, and stone-fruits in general, also for roses and many other flowering shrubs. The time for it is when the bud is perfectly formed, about or a little after midsummer. The subjoined cut represents the various parts in budding: *a* is the bud cut out, with a shield of bark attached to it; *b*, the stem, with a slit in the bark to receive the shield attached to the bud; *c*, the bud inserted and the leaf cut away. The bud to be employed is taken, by means of a sharp knife, from the branch on which it has grown—generally a branch of the former year—a small portion of the bark and young wood being taken with it, extending to about half an inch above and three-quarters of an inch below the bud. The woody part is then separated from the bark and bud; but care is to be taken that the bud itself is not injured, which, however, is always the case when the operation is attempted before the bud is sufficiently matured, and is indicated by a hollow left at the bud when the wood has been removed. A longitudinal and a transverse cut are made in the bark of the stock intended to receive the bud, in the form of the letter T; the bark is raised on both sides, for which purpose the handle of the *budding-knife* generally terminates in a thin ivory blade, and the bud is inserted, the bark attached to the bud being cut across so as to join exactly to the transverse cut in that of the stock, that the bud may be nourished by the descending sap.

The leaf in the axil of which the bud grew is cut off. The newly inserted bud is for a time preserved in its place, and prevented from too much access of air by strands of bass-matting. The process just described is distinctively called *shield-budding*, and is the most common method of budding. Other methods are occasionally employed, as *reversed shield-budding*, in which the incisions are in the form of the letter T reversed, which is sometimes practised with trees of the orange family and others in which there is a great flow of descending sap; and *scallop-budding*, in which a thin slip of bark is removed from the stock, and a similar slip bearing the bud is placed upon it, the upper edge and one of the lateral edges being made to fit exactly. Scallop-budding may be performed in spring, and if it fails, the ordinary method may be resorted to in summer. Budding is also sometimes performed by taking a tube of bark with one or more buds from a small branch, and placing it upon a branch of a similar thickness in the stock, from which the bark has been removed.

BUDDLE'A, a genus of shrubs of the natural order *Scrophularineæ*, of which many species are known, all natives of the warmer parts of the world, and some of them much admired for their beautiful flowers. *B. Neemda* has received the praise of being one of the most beautiful plants of India. *B. globosa*, a native of Chili, with downy branches, lanceolate leaves, and globose heads of orange-colored flowers, is hardy enough to endure the climate of most parts of England, and has become a very common ornament of gardens, but in Scotland it needs the protection of the greenhouse or frame.

BUDE BURNER and BUDE LIGHT. The Bude Burner, so called from the name of the residence of the inventor, Mr. Gurney, consists of two, three, or more concentric argand burners, each inner one rising a little above the outer. On the same principle, a powerful light is produced by a number of flat flames disposed in concentric circles like the petals of a rose.—The Bude Light, also the invention of Mr. Gurney, depends upon introducing oxygen into the center of the flame instead of air, as in the common argand. A light of the most dazzling brilliancy is thus produced.

—BUDE is a small but growing watering-place on the north coast of Cornwall, 18 miles N.W. of Launceston. The cliffs here are grand, and the country around is interesting.

BU'DGET, from the same source as the French *bougette*, means a small bag, and has been used metaphorically to express a compact collection of things, as a budget of news, a budget of inventions, and the like. Water-budgets or buckets were a very honorable blazon on a coat-armorial, as generally conformed in honor of some valiant feat for supplying an army with water. Guillim, in his *Display of Heraldry*, thinks, the three mighty men in David's army who broke into the host of the Philistines, and drew water from the well of Bethlehem, 'deserved to have been remunerated with such armorial marks on their coat-armors for their valor.'

The term, 'The Budget,' is in Britain, from long usage, applied to that miscellaneous collection of matters which aggregate into the annual financial statement made to parliament by the Chancellor of the Exchequer. It contains two leading elements—a statement how the nation's account of charge and discharge stands in relation to the past, and all explanation of the probable expenditure of the ensuing year, with a scheme of the method in which it is to be met, whether by the existing or new taxes, or by loan. The statement of the budget is always an important, sometimes a very exciting occasion; as, for instance, Sir Robert Peel's adoption of an income-tax in 1842, and his legislation for free trade in 1846. Another instance is Mr. Gladstone's reduction of the wine-duties and treaty with France in 1860.

BUDHA'NUH, a town of India, in the British district of Mozuffurnuggur, North-west Provinces, on the route from Kurnoul to Meerut, 43 miles south from Kurnoul. The surrounding country is wooded and well cultivated, and the bazar of the town is well supplied. Pop. (1872) 6162.

BUDOS HEGY, a mountain belonging to the Carpathians, on the eastern border of Transylvania, in lat. 46° 12′ N., and long. 25° 40′ E. It is quite isolated, steep, and of conical shape, densely wooded on the lower slopes, and has an elevation of 7340 feet. It has numerous caverns, that emit sulphurous exhalations, and from its base issue strong sulphuric springs.

BU'DWEIS, a town of Bohemia, situated on the Moldau, about 77 miles south of Prague. B. is well built, is partly fortified, and has an old cathedral, manufactures of woollens, stoneware, machines, lead-pencils, saltpetre, &c. It has also a brisk trade in grain, wood, coals, and salt. There are numerous schools, both for education in the Bohemian and in the German tongue. The Slavic name of B. is *Budejowice*. Pop. (1880) 23,845. In the neighborhood is an old feudal fortress, the *Schloss Frauenberg*, one of the seats of Prince Schwarzenberg, and a fine new Gothic castle also belonging to the same nobleman. Here he keeps herds of wild swine for the chase.

BUEN AY'RÉ in Spanish, or BON AIR in French, an island in that subdivision of the West Indies which runs parallel with the coast of Venezuela. It is in lat. 12° 20′ N., and long. 68° 27′ W., being 30 miles to the east of Curaçao, which, like itself, belongs to the Dutch. B. A. produces cattle and salt. It measures 20 miles by 4, and contains about 4000 inhabitants. It has a tolerable harbor on its leeward or south-west side.

BUE'NOS AYRÉS, a city of South America, on the right bank of the Plata, which here, at a distance of 150 miles from the open sea, is 36 miles across. It stands in lat. 34° 36′ S., and long. 58° 24′ W. Its disadvantages as a maritime town are great; the flood-tides of the ocean, when backed by easterly winds, being apt to make the estuary overflow its banks; and again, when westerly winds prevail, the estuary loses both width and depth. Monte Video, on the opposite shore possesses a better harbor, and is nearer to the Atlantic, nor can it be doubted that, but for the greater facilities of B. A. in carrying on the inland trade, the former town would have proved a dangerous rival. Steam is rapidly placing both upon more equal terms. Of the trade, however, with Chili by Mendoza and the Andes—a trade which must always be carried on by land—B. A. must still command the monopoly. So familiar had B. A. become with landcarriage on an extensive scale, that its merchants, when blockaded in front during the war with Brazil, established, as it were, a new port of entry in the mouth of the Salado or Saladillo, at a distance of at least 150 miles. As a city, B. A. labors under some peculiar disadvantages. Its supplies of fresh water are received from the Plata in rudely constructed carts, though a thorough scheme of water-supply and drainage is now being carried out. Its immediate territory, purely alluvial, is almost as destitute of timber as of stones—the latter being brought either as ballast from Europe, or as freight from Martin Garcia, an island on the opposite side of the estuary; and the former from the province of Entre Rios, and from the islets of the Uruguay and the Parana.

Fuel is almost as scarce as building material—peach-trees and the withered thistles of the prairies yielding the only indigenous supplies. B. A., which appears to deserve its name of *good aire*,

contains (1869) 177,787 inhabitants—about a third of whom are of European birth or descent. Among the Europeans the vast majority are Spanish, Italian, French, and British. B. A. publishes newspapers in French, English, Italian, and German, as well as in Spanish. The city is partitioned into blocks of about 150 yards square, by granite-paved streets. New houses are everywhere springing up; tramways traverse it in every direction; and the value of property has enormously increased. The principal buildings are the cathedral and its dependent churches, Episcopalian and Presbyterian chapels, a foundling hospital, an orphan asylum, the university, a military college, several public schools, and the government offices; there are also printing establishments, and manufactories of cigars, carpets, furniture, and boots and shoes. The exports consist of precious metals, hides, beef, wool, skins, tallow, and horse-hair; and the imports of cottons, linens, woollens, jewelry, perfumery, and deals. The imports have an annual value of £8,000,000; exports, about £11,000,000. In each of the years 1879 and 1880, less than £1,000,000 worth of goods were imported from the United Kingdom, and over £2,000,000 were exported from B. A. thither. There was a Continental Exhibition held at B. A. in 1882. B. A. was founded in 1535; but was subsequently twice destroyed by the Indians. In 1806, to the glory of B., a British force, which had just captured the city, was obliged to surrender; and in 1807, another which attempted to recover the place, was repulsed with heavy loss; and these successes over so formidable a foe emboldened the colonists, three years afterwards, to throw off the yoke of Spain.

BUENOS AYRES, a province of the Argentine Confederation in South America, of which the city B. A. is capital, extends itself along the Atlantic, from the mouth of the Plata to that of the Rio Negro on the 41st parallel; on the N.E., it is washed by the Plata and the Parana as far as the Arroyo del Medio; on the N. and the adjacent section of the W., it touches the province of Santa Fé. Elsewhere, its borders cannot be defined, constantly advancing, by slow and perilous steps, into the domain of the aborigines, for here the contest is not with the wilderness itself, which is a boundless prairie, but with its tenants, who, having an unlimited supply of horses for all purposes, are secured, in their every foray, alike against famine and fatigue. Its area is estimated at 63,000 square miles, with a pop. of (1869) 495,107.

Besides the existing province of the name, it at one time comprised Uruguay or Banda Oriental, Paraguay, Bolivia, and the Argentine Confederation, being originally an appendage of Peru, under the immediate command of a captain-general, and becoming, in 1775, a separate vice-royalty of itself. Though the first three of these four division broke off chiefly in connection with the revolutionary struggle, yet the fourth continued, down to 1853, to recognize the city of B. A. as its head; and the inland states endeavored both by war and diplomacy to re-annex the maritime province to the republic, till, in June 1860, their object was obtained, and B. A. became once more a province in the Argentine Confederation.

The country approaches so nearly to a plain, that most of the rain which falls is either absorbed or evaporated, or lost in salt-lakes, comparatively little drainage entering the Parana or the Plata. The climate, though on the whole healthy and agreeable, is yet by no means steady or uniform. Every wind, in general, has, to a remarkable degree, its own weather—sultriness coming from the north, freshness from the south, moisture from the east, and storm from the west; and besides the periodical heats of every summer, successive years of more than ordinary drought occur. Agriculture, properly so called, is followed chiefly in the more temperate and humid districts of the eastern coast; while the interior presents almost uninterrupted pasturage to countless herds of horses and cattle. Under these circumstances, the business of grazing and hunting combined occupies or interests the great bulk of the population—a business that renders the province, whether as to the disposal of its productions or as to the supply of its wants, peculiarly dependent on that external commerce, which, throughout the whole of Spanish America, has naturally been identified with political freedom. Let it be added, that the Indians are intractable, and that the Africans, few in number at best, are principally menials; and it is seen at once why, in spite of national jealousies and sectarian prejudices, immigration from Europe has been not only tolerated by public opinion, but also encouraged by legislative enactment. Moreover, a comparatively congenial climate, as a recommendation to foreigners, has powerfully seconded the efforts of liberality and patriotism. It is perhaps mainly owing to this cause, which is common alike to Chili and to B. A., that these two districts, notwithstanding their full share of wars and troubles, have so decidedly outstriped the other fragments of the same colonial empire in all the elements of liberty and civilization. Hence their higher importance in the eyes of Europeans in general, and of Englishmen in particular. B. A. is the largest, most populous, and most flourishing of the provinces which comprise the Argentine Confederation. Numerous railways traverse it, emanating from the city of B. A., and extending to other parts of the republic. The annual immigration into B. A. is from 20,000 to 40,000.

BU'FFALO (*Bos Bubalus*), an animal of the ox tribe, very important and useful to man. It is a native of the East Indies, where it has been long domesticated, and from which it was carried to Egypt and to the south of Europe. It was introduced into Italy about the close of the 6th c. A.D., and is now very generally used as a beast of draught and of burden in that country, as it is also in India.

The B. is larger than the ox, and its limbs are stouter. Its form is more angular and clumsy; the head is larger in proportion to the size of the body; and the forehead is rather convex, and higher than broad; the dorsal line rises into a considerable elevation above the shoulders; the dewlap and the tail resemble those of the ox; the horns are large, slightly compressed, recline towards the neck, and have their points turned up. It is characteristic of the B., when walking or running, to carry the head with the muzzle projecting straight forward, and the horns laid back on the shoulders. The hair is irregular and bristly, often very thin, so that the smooth brown hide 'shines with an unpleasant polish in the sunlight.' In this as in other respects, the animal is adapted for marshy situations, which it naturally affects; preferring for its food the rank coarse herbage which they afford, delighting to immerse itself in water till only its head appears above the surface, in which condition it will remain for hours, and often enveloping itself in mud as a protection against insects. On account of these propensities, the buffaloes used as beasts of burden in India are seldom laden with any goods liable to be spoiled by water, as the animal is always ready to take an opportunity of lying down with his load in any river or pond which presents itself. In Italy, the B. seems nowhere more at home than in the Pontine Marshes and the pestilential Maremma. The very regions where malaria is most prevalent seems to be these most adapted to its constitution.

The B. is a very powerful animal, much more powerful than the ox, and capable of dragging or carrying a far heavier load. The female yields a much greater quantity of milk than a cow, and of excellent quality. It is from B. milk that the *ghee* or semi-fluid butter of India is made. The hide is greatly valued for its strength and durability, but the flesh is very inferior to that of the ox.

The B. exhibits a considerable amount of intelligence. In a state of domestication, it is capable of becoming very docile. In the south of Europe, it is generally managed by a ring passed through the cartilage of the nose, but in India by a mere rope. The Indian driver rides upon a B.; but these animals keep so closely together as they are driven along, that, if necessary, he walks from the back of one to that of another perfectly at his ease. In a wild state, the B. is savage and dangerous, and even in domestication it is apt to resent injury. The native princes of India make buffaloes and tigers fight in their public shows; and the B. is more than a match for the tiger, even in single combat. The appearance of a tiger excites a herd of buffaloes, much as we see oxen excited by the approach of a dog; and if his safety is not secured by flight, they kill him, tossing him from one to another with their horns, and trampling him with their feet.

The B. is used in some parts of the east in the shooting of waterfowl, being trained to the sport, and sold at a considerable price. The sportsman conceals himself behind the B., which, being a familiar sight, is not alarming to the birds.

The CAPE B. (*Bos Caffer*) is generally regarded as a distinct species. It seems never to have been reduced to the service of

Cape Buffalo.

man, although there is reason to believe it to be very capable of domestication. The horns are very large; they spread horizon-

tally over the top of the head, and are then bent down laterally, and turned upwards at the point. The head is carried, as by the common B., with projecting muzzle and reclining horns, but the bases of the horns nearly meet on the forehead, where they are from eight to ten inches broad. The length of a full-grown Cape B. is about 8 feet from the root of the horns to the tail, and the height 5½ feet. This animal is regarded as more formidable than any other in South Africa; and the hunter will more readily risk an encounter with a lion than offer any provocation to a B. without great advantages for the combat, or great facilities for escape.

The B. is still found in large herds in the interior of South Africa, but in Cape Colony, where it was once plentiful, it has now become comparatively rare. The hide is so thick and tough that the Caffres make shields of it, impenetrable to musket-shot; and the balls used by the huntsmen in shooting the animal are mixed with tin, and yet are often flattened by the resistance. The Cape B. grazes chiefly in the evening, and lies in woods and thickets during the day.

An attempt has been made to establish a genus, *Bubalus*, having the common B. for its type; but the characters lack precision, and the limits are uncertain.—The *Buffalo* of the Anglo-Americans is the American Bison. See BISON.

BUFFALO, a city of the state of New York, standing at the mouth of Buffalo River, which enters Lake Erie within 2 miles of its outlet, the Niagara River. In 1801, when B. was founded, the basin of its fresh-water sea contained certainly fewer than 50,000 inhabitants, and seemed cut off from commercial communication by the Niagara Falls on the east, and the currents of the Detroit and St. Clair on the west. But these and other natural disadvantages have been made to vanish. The construction of piers and breakwaters in the river and at its mouth have removed the bar, and given B. one of the best harbors on the lakes. Steam has brought Lakes Huron, Michigan, and Superior within easy reach. Its commerce is large, the grain trade being the most important item in it. The receipts of grain and flour during the decade 1864–74 amounted to 522,874,944 bushels. In the year 1881, there were received at B. 26,838,700 bushels of wheat, 1,941,000 bushels of flour, and 51,166 of maize, of which 17,750,000 bushels of wheat and 31,635,000 of maize were again exported. The elevators of B. hold 7,000 000 bushels. Next to the traffic in grain is that in live-stock. British improvements along the Niagara and the St. Lawrence, available as they are for sea-going ships, have rendered B. a maritime emporium. The Erie Canal, 364 miles long, has connected B. as its terminus with the tide-waters of the Hudson; while three other enterprises of the kind, commencing respectively at Erie, Cleveland, and Toledo, have linked Lake Erie at three or rather four points with the Ohio, and through it with the Mississippi. Since about 1862 its lake commerce has much decreased owing to the increase of railway facilities, and manufacturing industries have taken the lead. Among manufactures, that of iron is the chief. Ship-building is also largely carried on, and there are extensive wool-factories and numerous saw-mills. The rise of B. has been remarkably rapid; in 1810, there were 1508 inhabitants; (1830) 8653; (1850) 42,261; (1870) 117,714; and in 1880, 155,137. The city debt in 1880 was $8,211,934; and the valuation above $100,000,000. In 1814 the British burned B. In 1825 the Erie Canal was opened.

B. is situated in lat. 42° 53′ N., and long. 78° 55′ W. It is regularly built. Its streets are straight and broad—Main Street, in particular, being 2 miles long and 120 feet wide; and its squares, which are three in number, are shaded by rows of trees. The most prominent public buildings are the city and county hall, erected at a cost of 2,000,000 dollars, custom-house, post-office, arsenal, penitentiary, and an asylum for the insane. There are nearly 80 churches, a university, 8 daily newspapers, several libraries, &c. It is divided into five wards, and is governed by a mayor and council annually elected. See BUFFALO in AM. SUPP.

BUFFALO'RA, a small town of Lombardy, about 25 miles north-north-west of Pavia, on the Ticino, here crossed by a bridge. The Austrians commenced the Italian campaign of 1859 by entering Piedmont at this point. The bridge was partially blown up by Austrian Engineers. Pop. 1250.

BUFFET, an article of furniture formerly serving the same purpose as a sideboard, which has now superseded it. B. is the name given in France to a refreshment bar.

BUFF LEATHER is usually made out of salted and dried South American light ox and cow hides. After being limed in the usual way, they are unhaired and rounded, so that only the best part of the hide is made into buff leather. The grain and flesh being then scraped or cut off, the true cuticle, which is of a flexible fibrous nature, alone remains. The hide is next sprinkled over with cod-oil, and placed in the *stocks*, where it is worked for about 15 minutes. Having been taken out and partially dried, it is again submitted to a similar process of oiling and stocking; and during the first day, these operations may be repeated six times, decreasing daily for about a week, when one oiling and stocking in a day is sufficient. The hides are then placed in a stove, and subjected to aprocess called 'heating off,' after which they are scoured and rendered free from oiliness by being soaked in a strong lye of carbonate of potash. They are next worked well in the stocks, hot water being poured copiously upon them until the water runs off pure. Having been dried, they are subjected to a process called *grounding*—i. e., they are rubbed with a round knife, and also with pumice-stone and sand, until a smooth surface is produced. The leather, which is very pliant, and not liable to crack or rot, is now ready for the market, and is generally used for soldiers' belts and other army purposes.

During the early part of this century, the principal seat of the B. L. manufacture was in the neighborhood of Edinburgh, one manufacturer turning out previous to the battle of Waterloo, about 1300 hides per week. In peaceable times, the demand for B. L. is comparatively small, and the manufacture is now almost confined to London and the neighborhood, where the raw material is most readily procured, and the demand for the manufactured article is greatest. The natural color of the leather is light-yellow, but for some purposes it is bleached white. The precise chemical operation of the oil in the process of the manufacture is rather obscure, but as no glue can be got from hide that has been made into buff, the gelatine of the hide must have entered into combination with some of the constituents of the oil, and had its nature completely changed.

BU'FFO (Ital. from corrupt Latin *buffa*, a slap on the cheek, as practised by clowns and mountebanks in farces), an Italian theatrical term applied to an actor or operatic singer who takes the light or humorous part in an opera or play. A burlesque opera is called *opera buffa*, and a burlesque play *commedia buffa*.

BUFFON, GEORGE LOUIS LECLERC, COMTE DE, one of the most famous naturalists and writers of the 18th c., was born at Montbard, in Burgundy, September 7, 1707. He studied law at the college of Jesuits at Dijon, but showed so marked a predilection for astronomy and mathematics, that his father allowed him to follow his own inclinations. At Dijon he became acquainted with Lord Kingston, whose tutor, a man of learning and taste, directed the mind of B. to the study of the sciences. With Lord Kingston and his tutor, B. traveled through France and Italy, and came to England, where to improve his knowledge of our language he translated Newton's *Fluxions* and Hales's *Vegetable Statics*. In 1733 he wrote several original essays, which gained notice in the Academy, of which he had been made a member. His *general* love of science received a definite impulse toward zoology by his appointment, in 1739, as intendant of the royal garden and museum. Hitherto zoology consisting of a series of unconnected observations and fruitless attempts at classification, had been commonly regarded by educated readers as a dry study, and by savans as play-work. B. first conceived the idea of making it attractive to the first of these classes, and of securing for it, at the same time, the respect of the second. His plan was assuredly comprehensive enough, since he aimed at nothing less than a collection of all the known facts of physical investigation, and a systematic arrangement of these, to assist the author in forming a theory of nature; but B. possessed neither the science nor the patience necessary for such a task.

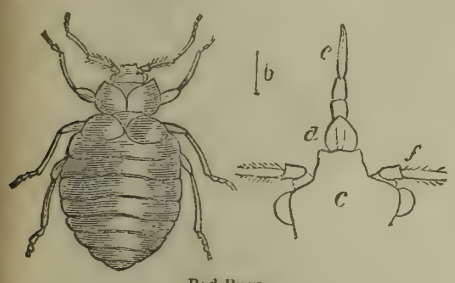
Endowed, however, with a brilliantly rhetorical imagination, and always inclined to deliver himself from doubts and ignorance by sparkling hypotheses, the elaboration of which cost him little trouble, he contrived to produce a work which, if not severely scientific in its method, at least shone with what many then conceived to be the brightest literary lustre. However, it is not to be denied that many of his views are very ingenious, although later researches have completely exploded them. The *Natural History* of B. made an epoch in the study of the natural sciences, though it has now little or no scientific value. His attempted explanations of natural phenomena were opposed by Condillac, who, with Helvetius, Diderot, D'Alembert, and others, also ridiculed, with a certain degree of justice, the excessive pomp of style used by Buffon. The most insignificant part of B.'s treatise is the mineralogy, for which he was quite unqualified by the deficiencies of his chemical, mathematical, and physical knowledge. The systematic and anatomical arrangement of the mammalia was executed by Daubenton, the colleague of Buffon. B.'s works passed through numerous editions, and several were translated into most of the languages of Europe. The best complete edition is the *Histoire Naturelle Générale et Particulière*, in 36 volumes (Par. 1749—1788). After receiving several high honors, being elevated to the rank of Comte de B. by Louis XV., and treated with great distinction by Louis XVI., B. died in Paris, April 16, 1788. In person and carriage, B. was noble; as a Parisian academician, and a self-complacent, theoretical naturalist, dressed in courtly style, pursuing his pleasant studies in the *allées* of the Royal Garden, and largely participating in the vices of his time, B. was quite a model of a French philosopher of the 18th century. His son,

Henri Leclerc, Comte de B., born 1764, was attached, at the outbreak of the revolution, to the party of the Duke of Orleans, and fell under the guillotine. His last words were: '*Citoyens, je me nomme Buffon.*'

BUFFOO'N (Fr. *bouffon*), a low jester. The Italian *buffo* (from *buffa*, a farce) is the name given to a comic singer in an opera. In the corrupt Latinity of the middle age, *buffa* meant a slap on the cheek; and in the Italian, *buffare* signifies the puffing of wind through the mouth. It is probably from the favorite trick played by clowns in farces—one swelling out his cheeks with wind, the other slapping them, so as to make a ludicrous explosion—that the terms *buffones* in Latin, *buffoni* in Italian, *bouffons* in French, and in English *buffoon*, were derived. In Italy, the *buffo cantante* is distinct from the *buffo comico;* the former having greater musical talent, and sustaining a more important part, the latter having greater license in jocoseness. The voice of a *buffo cantante* is generally a bass, but sometimes a tenor buffo is introduced.

BUG, or BOG. There are two rivers of this name in Russian Poland. The Western B., the largest tributary of the Vistula, rises in Austrian Galicia, and after a course of about 450 English miles, and receiving numerous tributaries, it joins the Vistula at the fortress of Modlin, near Warsaw. It is navigable for a considerable distance. The Eastern B., the Hypanis of the ancients, rises in Podolia, and flows south into the estuary of the Dnieper. Its length is more than 400 miles. It is navigable for small-craft as far as Wosnessensk. At the junction of the Ingul with the B., stands the city of Nicolaiew (q. v.).

BUG, a name applied to a large family of insects; *Cimicidæ*, of the order *Hemiptera* (q. v.), sub-order *Heteroptera*, and often still further extended in its signification so as to include the whole of that sub-order, the insects of the section *Geocorisæ* being designated land-bugs, and those of the section *Hydrocorisæ*, water-bugs, the latter including water-scorpions, boat-flies, &c. All these insects and particularly the land-bugs, although some of them are radiant in beautiful colors, have a strong resemblance in form and structure to the annoying and disgusting HOUSE B. or BED B. (*Cimex lectularius*). The statement that this insect was introduced into England with timber brought from America to rebuild London after the great fire of 1666, must be rejected as erroneous; for although it appears to have been comparatively rare in England, it was well-known in some parts of Europe long before that time, and is mentioned by Dioscorides. The Bed B. is destitute of wings—an anomalous peculiarity, as the insects of its order, and even of the same family, are generally furnished with them. The body is very flat, of a somewhat oval form; the whole insect is of a dirty rust color, emits an offensive odor, and is about three-sixteenths of an inch in length; the legs are moderately long, and capable of being employed for pretty rapid motion; the antennæ are thread-like and very slender, about half the length of the body; the mouth is formed for suction alone, and is furnished with a sort of proboscis, which is three-jointed, forms a sheath for the true sucker, and when not in use is recurved under the head and thorax. The B. lurks during the day in crevices of walls, of bedsteads, and of other furniture, but is sufficiently active during the night; and when it finds opportunity, sucks blood until it distends itself. It seems, however, to be capable of subsisting long without food. Young bugs resemble their parents in most things, except size and the want of *elytra*, insects of this order not undergoing such marvelous transformations as those of some other orders.



Bed Bugs.

a, the insect, magnified; *b*, its natural length; *c*, the head, upper side; *d*, labrum; *e*, proboscis extended; *f*, base of antennæ—very highly magnified.

The best preventive of bugs in a house is *scrupulous attention to cleanliness;* but where the nuisance exists, it is not easily removed, and various means are employed for this purpose, of which one of the best and safest is thorough washing with spirit of turpentine, although recourse is even had to washing with a solution of corrosive sublimate.—Other species of B. (*Cimex*) suck the blood of some of the inferior vertebrate animals, as pigeons, swallows, bats, &c.; but the greater number of insects of the B. family live by sucking the juices of vegetables. A small species (*Tingis pyri*), which sucks the leaves of the pear-tree, is very destructive in some parts of Europe, where it is popularly called the *tiger*. Some of these winged wood-bugs or field-bugs are capable of inflicting very painful wounds. Flying-bugs, 'enormous and fetid,' are among the pests of India. Night is the time of their activity. Warm countries generally have winged bugs of great size and beauty; but if touched or irritated, they 'exhale an odor that, once perceived, is never after forgotten.' A winged B., as large as a cockchafer, lodges in the thatch and roofing of houses in Chili, and sallies forth at night, like the Bed B., to suck blood, of which it takes as much as a common leech.—It is worthy of notice that a species of field-B. (*Acanthosoma grisea*), a native of Britain, is one of the few insects that have yet been observed to show affection and attention to their young. De Geer observed the female of this species, which inhabits the birch-tree, conducting a family of thirty or forty young ones as a hen does her chickens, showing great uneasiness when they seemed to be threatened with danger, and waiting by them instead of trying to make her own escape.

BUGEAUD, MARSHAL, was born at Limoges, in France, October 15, 1784. In his 20th year he entered the army as a private. His conspicuous bravery in the Prussian, Polish, and Spanish campaigns gained him rapid promotion. Shortly before the fall of Napoleon, B. was made a colonel, and in 1815 commanded the advance-guard of the army corps of the Alps. He afterwards retired to his estate, but was called into public life by the July revolution of 1830. He was elected deputy for Perigueux, and gained the esteem of Louis-Philippe, who created him a marshal. In 1835, he voted against electoral reforms and universal suffrage, denounced 'the tyranny of the press,' and soon contrived to make himself very unpopular. In December 1840, he was appointed governor general of Algiers. He immediately set about organizing the celebrated irregular force known as the Zouaves, and in a few years the French arms were everywhere triumphant over the Arab tribes. The cruelty of some of B.'s proceedings excited strong feelings of reprobation at the time, as well in France as in Europe generally.

In 1844, he gained a victory over the Emperor of Marocco's forces at Isly, for which he was created Duc d'Isly. In the revolution of February 1848, Marshal B. had the command of the army in Paris, and would have dissuaded the king from signing the act of abdication; but panic made such counsel useless. Among all the friends of Louis-Philippe, Marshal B. seems to have been the only man who preserved firmness and presence of mind. When Louis Napolean became president, he intrusted the chief command of the army of the Alps to B., who died of cholera in Paris, June 9, 1849.

BUGENHAGEN, JOHANN, surnamed *Pomeranus*, or Dr. Pommer, one of Luther's chief helpers in the Reformation, was born at Wollin, near Stettin, in Pomerania, 1485; studied at Greifswald, and as early as 1503 became rector of the Treptow Academy. There he lived quietly, fulfilling the duties of his office until 1520, when his religious views, were changed by reading Luther's little book, *De Captivitate Babylonicâ*. B. was now seized, as it were, by the zealous spirit of the Reformation, and, to avoid the persecutions of the Catholic party, he betook himself to Wittenberg, where his talents procured for him in succession several high positions. B.'s remarkable philological and exegetical powers were of great service to Luther in his translation of the Bible. In 1525, he opened the controversy between Luther and Zwingli by a treatise against the latter, to which Zwingli ably replied. He possessed a superior talent for organization, establishing churches in Brunswick, Hamburg, Lubeck, and Pomerania. In 1537, he was called to Denmark by Christian III. to reform the ecclesiastical establishments of that country. He accomplished this so admirably, that the Danes to this day consider him their Reformer. In 1542, he returned to Wittenberg, and continued his energetic efforts to extend the new theology throughout his native land. He died 20th April 1558. His best work is his *Interpretatio in Librum Psalmorum* (Nürnberg, 1523).

BU'GLE (*Ajuga*), a genus of plants of the natural order *Labiatæ*, having an irregular corolla, with very short upper lip and trifid lower lip, the stamens protruding. The species are mostly natives of the colder parts of the Old World, and several are British. The Common B. (*A. reptans*) is abundant in moist pastures and woods. Its flowers are generally blue, but varieties occur with white and purplish flowers, which are often introduced into flower-borders. The Alpine B. (*A. alpina*) is one of the beautiful flowers of the Swiss Alps.

BU'GLOSS, a name popularly applied to many plants of the natural order *Borragineæ* (q. v.), as to the species of *Anchusa* or Alkanet (q. v.), &c. In some botanical works it is confined to the genus *Lycopsis*, a genus differing from *Anchusa* in little but the curiously curbed tube of the corolla, and of which one species, *L. arvensis*, is a common weed in cornfields in Britain. The beautiful genus *Echium* bears the English name of VIPER'S BUGLOSS.

BUHL-WORK, or BOOL-WORK, is the name applied to a sort of inlaying of brass scrolls and other ornamental patterns in wood. The name is derived from its inventor, Boule, an Italian cabinet-maker, who settled in France in the reign of Louis XIV. He employed veneers of dark-colored tortoise-shell, inlaid with

brass. Cabinets of his manufacture are highly prized, as are also those of his contemporary Reisner, a German, who used a ground of tulip-wood, inlaid with flowers, &c., in darker woods, and varied with margins and bands of light wood, with the grain crossed for contrast. This modification of B. W. is correctly called Reisner work. For details of the methods of working, see INLAYING and MOSAIC.

BUHREA'CH, or BHARAICH, a town of Oude, India, the principal place of a district of the same name. It is in N. lat. 27° 34', E. long. 81° 33'—65 m. N.E. of Lucknow. It is an old town, of considerable size, situated in a pleasant wooded plain, on the left bank of the Sarju. The houses are mostly built of mud and covered with thatch; but the mausoleums, mosques, and residences of merchants are of brick and lime-mortar. North-east of the town is the tomb of Selar, a reputed Mussulman saint, to which there is a great concourse of pilgrims annually in the month of May. Pop. (1871) 18,889; of district, 774,640.

BU'HRSTONE, a variety of quartz (q. v.), containing many small empty cells, which give it a peculiar roughness of surface, particularly adapting it for millstones. The name is given without reference to geological relations, but it is *vein quartz*, rather than true *quartz rock*, which ordinarily assumes the character of buhrstone. There are different varieties of B., some of which are more compact, or have smaller cells than others; and those in which the cells are small and very regularly distributed, about equal in diameter to the spaces between them, the stone being also as hard as rock-crystal, are most esteemed. Good B. is found at Conway in Wales, and at several places in Scotland; but the finest millstones are obtained from the quarries of La Ferté-sous-Jouarre, in the department of Seine-et-Marne, near Paris. A single millstone in one piece of 6 feet diameter, sells for about £50, and one formed of several pieces for about £33. It is not unusual to form millstones of pieces of B. cut into parallelopipeds, like great wedges of soap, and bound together by iron hoops.

The stone is found in beds or in detached masses, and the mode of quarrying is peculiar. When the mass is large it is cut out into the form of a huge cylinder; around this, grooves are cut, at distances of about 18 inches, the intended thickness of the millstones; into these grooves, wooden wedges are driven, and water is thrown upon the wedges, which, causing the wood to swell, splits the cylinder into the slices required.—Millstones are not always made of B., but sometimes of silicious gritstones, of sandstone, and even of granite. B. millstones are extremely durable.

BUILDING, the art of erecting or building houses and other edifices, in which several distinct professions are usually and more immediately concerned. At the head of the building-trade is the architect, who is employed to draw plans and make out specifications of the work to be performed. The builder acts ministerially; his duty consists in carrying out the plans put into his hands, according to certain stipulated terms. The profession of the architect demands not only much imaginative power, but great artistic skill, along with a practical knowledge of details. Endeavoring to realize the wishes of his employer, the architect devises what shall be the external effect and interior accommodation of a building, and portrays the whole on paper with rigorous accuracy. Besides general designs to give an idea of the structure and its interior arrangements, he furnishes the working plans or drawings, which are to guide the different mechanics—masons, joiners, &c.—in their several operations. These services of the architect, of course, involve much thought and labor, and he is therefore under the necessity of employing a staff of assistants, by whom the plans are executed under his orders. The making out of the specifications is a matter of careful study. To perform this part of his duty properly, the architect needs to be acquainted with the qualities of different kinds of materials; such as stone, lime, sand, bricks, wood, iron, &c. A knowledge of the strength of timber is particularly desirable. When the specifications are made out, they and the contract are subscribed by the builder. To insure as far as possible a faithful adherence to the specifications, the architect appoints a 'clerk of works' to keep watch over the whole operations, and who is authorized to check any seeming fault. During the whole proceedings, the architect is paramount. For the due execution of his plans, he feels that his professional reputation is at stake; and, accordingly, having involved his responsibility, the employer cannot with propriety interfere to make alterations while the work is in progress.

Such is the etiquette of the profession. Should alterations be desirable, they become matter for a fresh agreement among the parties. When the works are finished, the builder hands his account to the architect to be examined and checked. If satisfied of its correctness, he grants a certificate of the fact, and this is the warrant for payment by the employer. The builder having been settled with, the employer now pays the architect's fee, which closes the transaction. This fee may be one, two, or more per cent. on the entire cost of the B., according to local usage or terms agreed on; whatever it is, it covers all charges for advice, plans, and other professional trouble.

Builders undertake work by 'contract,' or by 'schedule of prices.' If by contract, they engage to execute the whole works for a stipulated sum. If by schedule of prices, they agree to abide by the measurements of valuators appointed by the architect. These valuators go over the works when finished, and, taking an exact account of everything, compare it with the account rendered by the builder; the architect being the ultimate referee. It is exceedingly important, for the sake of an amicable adjustment of accounts, that the builder should adhere scrupulously to the letter of the specifications—i. e., the covenant under which he has become bound. He can justify no departure from the specifications, on the plea that something as good has been given or done, or that he was not checked at the time by the clerk of works. Being explicitly a person employed to do a certain piece of work, in a certain way, he is in no respect entitled to substitute his own notions for those of his employers.

It may happen that a proprietor acts as his own architect, and employs a builder to execute his designs, on the understanding that he is to pay for everything according to a schedule of prices. In many instances, the builder is proprietor as well as architect, and merely carries out his own plans. Such is generally the case in the neighborhood of London, where builders speculate in leasing land and erecting rows of dwellings for sale. This plan is greatly facilitated by the opportunity of buying every article required in house-building ready for use; such as bricks, door-steps, hearthstones, joists, flooring, doors, windows, marble mantel-pieces, slates, &c. In fact, house-building in the metropolitan district is very much reduced to a system of purchasing and putting together certain articles from manufactories and depôts. For this kind of business, there may be said to be establishments for the sale of doors and windows, as there are shops for the sale of nails, locks, and hinges.

The application of a comprehensive manufacturing system in the preparation of various parts of a building is observable most particularly in certain establishments of great magnitude. The test is this—whether the builder conducts so gigantic a trade as to warrant him in setting up a steam-engine of great power, and in providing highly wrought machines for cutting and otherwise treating wood, stone, &c. When once this degree of magnitude is reached, the operations are conducted under very great advantage. The Crystal Palace in Hyde Park could never have been built at the stipulated cost, nor in the required space of time, but by the application of steam-power to work the machines which shaped and grooved the *two hundred miles* of sash-bars; by the resources of the largest English establishment in the glass-trade, in making one million square feet of sheet-glass; and by the skill and capital of our great iron manufacturers, in rapidly producing three thousand iron columns, and more than that number of iron girders. When the late Mr. Thomas Cubitt was engaged in the vast building operations at Belgravia (a district in the west of London owned by the Marquis of Westminster), his factory on the banks of the Thames was the most complete ever known in the trade. It exemplified both the principles adverted to above—the manufacture of various articles by steam-worked machinery; and the collecting of large stores of other articles made in a similar way by other firms. There was a store of drawing-room and parlor doors, a store of window-sashes, a store of street-doors, and stores of mantel-pieces, stone and marble steps, balusters, slates, knockers, bells, and all the materials for house-building from the coarsest to the finest. There was also observed that systematic gradation of kinds and dimensions which is so much attended to in the higher kinds of machinery, and which so much expedites all operations; seeing that one particular piece would not only fit into or against another, but into or against any one of a whole class to which that other belonged. A house built in this systematic way partakes a good deal in the nature of a large machine, in which all the parts fit together with very great accuracy. There can be little doubt that if skill and capital be judiciously applied in this way, a house ought to be better built and to cost less than if built in the ordinary unsystematic manner. It may also be mentioned here, that Mr. Cubitt was the owner of a very large brick-making establishment on the banks of the Medway, between Rochester and Maidstone, where steam-power was employed in all the operations of making bricks. Some of the great railway contractors, who have become millionaires, were originally house-builders, alive to the grand results producible by the combination of steam-worked machinery with the labor of well-organized bodies of men.

As an art, B. is of vast antiquity, and has assumed different forms, according to the necessities of mankind and the materials readily at their disposal. In ancient Egypt, Greece, and Italy, B. in stone rose to a high state of perfection, and till the present day it may be said that the greatest progress in the art is made only where stone of a manageable kind is conveniently at command. Rome, Paris, Lyon (with very many Italian and French cities),

Bordeaux, Brussels, Munich, Geneva, Vienna, Edinburgh, and Glasgow are specimens of what may be achieved in stone workable with the chisel; Aberdeen is mainly built of granite. On the other hand London, the greatest city within the bounds of civilization, is built of brick; so likewise are Manchester and Liverpool; also Amsterdam, Rotterdam, and other towns in Holland; and as a general fact, it would appear that wherever brick has to be resorted to, there the allied arts of architecture and building, as regards domestic accommodation and elegance of style, are on a poor scale. B. with stone of a superior kind is now becoming common in New York, Philadelphia, and some other American cities. It is not necessary to trace in this article the various processes embraced in the comprehensive term BUILDING; seeing that all the materials used, and all the operations conducted, are noticed under the proper headings in the Encyclopædia.

BUILDING ACT FOR LONDON AND ITS NEIGHBORHOOD. See METROPOLIS LOCAL MANAGEMENT ACT.

BUILDING LEASES. In the law of England, a building lease is a demise of land for a long term of years, the lessee covenanting to erect certain houses or edifices thereon, according to specification. By the 19 and 20 Vict. c. 120, amended by the 21 and 22 Vict., c. 77, and which acts also apply to Ireland, the Court of Chancery is empowered to authorize leases of settled estates and B. L., which shall take effect in possession within one year next after the making of the same; the term for such building lease being ninety-nine years; or where the court shall be satisfied that it is the usual custom of the district, and beneficial to the inheritance to grant B. L. for longer terms, then for such term as the court shall direct. By a subsequent enactment, it is declared that the term building lease shall include a repairing lease, but such repairing lease to be for a term not exceeding sixty years.

By the 5 and 6 Vict. c. 108—passed to enable ecclesiastical persons to grant long leases for building, repairs, or other improvements—it is enacted that any ecclesiastical corporations, aggregate or sole, excepting as mentioned in the act, may, with consent of the *Ecclesiastical Commissioners for England* (q. v.)—to which, where the lessor is incumbent of a benefice, the consent of the patron also must be added—demise by deed the corporate lands or houses for any term not exceeding ninety-nine years, to take effect in possession and not in reversion, to any person willing to improve or repair the same; provided, that on the grant of such leases, a small rent may be reserved during the six first years, with an increased rent afterwards; but no such lease is to comprise the usual house of residence, its out-buildings or pleasure-grounds. The act contains other regulations, and it declares generally that it is made without prejudice to any right that ecclesiastical persons have under the former law to grant or lease, whether by renewal or otherwise.

In the Scotch law, the term building lease is applied to the case of proprietors of entailed estates, who, in order to encourage the building of villages and houses upon property so settled, are to have it in their power to grant leases of land for the purpose of building, for any number of years not exceeding ninety-nine years. See this matter regulated by the 10 Geo. III. c. 51. By the 3 and 4 Vict. c. 48, proprietors of entailed estates in Scotland may feu or lease on long leases ground for the building of churches and schools, and for the dwelling-houses and gardens for the ministers and masters of the same, and also for burying-ground and playground attached to such churches and schools. See LEASE, LEASEHOLD, and GROUND-RENT.

BUI'LDING SOCI'ETIES. See BENEFIT SOCIETIES.

BUI'LDING STONE. The chemical composition of B. S. varies. The majority of kinds are more or less silicious, and are designated sandstones. These consist of particles of sand, united together by the force of cohesion, and by a small proportion of a natural cement; in some cases, ferruginous, consisting of a compound of iron; and in other instances, calcareous, composed of carbonate of lime. Igneous rocks furnish very durable B. S., though in general the hardness of the materials renders them so difficult to work, that they are seldom resorted to where softer stones can be procured. Thus, granite is largely employed in the construction of the houses in Aberdeen, in the erection of bridges, in the paving of streets, and wherever great durability is required. Greenstone and basalt are also occasionally used.

The B. S. employed in the new Houses of Parliament is a magnesian limestone, or a double carbonate of lime and magnesia, which is very close and compact in texture, and is soft enough to be easily cut with the chisel; unhappily it has not proved firm enough to resist weathering, having already shown signs of decay. The other forms of carbonate of lime exhibit considerable durability. Near Bath, and in the Isle of Portland, an oolitic limestone is quarried, which is easily cut, and stands well.

A very convenient and accurate way of determining the durability of a B. S.—in other words, its power of resisting the effects of frost and other atmospheric agencies—is to place a small block in a cold saturated solution of sulphate of soda; raise to the boiling point, so as to expel air from cavities in the stone, which then become filled with the solution; then allow to cool, and suspend the block of B. S. in air. Every now and then, it is dipped into the solution, and subsequently air-dried. The result is, that the sulphate of soda crystallizes on the outside, and partially in the interior of the block, and in this respect acts as water does when it is frozen during winter; and if the B. S. be porous, and liable to decay by natural agencies, it gradually breaks up, and particles scale off. The amount of this corrosion can be determined by weighing the detached portions. Some building stones contain iron pyrites in little nodules diffused here and there throughout the mass, and such become discolored from the pyrites being decomposed by atmospheric influence, and the brownish-red oxide of iron (rust) is left as a stain on the surface of the block. The liability to decay or to discoloration in a B. S. may be arrested to a great extent by coating the outer surface with boiled linseed-oil, which communicates a dark appearance to the stone, but prevents oxygen or moisture from gaining access to the block. Ordinary oil-paint is employed for the same purpose. For the preservation of B. S. from decay by means of various solutions, see STONE, PRESERVATION OF.

BUJALA'NCE, a city of Andalusia, Spain, about 20 miles east of Cordova. It is surrounded by a moat and a wall flanked with old towers, has an old Arab castle, and manufactures of woollens, glass, and pottery, exports of agricultural produce, and an important annual cattle-fair. Pop. about 9900.

BU'KKUM WOOD. See BRAZIL WOOD and SAPPAN WOOD.

BU'KKUR, a town of Sinde, about three miles east from the Indus, on a water-course derived from the great river, and flowing parallel with it, 190 miles west of Lahore. It is situated in a fertile district, and carries on an active commerce. Pop. 8000.

BU'KKUR, a fortified island of the Indus, in Sinde, in lat. 27° 39′ N., and long. 68° 56′ E. It is 400 yards from Roree on the left bank, and 100 from Sukkur on the right. In the ordinary state of low water, the western and eastern arms of the river are respectively 15 feet and 30 feet deep. In particularly dry seasons, however, the former has been known to disappear altogether, and even the latter is said to have occasionally been fordable. In 1839, a British force, on its march to Afghanistan, made a stepping-stone, as it were, of B. crossing the Indus, having joined it to either mainland by a bridge of boats. B. is no longer of any military value against a civilized assailant, commanded, as it is, on both sides by higher grounds. It is composed of limestone, being 800 yards long, and 300 broad, and rising 30 feet from the average level of the stream.

BUKOWI'NA, a duchy in the Cis-Leithan (non-Hungarian) section of the Austrian empire, on the Russian frontier; area, 4000 sq. m.; pop. (1880) 571,671 (of whom 41 per cent. are Ruthenian Slavs and 38 are Moldavians). It is traversed by offsets of the Carpathians, gives rise to many rivers, and abounds in wood, along with considerable mineral riches. Wood-cutting and mining afford occupation for a great number of the inhabitants. Large numbers of cattle are reared, and also excellent horses. B., till the end of the 15th c., belonged to Transylvania, when it came under the dominion of the Turks, by whom it was ceded to Austria in 1777. Czernowitz is the chief town.

BULACA'N, a town of Luzon, Philippines, at the head of the Bay of Manila, about twenty miles north-west of the city of that name. B. is chiefly composed of wooden-houses, but has spacious streets, manufactures of silken mats and other fabrics, and large sugar-boiling establishments. Pop. between 9000 and 10,000.

BULB, in Botany, a subterranean bud covered with imbricated scales, having at their base a flattened disc, which represents the proper stem of the plant, and from which the roots proceed downwards, whilst from the midst of the scales an annual herbaceous stem and leaves are sent up. The scales are regarded as modified leaves, and sometimes are all fleshy, as in the lily; sometimes the outer ones are membraneous, as in the onion, in which case the B. is said to be *tunicated*. The B. is popularly but erroneously regarded as the root or part of the root of the plant, and plants in which it is found are very generally described as *bulbous-rooted*. New buds are formed in the axils of its scales, which grow at the expense of the parent B., and gradually destroy it. In some plants, as the tiger-lily and some species of allium, leaf-buds (*bulbils* or *bulblets*) are developed on the stem above ground, which spontaneously separate and serve for the propagation of the plant, and which are entirely of the nature of bulbs, being formed of thickened scales sometimes so closely united as to form a solid mass.

The CORM (q. v.) was formerly regarded as a kind of B., and described as a solid B., but its structure is essentially different, although both it and the TUBER (q. v.) may be included in the description which Linnæus has given of the B. with reference to the purpose which it serves as 'the winter-quarters of the plant.' Many bulbs, if removed from the ground during the period when the vegetation of the plant is most dormant, may be kept in a dry place without injury for a considerable time, even for years.

Bulbs serve also for the preservation of plants in periods of drought, and are particularly frequent in those which delight in sandy soils. The abundance of 'bulbous-rooted' plants is a remarkable characteristic of the flora of the Cape of Good Hope. 'Bulbous-rooted' plants are very often distinguished by the beauty of their flowers, and many of them are among the most esteemed ornaments of gardens, green-houses, and stoves. The bulbs of tulips, hyacinths, and other favorite flowers are important articles of trade. Some bulbs, as that of the onion, are valuable as articles of food; others, as that of the squill, from their medicinal properties.

BU'LBUL, a Turkish name (used also in Persian) for the nightingale, which has found its way into English poetry through Byron's patronage. But the same name is given in India to a very different bird, *Pycnonotus hæmorrhous*, belonging to the great tribe of *Dentirostres*, and formerly ranked among the thrushes, to which it is pretty nearly allied. It is a little bird of brilliant plumage, and the male has a crest or tuft on its head. It is remarkable for its pugnacity; the Singhalese consider it the most *game* of all birds.

BULGA'RIA, an autonomous principality, tributary to Turkey, which till 1878 constituted the Turkish villayet of the Danube (Tuna). B. is bounded to the north by the Danube and the Dobrudscha, now Rumanian; on the east it has the Black Sea; on the south the Balkan range; and on the west, Servia and Rumelia. There are altogether between two and three millions of the Bulgarian race; of the 1,995,700 souls who formed, in 1881, the pop. of the state of B., the great majority are Bulgarians. The area of B. is about 24,600 sq. miles. The country slopes terrace-like from south to north, and from the west to the east, acquiring a plain-like character before reaching the Black Sea. The rivers are rapid and tributary to the Danube.

The soil in some parts is very fertile, producing great abundance of corn; in others, it does not yield sufficient for the consumption. There is excellent pasture-land, and the lower terraces are richly wooded. The exports include horned cattle, sheep, corn, wine, iron, wood, honey, wax; and otto of roses is an important article. The inhabitants are hard-working, hospitable, and fairly intelligent, but suspicious and greedy; their faith is that of the Greek Church. The prince, freely elected by the people, must be confirmed by the Porte with the assent of the Powers. The first choice of the Bulgarians was the Prince of Battenberg, a cousin of the Grand-duke of Hesse, who in 1879 became Alexander I. of Bulgaria. The government is Christian, and there is a national militia. The Berlin Congress decided that the military importance of B. should meanwhile be decreased by the demolition of all its fortresses.

The earliest known inhabitants of B. were the Mœsians, who contended long against the Romans, and allied themselves with Gothic and Slavonic tribes against the Greek empire. Anastasius, the Greek emperor, in 507, built an extensive wall to defend his territories from Mœsian invaders. In the 7th c., the Bulgarians, a people of Finnish origin, whose original seat was the banks of the Volga, conquered the Mœsians, and established the kingdom of Bulgaria; they soon lost their own language and customs, and became assimilated to the other Slavonic inhabitants. After being tributary to the Greek emperors, and contending for some time against Hungary, B. became subject to the Porte in 1392; but the frightful oppression of despotic and sanguinary pashas has not, even to the present day, robbed the inhabitants of a distinctively national life and love of freedom. In April 1876 an insurrection broke prematurely out in B., and was quenched in blood, the Bashi-bazouks or Turkish irregulars committing savage excesses. The atrocities in B., taken in connection with the Servian war and the condition of other Christian provinces of Turkey, led to diplomatic intervention; and in December a conference met at Constantinople, but without result. The war of 1877–78, between Russia and Turkey, followed. The Congress of Berlin, which revised the treaty of San Stefano, declined to sanction the erection of a Bulgarian principality extending from the Danube to the Ægean. But it constituted an autonomous, though tributary, Bulgaria north of the Balkans, and to the mainly Bulgarian province south of them, that of Eastern ROUMELIA (q. v.), it granted administrative autonomy.

The BULGARIAN LANGUAGE is divided into two dialects—Old Bulgarian and New Bulgarian; the former, the richest of the Slavonic dialects; the latter remarkable for its store of popular songs.

BULGARIN, THADDEUS, a Russian author, was born in Lithuania, 1789; fought in the campaign against France; but afterwards served under Napoleon. On Napoleon's fall, he devoted himself to literature. He wrote both in Polish and Russian; and ultimately settling in St. Petersburg, became a popular author. He composed several romances—of which *Demetrius* and *Mazeppa* are the best—and published different periodicals. His large work, *Russia in its Historical, Statistical, Geographical, and Literary Aspect*, was published at Riga, 1839—1841. He died in 1859.

BU'LKHEADS, in a ship, are the partitions between the several portions of the interior; whether to separate it into rooms, or as a safeguard in case of wreck.

Water-tight B. are among the improvements in modern ship-building; they are iron walls running athwart the hold, as a means of dividing it into several portions; the interior is thus cut off into cells, each water-tight in reference to its neighbors. When such a ship is leaking in any one of the compartments, there is thus a chance that the others may be kept dry until the damage is repaired. In iron steam-ships the water-tight bulkheads are generally placed transversely, but there are frequently longitudinal water-tight divisions also. The number and disposition of the compartments depends on the ship-owner and the ship-builder; but it is now the common practice to place the engines and boilers in water-tight sections, and experience has proved the special value of a collision-bulkhead in the bow. In iron-clads of the navy, such as the *Hercules* and the *Belleropon*, which have an inner bottom, there are nine transverse water-tight bulkheads. In the torpedo-ram *Polyphemus*, the principle of having numerous water-tight compartments in the lower part of the vessel has been carried as far as possible.

BULL (Lat. *bulla*, primarily, anything round or swelling) was originally the name of the capsule of the seal appended to letters from emperors or from the pope. Afterwards, the word was applied to the seal, and next to the document itself, as in the case of the celebrated Golden Bull of the Emperor Charles IV., which was so named from the golden capsule appended to imperial letters and other important documents by the Byzantine and Frank emperors as early as the 9th century. They are issued by the apostolic chancellor, and are dated 'from the day of incarnation,' whereas briefs are always dated 'from the day of the nativity.' The name is now applied exclusively to letters or documents issued in the name of the pope.

In cases of granting favors, &c., the seal is appended to the open letter by a yellow or red band of silk; but in the administration of justice, a gray hempen band is used. All bulls, excepting those addressed to the United Greek Christians, are written in Latin with Gothic letters, and on the rough side of the parchment. See BRIEF. All bear the name and title of the pope—for example, *Gregorius Episcopus Servus Servorum Dei*, &c., is prefixed; then follows a general introduction, in which the initial words are used to give a distinct name to the B., as in the examples: the B. *Exsurge Domine*, issued by Pope Leo X. against Luther in 1520; the B. *In Cœna Domini*, the celebrated B. against heretics, often reissued since 1536; the famous *Unigenitus*, or B. against Quesnel's writings, 1713; the *Dominus ac Redemptor Noster*, or B. for the abolition of the order of Jesuits; the *Ecclesia Christi*, or the B. which completed the *concordat* with France in 1801; the *De Salute Animarum*, or the B. for the regulation of the Catholic Church in Prussia. To every B., the leaden seal of the Church is appended, bearing on the obverse the arms of the pope, and on the reverse his name. Bulls issued during the interim between the election and consecration of a pope have no armorial bearings on the seal. A *bullarium* is a collection of papal bulls, as the *Bullarium Magnum Romanum a Leone Magno ad Benedictum XIII.* (19 vols., Luxembourg, 1727—1758), the *B. Romanum* (28 vols., Rome, 1737—1744), and the *B. Benedicti XIV.* (Mechlin, 1826—1827), and more recently, the continuation of the *Bullarium Romanum Magnum* by Barberini (Vienna, 1835).—From the same medieval Latin word *bulla* is derived the word *bulletin* (Italian, *bulletino*), commonly applied to dispatches from generals, reports of the health of royal personages, and on the continent, at least, to other brief authenticated documents, such as those of scientific societies, the best known of which are the bulletins of the St. Petersburg and Belgic academies. It is, moreover, used as a title for periodicals, and, in France, also designates the slips of paper on which electors write their votes.

BULL, OLE BORNEMANN, a famous violinist, was born 5th February 1810, at Bergen, in Norway. His father, it is said, attempted to coerce him into the study of theology, and would not permit a musical instrument about the house. This foolish treatment only gave a more decisive character to the peculiar genius of the boy. At the age of 18 he was placed at the university of Christiania, from which he is said to have been expelled for taking temporary charge of the orchestra at one of the theaters. In 1829 he went to Cassel, in Germany, to study under Spohr, but was so coldly received that he betook himself to the study of law at Göttingen. He was subsequently at Minden, whence, in consequence of a duel, he fled to Paris in 1831.

An unsuccessful attempt to drown himself in the Seine was the turning-point in his life. He thereafter acquired the patronage of a lady of rank, and rapidly rose to fame as a violinist. His style of playing was like that of Paganini. B., however, wished to excel his model in originality, and in triumphing over the most

extraordinary difficulties; but it was impossible for him to follow the flight of the great Italian, in whose brain some capricious musical demon seemed to lurk. Nevertheless, he was received in Italy with prodigious enthusiasm—Malibran herself embracing him on the stage at Naples. In 1836, he visited England, Scotland, and Ireland, and subsequently traveled in a professional capacity through Belgium, Holland, Russia, and Germany. After a long repose, he sailed for America, whence he returned in 1850; but he again went out, and was so successful, that he thought of retiring from public life. He purchased in Pennsylvania 125,000 acres of excellent ground, and founded a colony of Scandinavians. This turned out a complete failure, and B. fell back on his violin. He returned with a fortune to the United States in 1869, but visited Europe again in 1875. He died 18th August 1880.

BULL, GEORGE, D.D., a learned prelate and theological writer, born at Wells, Gloucestershire, England, March 25, 1634; studied at Oxford, whence he retired in 1649, having refused to take the commonwealth oath imposed by the parliament. Receiving holy orders, his first charge was the parish of St. George's, Bristol. In 1658, he obtained the rectory of Suddington St. Mary's, near that city; and in 1662, was presented to the vicarage of Suddington St. Peter's. In 1669, he published his *Harmonia Apostolica*, the object of which was to reconcile the apostles Paul and James on the subject of justification. This work occasioned considerable controversy among divines, and in answer, B. published his *Examen Censuræ* and *Apologia pro Harmonia*. In 1678, he was presented to a prebend in Gloucester Cathedral, and made Rector of Avening, Gloucestershire. In 1679, he was installed Archdeacon of Llandaff, and received the degree of D.D. from Oxford University. In 1685, he published his *Defensio Fidei Nicenæ*, against the Arians and Socinians, Tritheists and Sabellians; and in 1694, his *Judicium Ecclesiæ Catholicæ*, for which the thanks of the whole French clergy were sent to him through the celebrated Bossuet. His last work was his *Primitive and Apostolical Tradition*, &c. He was consecrated Bishop of St. Davids in 1705, and died February 17, 1709.

BU'LLA, a genus of Mollusca, which in the older systems, founded upon characters taken from the shell alone, contained a heterogeneous assemblage of species essentially very different. Some of those having been removed to other orders, according to their organization, the genus *Bulla*, and the family *Bullidæ*, of which it is the type, are placed in the order *Tectibranchiata* of Cuvier, an order of the class *Gasteropoda* (q. v.), and of that section of it called *Monœcia*, having the male and female organs of sex combined in the same individual. The *Bullidæ* have a convoluted and generally thin shell, which serves as a covering and protection for the gills, and which in some of them is large enough to form a retreat for the entire animal, in others, is itself enveloped in the mantle. This shell forms a sort of transition link between the flat calcareous plate enclosed in the mantles of the *Aplysiæ* or Sea-hares—to which B. is nearly allied—and the spiral shell of snails and other such conchiferous mollusks. The mouth of the shell is large, extending the whole length of the shell, widening towards one end, the lip acute. The gizzard of the *Bullidæ* is very muscular; and among its thick coats, in many species, are found calcareous bony plates, which being moved against each other by its muscles, serve to grind down the food. All the species are marine, some are found on the British coast. Some, from their form and fragility, are popularly called BUBBLE SHELLS, as the British *Bulla Hydatis*.

Bulla Aperta.

BU'LLACE (*Prunus insititia*), a shrub or small tree, larger and much less spiny than the sloe, but very closely allied to it, as it is also to the plum, so that many botanists regard them all as one species, an opinion much confirmed by the circumstance that the varieties pass into each other by imperceptible gradations. The B. may be regarded as a form intermediate between the plum and the sloe. Its leaves, however, are generally broader in proportion to their length than those of either of these, and its fruit-stalks more frequently in pairs; it differs also from both of them in its downy fruit-stalks, and in having the under side of its leaves permanently downy. The flowers are rather larger than even those of the plum; the fruit is larger than the sloe, generally globose, and, although it partakes in some degree both of the acidity and the roughness of the sloe, it is not unpleasant, especially after having been mellowed by frosts, and makes excellent pies or tarts. 'A bullace-pie is a standing dish at the harvest-home supper in the south of England, only it requires rather more sugar than the housewife is always willing to allow.' The B. is common in hedges, coppices, and banks in England, and in many parts of Europe. It is rare in Scotland.

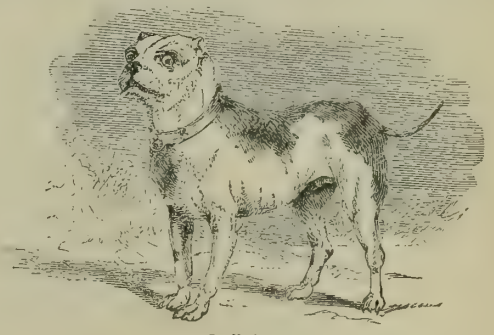
BU'LLÆ are collections of serous fluids of considerable size, situated immediately beneath the cuticle, and rising from the true skin. They differ from vesicles only in size; and no very definite line can be drawn between a large vesicle and a small bulla. They usually vary in diameter from a quarter of an inch to two inches. They may be followed by crusts or by ulcerations. They constitute a special order of skin-diseases, which includes Pemphigus and Rupia (q. v.).

BU'LLAS, a town of Spain, in the province of Murcia, and 26 miles west-north west of the town of Murcia. It is situated on a hill, 1840 feet above the sea. The streets are steep and unpaved. B. has manufactures of linen and hempen fabrics, earthenware, and brandy, and a considerable trade in manufactured goods and grain. Pop. 6145.

BU'LL-BAITING, a barbarous sport, once very popular in England, and in which all classes of society equally delighted, but now, through the progress of civilization, almost entirely confined to the lowest, and rare even among them. It consists in causing a bull to be attacked by dogs; and in order that the bull might be made as furious as possible, his nose was sometimes blown full of beaten pepper before he was turned loose. Another form of this sport was to fasten the bull to a stake, by a rope of some yards long, and to send bull-dogs against him, one at a time, which were trained to seize him by the nose, and when this was accomplished, it was called *pinning* the bull. But no small part of the enjoyment of the spectators was derived from the success with which the attacks of the dogs were met by the bull lowering his head to the ground, and receiving them on his horns, often tossing them to a great distance. In some places, B. took place regularly as a sort of annual festival, and funds were sometimes left to provide for it. King James I. of England greatly delighted in this sport. When the late Emperor Nicholas of Russia visited England, before his accession to the empire, he was present at a boxing-match and a B., which were got up to show him English tastes.

An equally barbarous sport, termed *Bull-running*, was formerly practised at Stamford and Tutbury, where men and women took the place of dogs, maddened the bull with hideous noise, and then pursued it with 'bull-clubs,' till the unfortunate animal expired beneath the blows of the brutal assailants.

BU'LL-DOG, a kind of dog which is regarded as peculiarly English, but concerning which it is doubted whether it has existed as a distinct race at least from the Roman era, or has more recently sprung up, as a variety of the mastiff, or a cross between the



Bull-dog.

mastiff and some other breed. Buffon, indeed, represesents the B. as the parent race, and the mastiff as derived from it, but this opinion is generally rejected as erroneous. The B. has been regarded as a distinct species by some naturalists, and named *Canis Anglicus*, *C. laniarius*, &c. It is much smaller than the mastiff, but is very strong and muscular. The breadth of muzzle is greater than in the mastiff, and the head is very large, almost appearing as of disproportionate size to the body. 'The forehead sinks between the eyes, and the line of the nose rises again at a considerable angle; the lower jaw projects beyond the upper, often showing the teeth, which altogether, with the frequent redness about the eyelids, produces a most forbidding aspect; the ears are partially drooping, unless the terrier blood is crossed in the animal, and the tail is carried high.' The hair is short, and the tail taper, and not bushy. The color may be ochry or reddish buff, brindled, fawn, or white, the last being preferred, and should be whole or unmixed, though dogs of two colors are exceedingly common. The B. used seldom to be seen except in the company of persons who delight in dog-fighting and other barbarous sports, but now has sometimes more reputable patrons. It was formerly much employed in bull-baiting, from which it derives its name. It is chiefly remarkable for its savage ferocity, and the pertinacity with which it retains its hold, as if its jaws were locked, and it could not let go. It will hang to the jaw or nose of a bull, although lifted from the ground. Colonel Hamilton Smith says he has seen one 'pinning an American bison, and holding his nose down, till the animal gradually brought forward its hind feet, and, crushing the dog to death, tore his muzzle out of the fangs, most dreadfully mangled.' The B. is also bold

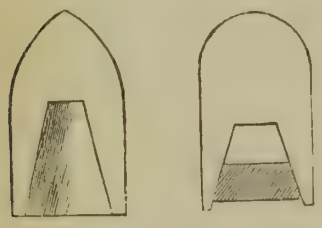
enough to attack any animal, however superior in size and strength.

The BULL-TERRIER is a cross between the B. and the terrier. It is smaller than the B., more lively and docile, and equally courageous. The ears are always pointed; the best color is white, with some black about the head. It is unrivalled in rat-catching. It is a great favorite as the companion of young men.

BULLER, CHARLES, born in Calcutta in 1806, was a gentleman whose name falls to be recorded more on account of the hopes which his death in 1848 disappointed, than for the performances of his life. He was educated at Harrow and Cambridge, at both of which he distinguished himself, and for a time studied in Edinburgh, where he had Mr. Thomas Carlyle for one of his tutors. He was called to the English bar in 1830, and entering parliament beform the Reform Bill, continued a member of the Lower House till his death. He was still but a rising man when he died. In politics, a philosophical radical, he occupied successively the posts of Judge-advocate-general and President of the Poor-law Commission under Whig governments. The interest taken in his career, and his popularity, were, it would seem, largely owing to his amiability and accomplishments for society.

BU'LLET is the leaden projectile discharged from a musket, fowling-piece, pistol, or similar weapon. When the smooth-bore muskets alone were used by British infantry, the bullets were made by casting. Molten lead was poured into moulds; and the moulds were dipped in cold water, to hasten the solidification of the lead. The moulds were cooled after every few times of using; and the lead was heated only just to the degree for maintaining fluidity. Bullets are now, however, made more expeditiously, and more truly spherical in form, by compressing machines, one form of which has been invented by Mr. George Napier. The lead is first fashioned into a rod about a yard long, by five or six eighths of an inch thick; this rod is passed between rollers to condense it; then between other rollers to press it into a row of nearly globular pieces; then a spherical die gives the proper form to each of these pieces; and, lastly, a treadle-worked punch separates them into bullets. With one of these machines, and two dies, nine boys can make 40,000 bullets in a day. Spherical bullets for the old muskets, carbines, and pistols varied from 14 to 20 to the pound, and from 0·60 to 0·68 of an inch in diameter. There is a particular ratio, depending on the specific gravity of lead, by which the number to the pound will give the diameter, or *vice versâ*.

Such bullets are, however, becoming every year less and less used in the army, being superseded by other forms better suited for rifles. These forms are singularly numerous. Robin's B. was egg-shaped, with the center of gravity at the larger end; Beaufoy's was ovoid, with a hemispherical cavity at one end; Manton's was a spherical ball put into a wooden cup, with projections on the exterior; Greener's was oval, with a plug of mixed metal driven into a hole barely large enough for it; Norton's, Delvigne's, Minié's, and others, are, or were, of various elongated shapes, mostly with some kind of plug, which, driven into the lead by the force of the explosion, causes it to fill up the grooves in the rifling of the barrel. This expanding or dilating action has been claimed by many inventors; but the government, in 1857, awarded Mr. Greener £1000, as the person who had practically solved the difficulty as far back as 1836. The bullets for the Enfield rifles are now made with extraordinary speed, by machinery of beautiful construction. The machine draws in a coil of leaden rod, unwinds it, cuts it to the required length, stamps out the bullets with steel dies, drops them into boxes, and conveys them away. Each machine, with its four dies, makes 7000 bullets per hour; and four such machines, in an easy day's work, turn out 300,000 bullets. So nearly are the machines automatic, that one man can attend them all. Other machines, attended by children, produce an equal number of little boxwood plugs for filling the cavity at the hinder end of the bullet. The differences between various bullets of modern invention are further noticed under CARTRIDGE, and BREECH-LOADING ARMS AND NEEDLE-GUNS.



Early Forms of Minié and Enfield Bullets.

BULLET-TREE, or BULLY-TREE, a tree found in Guiana, and valued for its wood, which is solid, heavy, close-grained, and durable, and also for its fruit, which is a drupe about the size of a cherry, and very delicious. It is supposed to belong to the genus *Mimusops* (natural order *Sapotaceæ*, q. v.).

BU'LLETIN. See BULL.

BU'LL-FIGHT. Combats of men with bulls, for the entertainment of the public, were common in Greece, particularly in Thessaly, and in Rome under the emperors, though in later times they were forbidden both by emperors and popes. They are still a favorite pastime in Spain and Mexico. In Spain, they were abolished by Charles IV.; but Joseph, Napoleon's brother, re-established them, out of policy, the mass of the Spanish population being passionately fond of the sport. The most magnificent bull-fights were at one time instituted by the monarchs themselves; at present, both in the capital and in the larger towns of Spain, they are held either as private speculations, or for the benefit of public institutions. In Madrid, the bull-fighting season commences in April, and lasts until November. During that time, there is at least one afternoon in every week devoted to the sport. The proceeds go to the funds of the General Hospital. The fights take place in a kind of circus, called the *Plaza de Toros*, round which the seats rise one above another, like the steps of a stair, with a tier of boxes over them. The *Plaza* is capable of containing from 10,000 to 12,000 people, who pay a high price of admission, considering the rate of wages in Spain; and all go attired in their best to the spectacle. The best Andalusian bulls are bred at Utrera, the best Castilian ones on the Jarama, near Aranjuez. The latter are the breed usually chosen for fight in Madrid. They are fiercer and more active, but inferior in strength to British animals. The horses engaged in the conflicts are worthless brutes, fit only for the knacker. The men employed in the fight are generally those who have been bred to it as a profession, but occasionally amateurs may take part in it. The B. has been described as a tragedy in three acts. The principal performers in the first are the *picadores*; in the second, the *chulos* are the only actors; the third and last act devolves solely on the *matador*. The *picadores* are all mounted, dressed like Spanish knights of the olden time, and armed with a lance; they take up their position in the middle of the circus, opposite the bull-stalls. The *chulos*, who are on foot, are gay with ribbons, and wear very bright-colored cloaks; they distribute themselves in the space between the barriers. The *matador*, *or* chief combatant, is also on foot. He is handsomely dressed, and holds in the right hand a naked sword, in the left the *muleta*, a small stick, with a piece of scarlet-colored-silk attached. On a sign given by the chief magistrate, a bull is let out from the stalls; the *picadores* stand ready in the arena waiting his charge. With a brave bull, they find all their skill requisite in acting on the defensive; with a cowardly one, they act on the offensive; and should their stabs be ineffectual in rousing the animal to the requisite fury, the poor beast is hooted by the crowd, and ultimately stabbed ingloriously in the spine.

Whenever a horse is wounded, the rider betakes himself to flight; and when either the above casualty happens, or a *picador* is thrown, the *chulos* rush in, and attract the bull by their cloaks, saving themselves, if need be, by leaping over the palisade which encloses the circus. At the same time, another *picador* calls off the bull's attention to himself by shouting. When the bull begins to flag, the *picadores* are succeeded by the *chulos*, who bring with them the *banderillas*—i. e., barbed darts about two feet long, ornamented with colored paper-flags, which they stick into the neck of the animal. Sometimes these darts have crackers attached to them, the explosion of which makes the bull furious. The *matador* now enters alone to complete the tragic business. As soon as the bull's eye catches the *muleta*, he generally rushes blindly at it; and then the *matador*, if he is well skilled, dexterously plunges the sword 'between the left shoulder and the blade,' and the animal drops dead at his feet. The victorious *matador* is greeted with acclamations, and not less so the bull, should he wound or even kill the *matador*, in which case another *matador* steps forth into the arena; but human life is rarely sacrificed. Eight or ten bulls are often despatched in a single day; twenty minutes being about the time usually taken to slay one.

In Madrid, in June 1833, 99 bulls were killed in the course of a single week. Bull-fighters are regarded as the lowest class in Spain. They are very ignorant and superstitious; and those who are killed on the spot, and die without confession, are denied burial rites.

BU'LL-FINCH (*Pyrrhula vulgaris*), a bird of the great family of *Fringillidæ* (q. v.), a little larger than the common linnet, and of a genus closely allied to the Grosbeaks and Crossbills. The genus is particularly characterized by the short, thick, rounded bill, of which the sides are inflated and bulging, and the tip of the upper mandible overhangs that of the lower one. The B. is a bird of very soft and dense plumage, of a delicate bluish-gray color above, the under parts of a bright tile-red, the crown of the head and the beak jet black, which color also appears in the greater wing and tail coverts, in the quills, and in the tail-feathers; the wings are crossed by a conspicuous white bar.

The colors of the female are less bright than those of the male. The tail of the B. is almost even. This bird is not unfrequent in England, Ireland, and the south of Scotland; and is found in most parts of Europe, from the south of Norway to the Mediterranean, extending eastward throughout Asia, even to Japan. It

frequents woods and gardens, builds its nest in trees or bushes a few feet from the ground, feeds chiefly on seeds and berries in winter, and in spring is excessively destructive to the buds of fruit-trees in those localities in which it is abundant, selecting the flower-buds, and apparently finding them the most palatable of all food. Selby says: 'I have known a pair of these birds to strip a considerable sized plum-tree of every bud in the space of two days.' On this account, gardners are sometimes compelled to wage war against the bull-finch.

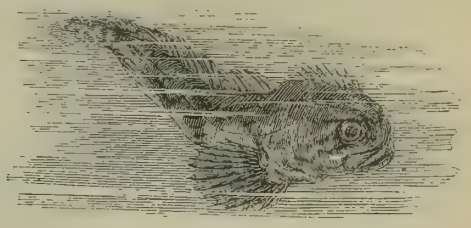
The song of this bird, in a wild state, is very simple, and has no particular quality to recommend it; but it is remarkably susceptible of improvement by education; and trained bull-finches of superior acquirements are sold at a very considerable price.

Bull-Finch.

Some of these birds learn to whistle an air very accurately, and with a power and variety of intonation far exceeding their natural song. The ability to whistle several airs well, is rare. The training of these birds is a work both of time and trouble; it is chiefly carried on in Germany. Not less than nine months of training are requisite; it begins when the bird is a mere nestling, and must be carefully continued till after the first moulting; for it is a curious circumstance, that all which has been previously acquired is very apt to be lost at that time, or is afterwards so imperfectly remembered that the bird is of little value. The B. is capable of very strong attachment to those who feed and caress it, and often becomes so thoroughly domesticated as to exhibit no desire for liberty.—Curious variations of plumage are sometimes observed in it.—Other species of the genus *Pyrrhula* are known, natives of different parts of the world; and in this genus some ornithologists include *Corythus* of Cuvier, of which one species, the Pine-finch (q. v.), or Pine Grosbeak, is a native of Britain.

BU'LL-FROG (*Rana pipiens*), a species of frog (q. v.) found in most parts of the United States and Canada, but chiefly abundant in the southern states. It is of a large size, eight to twelve inches long, of an olive-green color, clouded with black. It receives its name from the remarkable loudness of its voice, which has been compared to the bellowing of a distant bull, and comes in as a hollow bass in the frog concerts which takes place in the evening and all night long in marshy places in America. Its voice can be distinctly heard at a distance of forty or fifty yards. It sits for hours during the day, basking in the sun, near the margin of a stream, into which it plunges with a great leap on the least appearance of danger. It does not confine itself to insect and muluscuous food, like smaller frogs, but is said to be partial to young ducks, and to swallow them entire. Audubon says 'its flesh is tender, white, and affords excellent eating,' the hind legs, however, being the only part used for food. He adds that these parts make excellent bait for the larger cat-fish, and that he has generally used the gun for procuring them, loading with very small shot.

BU'LLHEAD, RIVER BULLHEAD, or MILLER'S THUMB (*Cottus Gobio*), a small fish, abundant in clear rivers and streams, in some parts of the British Islands, throughout the greater part of Europe, and in the north of Asia. It seldom exceeds four or five inches in length; is of a dark brown color on the upper parts, and white beneath; has rather large fins, with rays slightly produced into spines and prettily spotted; and in general appearance is not unlike the gunards (q. v.). It is, however, generally regarded as a disagreeable object to the sight, on account of the great size and depressed form of its head, from which it derives its English names; the name, Miller's Thumb, alluding to the broad rounded form which the last joint of the thumb of a miller used to acquire in times when machinery was ruder than now, by its continual employment in testing the quality of the flour produced, and in turning it over on the fingers for inspection, that it might be known if the mill was doing its work well. The appearance of the B. is rendered still more unattractive by the entire absence of scales, a characteristic of the genus to which it belongs, the whole body and head being covered with a soft skin. Yet it is said to be of a very delicate flavor, and in some countries is much sought after as an article of food. Its flesh, when boiled, is reddish, like that of the salmon. Izaak Walton speaks of angling for the B., and in his pleasant quaint style describes the habits of the fish: 'He does



Bullhead.

usually dwell and hide himself in holes, or amongst stones in clear water, and in very hot days will lie a long time very still, and sun himself, and will be easy to be seen upon any flat stone, or any gravel, at which time he will suffer an angler to put a hook baited with a small worm very near into his mouth, and he never refuses to bite, nor indeed to be caught, with the worst of anglers.'—The other British species of the genus *Cottus* (q. v.) are marine.

The name B. is not usually given to any of them. A sea-fish of a nearly allied genus (*Aspidophorus*) is sometimes called the ARMED BULLHEAD; it is also known as the POGGE (q. v.).—The River B. differs from the marine species of the same genus, in having only one short spine on each side of the head, on the *preoperculum*.

BULLINGER, HENRY, the friend of Zwingli, and one of the chief reformers in Switzerland, was born at Bremgarten, in the canton of Aargau, July 18, 1504. He studied at Cologne, where he became acquainted with the writings of Luther; and during the year 1527, he attended the theological expositions of Zwingli, and went along with the latter to the religious conference held at Bern in 1528, the result of which was the reformation of the canton. In 1529, he married Anna Adlischwyler, formerly a nun, who bore him eleven children. By a powerful sermon which he preached at Bremgarten, on Whitsunday 1529, B. induced his whole congregation to make a profession of Protestantism. In 1531, he was compelled by the Catholic party to flee from the canton, and went to Zurich, where in the following year he was appointed pastor of the principal church. In the controversy on the eucharist and the affairs of the Anabaptists, B. distinguished himself by his integrity and moderation; and in his house at Zurich several German theologians, compelled to leave their country, were hospitably sheltered. He took part in drawing up the first Helvetic Confession at Basel, in 1536, and in establishing a close relation between the Swiss and Anglican Churches. He died September 17, 1575. His writings are numerous. The most important is a *History of the Reformation*, which was first published at Zurich, 1838. His sermons have been translated into English. See the Lives of B. by Hess (1828) and Christoffel (1875).

BU'LLION usually means uncoined gold and silver, in bars or other masses; but in discussions on the currency, the term is frequently employed to signify the precious metals coined and uncoined. The origin of the word B. in its present sense, as well as that of the French *Billon* (q. v.), and the corresponding Spanish *vellon*, seems to be as follows: B. originally meant the mint, where the alloy for the coinage was prepared, and the coin stamped (either from the Lat. *bulla*, a round boss or stud, or stamp; or from the verb *bullare*, to boil or bubble); and hence it came in England to signify the standard metal of which the coins are made. In France, where the kings debased the currency much more than ever took place in England, *billon*, the mint, came to signify the base mixture issued therefrom.

It is a question not yet satisfactorily settled, how far any great increase in the supply of B. has that effect in lessening the value of money, and consequently raising prices, which has always been very naturally attributed to it. It may indeed be maintained with some plausibility, that if B. were capable of being produced to such an extent beyond the actual demand for it as to glut the market, it would cease to be that general standard of money value which it has become, just because it is of all others the article which is steadiest in requiring a certain outlay of labor to produce it. Rises in prices have accompanied large supplies of gold, but they have also accompanied large supplies of other commodities indicative of a a great increase in riches. It is certain that great increases in the supply of B. do not, as in the case of other goods, glut the market. For some years past, the supply of gold, owing to the new fields opened in America and Australia, has been quadrupled, with certainly no more influence on prices than what a general increase in prosperity might cause. There is, it will be observed, this great

difference between gold and other commodities, that besides what may be within the crust of the earth, there is a great mass which has been accumulating for thousands of years in the possession of mankind, which comes forth as it is wanted. A few millions of tons of iron, or bales of cotton, beyond the usual annual average, would perhaps add a few hundred per cent. to the available quantity for consumption; but a few millions of pounds worth of gold, having to be counted with all the gold in existence in the world, makes a scarcely perceptible addition to the stock.

The term B. is in this country associated with the memorable BULLION REPORT of 1810. In the year 1797, by what was called the Restriction Act (see BANK), the Bank of England was restrained from paying its notes in gold. There thus came to be two separate and independent currencies in the country—one of B., the other of paper. They came to differ in value from each other so much that in the year 1813, gold, of which the mint price was £3, 17*s*, 10*d*. per ounce, was actually worth, in bank paper, £5, 10*s*., or in other words, the one-pound bank-note was worth 14*s*. 2*d*. There were various opinions on the cause of this difference. Some people simply said, that gold was dear taking paper as the standard of value; others said, it was owing to our exports not balancing our imports; others, to too great facilities in discounting, by which money was advanced on bad security; and in general, it was held, that there could be no over-issue of paper-money if it were backed by good security, and employed only for genuine transactions, and not in fictitious credits.

In the meantime, the select committee on the high price of gold B., had been wishing to get, not through theories or speculations but through actual facts, at the truth. The work of the committee was chiefly conducted by Mr Horner, aided by Sir Robert Peel, then a young man; and both of them entered on the task without any prepossession, and the desire to find the truth. They established the conclusion, among other important truths, that paper-money is always liable to be over-issued, and consequently depreciated, unless it be at all times immediately convertible into gold, and the monetary policy of the empire was subsequently established on this principle. A full analysis of the B. report will be found in Macleod's *Dictionary of Political Economy*.

BULL'S EYE, among the rigging of a ship, is a sort of small pulley in the form of a ring, with a rope spliced round the outer edge, and another through a hole in the center.—B. E., in rifle practice, is the small black center within the circle on the target.

BULL TROUT (*Salmo Eriox* or *S. griseus*), a fish nearly allied to the salmon, and like it, migratory in its habits, ascending rivers, in which it deposits its spawn, but living chiefly in the sea. It occurs in many of the rivers of Britain, and is not unfrequently taken in the Tweed and its tributaries. It is frequently called the GRAY TROUT, sometimes simply the GRAY, and is the SEWEN of

Bull Trout (*Salmo crioc*).

the Welsh rivers. It sometimes attains the weight of 20 lbs., although it is more commonly under 15 lbs. weight. It is less elegant in form than the salmon; the head and nape of the neck are thicker in proportion; and the tail, beyond the adipose fin, is more bulky and muscular; the tail fin is square at the end in young fish (in some places called *whitlings*), and in older ones, becomes convex by the elongation of the central rays, whence the name *round-tail* sometimes given to this species. The scales are rather smaller than those of a salmon of equal size, and the color is less bright; the males in the spawning season being reddish brown, the females blackish gray; at other times the general color is like that of the salmon trout. The B. T. agrees with the salmon in having only a few teeth on the most anterior part of the *vomer* (the bone which runs down the center of the palate); while the salmon trout, the common trout, and the great lake-trout, have a long line of teeth there: the teeth are larger and stronger than those of the salmon; there are differences also in the form of the gill-covers. To anglers, the B. T. is next to the salmon as a prize, and by many is mistaken for it.

The flesh is paler in color, coarser, with much less flavor, and is much less esteemed.—The name B. T. has been also given to the HUCHO (*Salmo Hucho*), or salmon of the Danube, which sometimes attains the size of 30, or, it is said, even of 60 lbs.

BULOW, FRIED. WILH. VON, a famous Prussian general in the war of liberation, was born in 1755, entered the army young, and soon distinguished himself. When Prussia declared war with France in 1813, it was B. that commanded in the first successful encounter with the French at Möckern, April 5, and revived the self-confidence of the army after the adverse battle of Lützen. His victories over Oudinot and Ney at Grossbeeren and Dennewitz, saved Berlin, and inflicted severe loss on the enemy. He acted a conspicuous part in the battle of Leipsic, and by taking possession of Montmartre, finished the campaign of 1814. The king acknowledged his services by an estate worth £30,000, and the title of Count Dennewitz. In the campaign of 1815, he joined Blücher by forced marches, and headed the column that first came to the aid of Wellington at Waterloo. He died at Königsberg, 11th January 1818.

BULRAMP'UR, a town of Oude, India, near the frontier of Nepaul, in N. lat. 27° 24′, E. long. 82° 15′, on the Raptee, in a plain, 90 miles north-east from Lucknow. It is a town of considerable size, but mostly of mud houses, covered with thatch. From B. there is a magnificent view of Dhawalagiri. The town is on one of the most frequented routes between Lucknow and Nepaul, so that during spring and summer it is much thronged by traders, exchanging the products of Hindustan and Tibet. Pop. (1871) 14,026.

BU'LRUSH, an English popular name for large rush-like or reed-like plants growing in marshes, not very strictly limited to any particular kind. Some authors employ it in a restricted sense as the designation of plants of the genus *Typha*, also known as Cat's-tail or Reed-mace. See TYPHA. It is perhaps more commonly restricted to large species of the genus *Scirpus* (q. v.), also called Club-rush, and particularly to *S. lacustris*, a common British plant, found also in all the northern parts of the world, growing about the muddy margins of lakes and ponds, with a creeping root and round stems varying from 2 to 8 feet in height, which are almost leafless, and bear their flowers in compound umbels of small brown spikelets on their side. The root is astringent and diuretic, and was formerly employed in medicine; but the stems are the most useful part of the plant, being much employed for making chair-bottoms, mats, &c.; also by coopers for filling up spaces between the seams of casks, to which purpose their spongy nature particularly adapts them, and not unfrequently for thatching cottages.

Bulrush (*Scirpus lacustris*)
a, top of stem and flowers;
b, a single floret.

BU'LSAR, a seaport of India, in the British district of Surat, presidency of Bombay, on the estuary of a small river of the same name, which falls into the Gulf of Cambay. It is 44 miles south of Surat. It is a thriving place, with manufactures of ginghams, and a considerable trade in grain, salt, and sugar. Pop. (1871) 11,313, chiefly weavers and sailors, but partly also employed in agriculture.

BU'LTI, or LI'TTLE TIBE'T, a territory lying on the Upper Indus beyond the Himalaya, and forming a sort of debatable land between India and Tatary. It is immediately to the north of the Valley of Cashmere, with which it is politically connected by conquest. It occupies about 8000 square miles, extending in N. lat. between 34° 30′ and 36°, and in E. long. between 75° and 77°. With an average elevation of about 7000 feet above the sea, B. is surrounded by mountains of nearly the same height above its own level. Hence the temperature is such that only snow falls in what ought to be the rainy season, though in summer the thermometer ranges at noon from 70° to 90° F.

European fruits are said to be plentiful. The inhabitants are of the Mongolian race, and chiefly Mohammedans. Among the animals are the sha, the large-horned goat, the sheep, the musk-deer, and the ibis. The only town of consequence is the capital Iskardoh, which, in fact, sometimes gives its name to the whole province.

BULUBGU'RH, or BA LAMGARH, a town of India, the principal place of a jaghire of the same name, called also Furreedabad. The town is situated on the route from Delhi to Muttra, 29 miles south of Delhi, in a pleasant well-cultivated country. The town is not large, and is very crowded, surrounded by a high brick wall, with mud bastions and a deep ditch. The jaghire has an area of 190 sq. m., and its pop. is supposed to be about 57,000. The British have never interfered with the civil or criminal affairs of the jaghire, except when their interference was requested, dur-

ing the minority of the present rajah; but the Rajah of B. derives his rights from the British government. The revenue of the state is estimated at 160,000 rupees. The rajah maintains a small force of 100 cavalry and 350 infantry.

BU'LWARK, in military matters, was the old name for a rampart or bastion. In a ship, the bulwarks are the boarding above the level of the upper deck, nailed to the outside of the timber-heads and stanchions. In ordinary vessels they form a parapet, protecting the seamen from the waves, and prevent loose articles from being swept off the deck; in men-of-war they, in addition, serve to protect the men from an enemy's shot. In an inquiry made a few years ago concerning the availibility of merchant-steamers as ships of war, it was found that the bulwarks would not afford sufficient protection to the men from musket-shot; but that if the hammock-stanchions were fixed all around the bulwarks, and the men's hammocks placed in a netting upheld thereby, a very good protection might be obtained.

BULWER LYTTON, Sir Edward. See Lytton.

BULWER, Sir Henry Lytton, G.C.B., the Right Hon., diplomatist and author, an elder brother of the late Lord Lytton, was born in 1804, entered the diplomatic service in 1827, and was attached successively to the British Embassy at Berlin, Brussels, and the Hague. In 1830, he entered parliament, and during the following seven years he represented, in order, the constituencies of Wilton, Coventry, and Marylebone. In 1837, he became Secretary of Embassy at Constantinople, where he negotiated and concluded a treaty which is the foundation of our present commercial system in the East. In 1843, he was made Minister Plenipotentiary to the court of Madrid, and concluded the peace between Spain and Morocco in the following year. Whilst in Spain, his firmness and candor proved a source of great inconvenience to Narvaez, the Spanish soldier-diplomatist of that day, and who, pretending to have discovered the complicity of the British plenipotentiary in certain plots against the Spanish government, ordered him to leave Madrid. Both parties in the House of Commons approved of the whole course of B.'s conduct while at the court of Madrid, and her Majesty awarded to him the highest decorations of the order of the Bath. He afterwards proceeded to Washington, where he evinced equal art in conciliating the temper of the people, and maintaining the interests of his own country. In 1852, he was sent to Tuscany as envoy extraordinary; and in 1856 was nominated by Lord Palmerston commissioner at Bucharest for investigating the state of the Danubian Principalities. As British commissioner he called forth from every minister and from every government concerned the warmest expressions of approval, and all concurred in recommending him for the post of ambassador to the Ottoman Porte, on the return of Lord Stratford de Redcliffe, in the spring of 1858. Sir Henry Lytton became a peer in 1871, with the title of Lord Dalling and Bulwer. He died in 1872. His works include a *Life of Palmerston; Historical Characters; An Autumn in Greece; France, Social, Literary, and Political;* and a *Life of Byron.*

BU'MBOAT, a boat employed to carry provisions and other articles from harbors and ports to vessels lying at some distance from the shore. Boats of this kind belong to a class of petty traders, who, in England are, for the most part, women. The provisions commonly offered for sale are soft bread, butter, fruit, vegetables, fish, and fresh meat—the fish fried, and the meat roasted, if wanted. Among the other articles are included shirts, drawers, stockings, gloves, pipes, needles, thread, and a variety of odds and ends. The less respectable of the B. traders try to smuggle spirits on board; but if this is discovered, it leads to instant punishment. In fitting out and also in paying off ships in H.M. navy, the B. people are allowed on board for a certain length of time daily; but when a ship is in active commission, they come alongside only at meal-hours. Among the class of B. people generally, there is no little acuteness and enterprise.

They learn all particulars about ships going and coming, and will even write to far-distant ports to secure a vessel's patronage. In their dealings, they of course prefer ready-money, but in certain cases they give credit, and it is understood lose little by their liberality; for any attempt at evasion of payment by any of the crew, meets the displeasure of commanding officers. From Hongkong up to the Bogue Forts, and in other Chinese waters, bumboats frequently accompany vessels, and are apt to become troublesome. From Malta, and some other places in the Mediterranean, the bumboats also haunt vessels on short cruises, in the hope of doing a little trade.

BU'MKIN or BOO'MKIN (diminutive of *boom*), on shipboard, is a short boom which projects over each bow of the ship, to aid in extending the lower edge or clue of the foresail to windward—in nautical phrase, 'to board the fore tack to.' In a boat, the B. is a small outrigger over the stern, used for extending the mizzen.

BUMMALOTI (*Saurus ophiodon*), a fish of the family *Scopelidæ* or *Sauridæ*, often regarded as a subdivision of the great family *Salmonidæ*. It is a marine fish, a native of the coasts of India, particularly of the Bombay and Malabar coasts, from which it is exported in large quantities, salted and dried, to other parts of India, being highly esteemed for its rich flavor, and often used as a relish. In commerce, it is known not only by the name B., but by the singular appellation of *Bombay Duck*. It is a fish of elongated form, with large fins and a very large mouth, the gape of which extends far behind the eyes, and which is furnished with a great number of long, slender teeth, barbed at the points. It is extremely voracious.

BUNDELCU'ND, a territory of Hindustan, between Gwalior on the west, and the Jumna, which separates it from the Doab, on the north-east. The area formerly known as B. included four districts belonging to the British North-western Provinces (Banda, Jalun, Jhansi, and Hamirpur). Now B. is officially used only for the 'Bandalkhand Agency,' a subdivision of the Central India Agency, and in this sense is applied to a group of nine native states, and twenty-five petty jaghires under native princes. The area of the agency is 10,600 sq. m., and the pop. estimated (1872) at 1,278,000. Studded, as B. is, with isolated rocks rising precipitously from its surface—each of them a nucleus, as it were, of independence—it has generally been very much subdivided. Notwithstandtng that it is well watered, the climate renders irrigation indispensable; and it is accordingly interspersed, at the cost of great labor and ingenuity, with artificial dams. B. though not destitute of woodlands, presents rather jungle and copse than heavy timber. It is said to possess inexhaustible deposits of iron-ore and some coal. The principal towns of B. are Calpee, Jhansi, Callinger, Banda, Jalun, and Chaturpur. The first three are noticed in their places, Callinger being famous for its cave-temples, and Jhansi and Calpee having acquired celebrity in the mutiny of 1857—1858.

BU'NDI, or BOONDEE, a town of India, in N. lat. 25° 26', E. long. 75° 43', 190 miles south-west from Agra, the capital of a small state of the same name. It is situated in a valley nearly surrounded by rocky hills. The palace of the rajah is on the slope of the hill above the town, and is of great magnificence and beauty, consisting of a number of parts built at different dates, but harmonizing extremely well together. The town contains few notable edifices. It has two good bazaars, but it is a place of little commerce. It is celebrated for its iron manufactures.—The raj or state of Bundi has an area of 2291 sq. miles. A range of mountains, running north-east and south-west, divides two nearly equal level tracts—that on the south-east extending to the river Chumbul, and that on the north-west to the base of the mountains towards Ajmere. The climate is said to be unhealthy. Although the rajah and dominant portion of the inhabitants are Rajpoots, the greater part of the population, particularly in the mountains, are Meenas, supposed to be an aboriginal race, who are indefatigable freebooters. The military force of the state, including the troops of the feudal chiefs and the police force, is 6170 men. The revenue is about £50,000. Pop. of B. 224,000.

BU'NGALOW, a species of rural villa or house, so called in India. Bungalows which form the residence of Europeans, are of all sizes and styles, according to the taste and wealth of the owner. Some are of two stories, but more usually they consist of only a ground-floor, and are invariably surrounded with a verandah, the roof of which affords a shelter from the sun. In the chief cities of Calcutta, Madras, and Bombay some of the bungalows are really palatial residences, while in the mofussil they are of more moderate pretensions. In general, they are provided with exterior offices, to accommodate the large retinue of domestics common in Indian life. Besides these private bungalows, there are military bungalows on a large scale for accommodating soldiers in cantonments; likewise public bungalows, maintained by government for the accommodation of travelers, and in which seem to be blended the characters of an English road-side inn and an eastern caravanserai.

These bungalows, though they vary greatly in actual comfort, are all on the same plan. They are quadrangular in shape, one story high, with high-peaked roofs, thatched or tiled, projecting so as to form porticos and verandahs. The B. is divided into 'suits' of two, three, or four rooms, provided with bedsteads, tables and chairs; windows of glass, and framed glass doors. Off each room is a bath-room, and earthen jars of cool water. Travelers are expected to carry their servants, cooking-apparatus, wine, beer, bedding, &c., with them; but the khitmutgar of the better class of bungalows supplies table-ware, condiments, and even sometimes food and liquors, and he is usually skilled in cooking. Government charges one rupee, or two shillings a day, to each traveler for the use of the bungalow. A book is kept, in which travelers enter their names, the time of their arrival and departure, with the amount paid, and any remarks regarding the state of the B. and attendance he may think proper. Natives seldom stop in these public bangalows, for though legally open to all, they are almost exclusively resorted to by Europeans; and natives even of good

condition are fain to seek 'the squalid desolation of a tottering caravanserai,' or village 'dhurrumsala.' At every travelers' B. is stationed a government peon, who acts as watchman,, and is bound to assist travelers' servants in procuring supplies of fuel and food in the nearest village. The distance between each B, on the trunk-

Bungalow

road is generally about 12 or 15 miles—an Indian day's journey. The annexed cut represents a B. in the jungle. The introduction of railways will very soon put an end to the antique system of traveling in India—a fact greatly to be desired as its annoyances are great.

BU'NGAY, a market-town of the county of Suffolk, England, 30 miles north-north-east from Ipswich. It occupies the sides and summit of a gently rising hill, on the right bank of the Waveney, and is a well-built town, with wide streets, the principal ones diverging from the market-place. The town grew around Bungay Castle, which is supposed to have been erected by the Bigods, Earls of Norfolk, and of the walls of which some ruins still remain. The ruins of a Benedictine nunnery are also to be seen in the town. The Church of the Holy Trinity is an edifice with a round tower, supposed to be of the time of Edward the Confessor. There are numerous places of worship, belonging to different denominations, and schools, charitable institutions, assembly-rooms, &c. What was formerly the theater is now used as a corn-hall. B. carries on a considerable trade by the river Waveney in corn, malt, flour, coals, and lime. Pop. (1861) 3805; (1871) 3503.

BU'NIAS, a genus of plants of the natural order *Cruciferæ*, distinguished by *incumbent* linear spirally twisted cotyledons (q. v.), and a nut-like silicule (or round pod) with 2—4 cells. Only a few species are known, natives of the Levant. One of these, *B. Orientalis*, is cultivated in some countries—particularly in France—as a field-crop, for the sake of its leaves, which are used for feeding cattle. It was introduced into Britain more than 100 years since, but its cultivation has never become general, the amount of herbage which it yields being comparatively small. It is sometimes called HILL MUSTARD.

BU'NION is a term applied in Surgery to enlarged bursæ, or synovial sacs, situated in the anterior part of the foot, and especially over the metatarsal joint of the first or the fifth toe (see FOOT), and accompanied by more or less distortion of the joint. In the great majority of cases, bunions are directly produced by the pressure of badly-fitting boots; and if the boots are constructed of patent leather, or any material which stops the excreting action of the skin, this, too, may be regarded as an indirect cause of their formation. A bunion begins as a painful and tender spot over one of the metatarso-phalangeai joints; the part gradually enlarges, and there are indications of an effusion into a natural bursa or a newly-formed sac. The progress of the affection may stop here, the bursa remaining, and serving to protect the subjacent parts from pressure; but far more frequently it undergoes repeated attacks of inflammation, causing its enlargement; or becomes the seat of corns; or suppuration of the contents of the cyst ensues. The last accident may be followed either by obliteration of the cyst, and cure, or by a troublesome form of ulcer, especially in persons of languid circulation.

It is only in its early stage that there is any hope of removing the disease; subsequently, the treatment must be only palliative. The tender spot that precedes the enlargement should be covered by night with wet lint and oiled silk, while by day a boot or shoe exerting no pressure on the part should be worn. If the part is very tender, it may be covered during the day with soap-plaster spread on wash-leather. As soon as a cyst can be detected, the part should be occasionally treated with strong tincture of iodine, with the view of promoting absorption. The writer of the article on this subject in Holmes's *System of Surgery*, recommends an ointment of biniodide of mercury (ten grains to an ounce of lard) for the cure of bunions when uninflamed, and for such as have much fluid within them. It should not be applied so constantly as to blister the skin.. When, from any cause, inflammation takes place in the sac, water-dressing, or a poultice, should be applied; and as soon as there are definite signs of suppuration, a free incision should be made, which at once relieves the pain, and is often followed by a complete cure.

The ulcers resulting from the bursting of a bunion are very difficult to heal, especially in old persons whose circulation is languid. Stimulating local applications, such as ointment of resin, should be applied, while opium and stimulants should be prescribed for internal use, together with nourishing diet. Such ulcers, under the best treatment, not very unfrequently form the starting-point for senile gangrene.

BU'NION is a painful condition met with in the joints of the feet, most commonly at the junction of the great toe with its metatarsal bone. It is caused by a gradual displacement of the bones, the toe itself turning outwards, and leaving the head or further extremity of the metatarsal bone projecting inwards. Over the latter, the skin is generally thin, and occasionally a bursa (sac) is present between the skin and bone. The pressure of a boot causes this bursa to inflame, and this may go on to suppuration or painful ulceration. Rest, poulticing, and such remedies are generally sufficient to subdue any inflammatory attack, and wearing a shoe so constructed as to save the B. from pressure, will probably prevent a recurrence of painful symptoms; but amputation and excision of the ends of the bones have been resorted to for the cure of the troublesome distortion.

BUNKER'S HILL. See CHARLESTOWN.

BU'NKUM, a phrase used in the United States to signify an oratorical display in favor of a sham proposal, in order to catch popular applause. A member of the legislature, for example, desirous of standing well with his constituents, makes a flaming speech in favor of a measure in which they are interested; but with the knowledge that the measure is impracticable, and will not be carried. In fact, the speaker does not want to carry it; his sole object is to impose on his supporters, and acquire the character of a meritorious public leader. Such is speaking for bunkum. In some instances, the state legislatures enact laws brought forward on these dishonest grounds—the whole members, or at least a large majority of them, having no other object than bunkum. The consequence is, that many laws, agitated for by popular factions, remain a dead-letter, unless they happen to be enforced by clubs organized for the purpose. The word B. is said to be a corruption of Buncombe, the name of a county in N. Carolina, the representative of which informed Congress on one occasion that he was merely speaking 'for Buncombe.'

BUNSEN, CHRISTIAN KARL JOSIAS, BARON, one of the most distinguished statesmen and scholars of Germany, was born, 25th August 1791, at Korbach, in the principality of Waldeck, and studied philology at Göttingen (1809—1813) under Heyne. He had been appointed teacher in the Gymnasium of Göttingen in 1811, but quitted the position in 1813; and in pursuance of a course of study of Old and Middle High German, begun in company with Lachmann, and to extend his knowledge of the Germanic tongues, went to Holland, and afterwards to Copenhagen, where he learned Icelandic from Finn Magnussen. The historical works of Niebuhr and his character as a politician had filled B. with enthusiasm, and he spent some months of 1815 in Berlin, in order to become personally acquainted with the historian. In 1816, he went to Paris, and studied Persian and Arabic under Sylvestre de Sacy, and in the same year to Rome, where he married.

Niebuhr, then Prussian ambassador, took the greatest interest in the scientific pursuits of B., and procured (1818) his appointment as secretary to the embassy. The residence of the king of Prussia, Friedrich Wilhelm III., in Rome in 1822, had a decided influence on his subsequent career. In the course of a conversation in which B. had disagreed with the king, the latter asked his views on the Prussian ritual (*Agende*) and hymn-book question, then much agitated. Though these views were very different from what the king had been accustomed to hear, he took them in good part, and with expression of his personal regard, requested B. to continue in the state service. On Niebuhr's departure from Rome (1824), B. conducted the embassy provisionally for a time, and was then appointed resident minister (1827). Living in intimate intercourse with Niebuhr, B. had employed the time in deepening his investigation into the philosophy of language and religion; and had made, on the one hand, the philosophy of Plato and the constitutions of antiquity; on the other, biblical inquiries, church history, and liturgies—objects of special attention. Though not within the scope of the great plan of his life, he contributed largely to the *Beschreibung der Stadt Rom* (Description of Rome), 3 vols. (Stutt. 1830—1843); the greater part of the topographical communications on ancient Rome, and all the investigations into the early history of Christian Rome, are by him.—The first visit of Champollion to Rome formed an epoch in B.'s antiquarian studies.

He was a zealous hearer of Champollion himself, and also encouraged Lepsius (q. v.) to the study of hieroglyphics. The Archæological Institute, established in 1829, found in B. its most active supporter. When he founded the Protestant hospital on the Tarpeian Rock (1835), he also built, adjoining his own house, a place of meeting for the Institute; and labored earnestly for the cause of Protestantism. The king of Prussia had often asked his advice in the matter of the ritual, but had not adopted it. B. then, along with the chaplain, introduced (1825) into the chapel of the embassy at Rome a liturgy modelled after his own views, and sent a report (1828) to the king of the result. The king had this liturgy printed, and wrote the preface with his own hand. The work never came into the hands of the trade; but the most part of it was embodied in the *Allgemeine evang. Gesang- und Gebetbuch*, printed (1846) without the author's name, in the Rauhe Haus, Hamburg, which may be considered as the second edition of the *Versuch eines allgemeinen evang. Gesang- und Gebetbuchs* (Attempt at a General Evangelical Hymn and Prayer Book), Hamb. 1833.

In 1841, he was sent on a special mission to London, to negotiate the erection of an Anglo-Prussian bishopric in Jerusalem, and was shortly afterwards appointed ambassador at the English court. It is understood that, on occasion of a visit to Berlin in 1844, he was asked to write down his views on the question of granting a constitution to Prussia; and that in consequence he presented a series of memorials representing the urgency for a deliberative assembly, and also made a complete plan of a constitution closely resembling the English. In the Schleswig-Holstein question, B. strongly advocated the German view, in opposition to Denmark, and protested against the London Protocol of 1850. But in the midst of all his political duties, B. continued unabated his literary and philosophical pursuits, the results of which have from time to time appeared. His views regarding the part that Prussia should act in the Eastern question not being, it is understoood, in accordance with those of his court, he ceased, in 1854, to represent Prussia at the court of England and retired to Heidelberg. In the estimation of Englishmen, B. must ever hold a high place. No foreigner has ever shown a deeper appreciation of their national characteristics, or a heartier love of their social and political liberty. It must also be acknowledged that he has done service to the cause of enlightened Christianity, for, while in England, he was regarded by those who knew him both as the most philosophical and most reverent of lay-theologians. His chief works are: *De Jure Atheniensium Hæreditario* (Gött. 1813), *Die Kirche der Zukunft* (The Church of the Future—translated into English, and published by Longman), Hamb. 1845; *Ignatius von Antiochien und seine Zeit* (Ignatius of Antioch and his Time), Hamb. 1847; *Die drei echten und die vier unechten Briefe des Ignatius von Antiochien* (The Three Genuine and the Four Spurious Epistles of Ignatius of Antioch), Hamb. 1847; *Ægyptens Stelle in der Weltgeschichte* (Egypt's Place in the World's History—translated into English by Cottrell), Hamb. 1845—1857; *Die Basiliken des Christlichen Roms* (The Basilicas of Christian Rome), 1843; *Hippolytus und seine Zeit* (Hippolytus and his Time), 1851; *Christianity and Mankind*, 1854; *Gott in der Geschichte* (God in History), 1857, and the *Bibelwerk*, which B. hoped to make his chief work, of which only a part appeared before his death, which took place in 1860. See *Memoir* by his widow (1868).

BUNSEN, Robert Wilhelm, a distinguished German chemist, born at Göttingen, where his father was a professor, on March 31, 1811. He entered the university of his native town in 1828, where he devoted himself to the study of the natural sciences, especially to zoology and chemistry. He afterwards prosecuted his favorite studies at Paris, Berlin, and Vienna. After having held the post of professor at Cassel, Marburg, and Breslau successively, B. was, in 1852, appointed to the chair of chemistry at Heidelberg, where he has since remained. He has published numerous papers on physics and geology, as well as on chemistry. The charcoal pile and the burner which bear his name are in extensive use. That the hydrate of oxide of iron is an antidote to arsenic, is an important fact which was made known by him, along with his friend Berthold, in 1837. B. was the first to produce magnesium in large quantities; and, in 1860, he invented the magnesium light, which has proved so important to photography. But the greatest discovery with which his name is associated, is that of the spectrum analysis—made in conjunction with his friend Kirchhoff—which has been the means of working so many wonders in chemistry, and revealing so much to astronomers. Its first result was the discovery of two new metals. B. is not only a prolific discoverer in chemistry, but he has proved himself also one of its most successful teachers. His manner of demonstration is very happy. We have from his pen: *Descriptio Hygrometrorum* (Göttingen, 1830); *Eisenoxydhydrat* (2d ed., 1837); *Gasometrische Methoden* (1857; English by Roscoe); and other papers. The government of Baden made him privy-councillor in 1863.

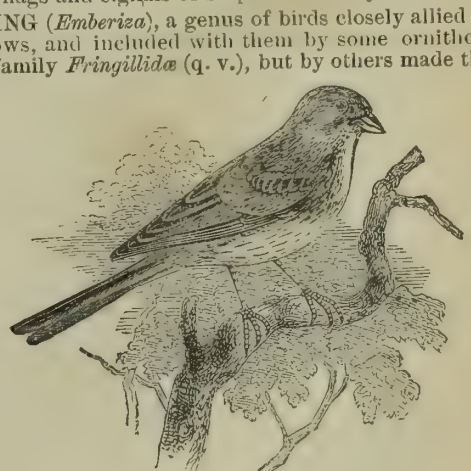
BUNT, a disease of wheat and other grains, or the parasitic fungus which causes that disease. The name B. is supposed to be a corruption of *burnt*, or at least derived from the same root, a derivation perhaps suggested by the analogy of *Brand* (q. v.). B. is also called *Pepper Brand*, and sometimes *Smut Ball*. It is one of the most common and injurious diseases of wheat, often affecting great part of a crop, although its prevalence has been greatly diminished by care on the part of farmers, and particularly by the selection of clean seed, and the dressing of the seed, before sowing, with some substance, which, without injuring its vitality, destroys that of the spores or granules of the fungus.

Even washing with water has a good effect, but greater benefit is derived from dressing with salt, quicklime, chloride of lime, Glauber's salt (sulphate of soda), and quicklime, or blue vitriol (sulphate of copper). Even arsenic and corrossive sublimate are used for this purpose. B. is now believed to be propagated by any contact of sound with unsound grain; by thrashing, which causes the B. dust to fly about; or by manure, in which the straw of infected grain bas been mixed. Upon this knowledge, the means now adopted for its prevention are founded. A considerable mixture of B. is not supposed to render flour absolutely unwholesome, at least when made into fermented bread, but the bread is of a peculiar flavor, and a very dark color. It is said that such flour is used to no small extent in the manufacture of gingerbread, the treacle disguising both the color and the flavor.

BU'NTER SA'NDSTEIN, or 'variegated sandstone,' is the lowest member of the Triassic Period. As the triass is more perfectly developed in Germany than in Britain, the German beds are considered the typical group of this period. The B. S. consists of various colored sandstones, interstratified with red marls and thin beds of limestone, which occasionally, as in the Harz, are oolitic, but in other places dolomitic. They attain a maximum thickness of 1500 feet. The English representatives of the B. S. are chiefly developed in Lancashire and Cheshire, and consist of red and mottled sandstones with beds of marl, and thick rather irregular bands of partially consolidated conglomerate called 'pebble beds.' Thirty species of fossil plants have been found in the B. S. near Strasburg, consisting chiefly of ferns, cycads, and conifers. But the most remarkable fossils in this formation are the remains of huge batrachians. Originally, the footprints which have been left by the animals on the moist sand were alone observed. From their resemblance to the impression made by a human hand, the animal producing them was provisionally named *Cheirotherium* (q. v.). The subsequent discovery and examination of the remains of teeth and bones in the same beds, have afforded sufficient materials to enable Owen to reconstruct an animal named by him *Labyrinthodon* (q. v.), which undoubtedly produced the footprints. These remains have been detected in Lancashire and Cheshire, as well as in Germany.

BU'NTINE, or BU'NTING, is a thin woollen material, of which the flags and signals of ships are usually made.

BU'NTING (*Emberiza*), a genus of birds closely allied to finches and sparrows, and included with them by some ornithologists in the great family *Fringillidæ* (q. v.), but by others made the type of



Common Bunting (*Emberiza miliaria*).

a distinct family, *Emberizidæ*, of which the most marked characteristics are a short, straight, conical bill; a curved form of the gape, produced by a narrowing of the sides of the upper mandible, and a corresponding enlargement of the under one, and a hard rounded knob on the palate or inner surface of the upper mandible. This knob probably aids in crushing the seeds, which are a principal part of the food of these birds. The species of the B. family are numerous, and are arranged in several genera. The true buntings (forming the restricted genus *Emberiza*) have the hind claw moderately short, curved, and strong, and the palatal knob large and bony. The Common B. or Corn B. (*E. miliaria*)—a bird considerably larger than a house-sparrow, brown, with darker streaks on the upper parts, whitish brown, with spots and lines of dark

brown on the under parts, and with a slightly forked tail—is frequent, particularly in low cultivated grounds in Britain, and in most parts of Europe, extending also into Asia, living in pairs during spring and summer, but in flocks in winter, and often visiting barn-yards at that season, along with chaffinches and sparrows. It is the largest of the British buntings. It is supposed that the winter flocks in Britain are much increased by migration from more northerly regions. This B. often passes the night on the ground in stubble-fields, and is taken in the nets employed for catching larks, and brought with them to market. It usually builds its nest on or very near the ground. Its notes are harsh and unmusical.—The REED B., or BLACK-HEADED B. (*E. Shoeniclus*), is a species common in marshy situations, both in Britain and on the continent of Europe; a very pretty little bird, with black head and throat, strikingly contrasted with the white nape and sides of the neck.—The CIRL B. (*E. Cirlus*), of which the head is olive-green, with black streaks, and with patches of bright lemon-yellow on the cheeks and over the eyes, is a rare British bird, and belongs chiefly to the south of Europe and the north of Africa. To this genus belong also the ORTOLAN (q. v.) and the YELLOW-HAMMER (q.v.).—The SNOW B. (q. v.), or SNOWFLAKE (*E. nivalis* of many authors), has been placed in the new genus *Plectrophanes*. The name B. has been often very vaguely used, and many species have been almost indiscriminately called buntings or finches. The palatal knob affords the best distinctive character. North America has a number of species of bunting.—The BLACK-THROATED B. (*E. Americana*) is extremely plentiful on the prairies of Texas and other south-western parts of the United States; extending, however, as far as to Ohio, and even to Massachusetts. In the middle and northern states, it occurs only as a summer bird of passage. In its habits, it closely resembles the Common B. of Europe; but the palatal knob is less hard.

BUNTING, JABEZ, an eminent Wesleyan minister, was born at Manchester in 1779. At the age of 20, he devoted himself to ministerial work, in which he was very successful. He was elected president of the annual conference in 1820, and again in 1828, 1836, 1844. In 1834, he was chosen president of the theological institution belonging to the Wesleyan Methodist body, and he acted as one of the secretaries to the Missionary Society in connection with his denomination, for a period of more than twenty years. He was the chief authority in all matters relating to the government and polity of Wesleyan Methodism. On his retirement from official life in 1857, his friends presented him with an annuity of £200, in consideration of the great services he had rendered to Methodism. He did not live, however, to profit by their kindness and forethought, having died in June 1858.

BUNYAN, JOHN, one of the most popular religious writers of any age, was born at Elstow, near Bedford, in 1628. He was brought up to his father's trade of tinker, and spent his youth in the practice of that humble craft, of which his name alone now serves to lessen somewhat the disrepute. It has generally been taken for granted that his early life was very loose and profligate, on the sole ground of his terrible self-accusations in after years, when, from the height of religious fervor and Puritan strictness, he looked back on dancing and bell-ringing as deadly sins. This point is satisfactorily disposed of by Macaulay (*Encycl. Britann.*, art. 'Bunyan'). In his 16th or 17th year, he enlisted in the Parliamentary army, and in 1645, was present at the siege of Leicester, where he escaped death by the substitution of a comrade in his place as sentry. Nothing further is known of his military career. After leaving the army, he married, and soon after began to be visited by those terrible compunctions of conscience, and fits of doubt, sometimes passing into despair, which, with some quieter intervals, made his life, for several years, a journey through that Valley of Humiliation of which he afterwards gave so vivid a picture. Hope and peace came at last, and in 1655, B. became a member of the Baptist congregation at Bedford. Soon after, he was chosen its pastor, and for five years ministered with extraordinary diligence and success, his preaching generally attracting great crowds. The act against conventicles, passed on the Restoration, put a stop to his labors; he was convicted, and sentenced to perpetual banishment.

In the meantime, he was committed to Bedford Jail, where he spent the next 12 years of his life, supporting the wants of his wife and children by making tagged laces, and ministering to all posterity by writing the *Pilgrim's Progress*. His library consisted of a Bible and Fox's *Martyrs*. He was at last released (but not by the interposition of a High Church bishop, as used to be said), and he at once resumed his work as a preacher, itinerating throughout the country. After the issuing of James II.'s declaration for liberty of conscience, he again settled in Bedford, and ministered to the Baptist congregation in Mill-lane till his death, at London, of fever, in 1688. B.'s whole works were published in 1736, in 2 vols. folio. The most popular of them, after the *Pilgrim's Progress*, are the *Holy War*—another allegory, much less successful—and *Grace Abounding to the Chief of Sinners*, an autobiographical narrative. It is supposed that no other book, except the Bible, has gone through so many editions, and attained to so wide a popularity, in all languages, as the *Pilgrim's Progress*. A facsimile reprint of the original edition of the *Pilgrim's Progress* was published in 1875. A statue of B. was unveiled at Bedford in 1874.

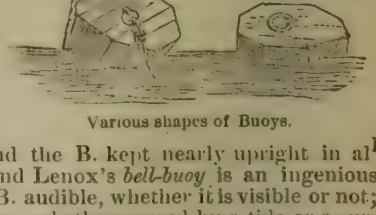
BU'NZLAU, a town of Prussia, in the province of Silesia, is situated on the Bober, about 25 miles west-north-west of Leignitz. B. has manufactures of woollens, linens, hosiery, tobacco, and earthenware, and a trade in grain. An obelisk to the Russian general, Kutusow, who died here in 1813, adorns the market-place. Pop. (1880) 10,790.

BU'NZLAU, JUNG or NEUE (*New Bunzlau*), a town of Bohemia, on the left bank of the Iser, a tributary of the Elbe, 31 miles north-east from Prague. It is well built of stone, has several churches, a Jewish synagogue, barracks, a hospital, a Piarist gymnasium, &c. It has manufactures of cotton and woollen fabrics, soap, and leather. It is said to have been founded by King Boleslaf in 973, and the fort built by him still exists. Its Bohemian name is *Mlada Boleslaw*. Pop. (1880) 9681.

BUOL-SCHAUENSTEIN, KARL FERD., COUNT, Austrian statesman, was born 17th May 1797. After filling subordinate diplomatic posts, he became ambassador at Carlsruhe in 1828, afterwards at Stuttgart (1838) and at Turin (1844). Leaving Turin on the outbreak of the war in 1848, he went as ambassador to St. Petersburg, and it fell to him to uphold the interest and dignity of his country, on occasion of the aid given by Russia in the Hungarian war. A not less difficult task was assigned him when, in 1851, he was sent to represent Austria in London; his address and conciliatory bearing contributed not a little to bring about a more friendly feeling between the two governments. On Schwarzenberg's death, B. was recalled to Vienna, and became foreign minister. In this position, he carried out the new politics of Austria no less firmly and successfully, though more moderately and quietly, than his predecessor. In the negotiations during and after the termination of the Crimean war, B. showed himself a skilful and able statesman

After defending with zeal and ingenuity, in diplomatic notes and circulars, the position which Austria had taken up with reference to Sardinia, B. suddenly, on the actual commencement of the Italian campaign of 1859, resigned his place, which was immediately filled by Count Rechberg. Failing health was the cause officially assigned for the step, but the general belief was, that it indicated a triumph of the war-party in the council of Francis Joseph. He died Oct. 28, 1865.

BUOY is a floating body, intended as a mark for the guidance of mariners. It is made either of wood or metal, and is mostly hollow, to make it float better. Buoys are generally moored by chains to the bed of the river or channel. They are of various shapes and sizes, and are painted of various colors, partly to render them conspicuous, and partly to distinguish them from one another. Sometimes floating buoys mark out the best channel for entering a dock; sometimes they warn the mariner away from sands, spits, and shoals; sometimes they mark out a continuous double line, as at Spithead, between which ships can alone with safety enter a harbor. The Trinity House has adopted a form of B., invented by Mr. Herbert, in which, by due attention to the center of flotation, and to the point where the mooring-chain is fixed, the tendency to pitch and roll is much lessened, and the B. kept nearly upright in all weathers. Messrs. Brown and Lenox's *bell-buoy* is an ingenious contrivance for rendering a B. audible, whether it is visible or not; so long as any stream of water, whether caused by a tide or a current, passes through the lower part of the B., it moves an undershot water-wheel, which rings a bell.



Various shapes of Buoys.

The lighting of coast buoys by means of compressed gas has been of late successfully attempted. Experiment proved that buoys 5 feet by 3 feet could contain enough of gas (made from shale-oil refuse or the like) to keep up a brilliant light for a month or more at a time.

BUOY'ANCY, of ships, is the amount of weight which can be buoyed up by the hull. The B. of a vessel is proportionate to the weight of water displaced by its presence (see HYDROSTATICS), and is found in this way. The cubic feet of the part of a vessel to be immersed being known, multiply it by the weight of a cubic foot of water (62·5 lbs.) and the product will be the weight of water displaced. From this subtract the weight of the vessel, and the result will be the B. or the weight a vessel will carry without

sinking lower than the given line. It is admitted, however, by naval architects, that all the old rules concerning B., displacement, and flotation, must undergo modification by the introduction of iron ships, paddle and screw propulsion, and the increased weight of broadside.

BUOY'-DUES. Buoys are under very stringent regulations, on account of their importance to the safety of ships. The public buoys, for guiding into channels, and warning from shoals and rocks, are usually marked on the best charts relating to that particular water-way. The corporation of the Trinity House has a peculiar jurisdiction over the buoys and beacons in the Thames, and along the Essex and Suffolk coasts; as well as on other coasts in England and Wales. All ships which enter the ports within this jurisdiction pay a small sum as buoy-dues. The payment is sometimes a tonnage rate, varying from 0½*d.* to 2*d.* per ton; sometimes a rate per vessel, varying from 4*d.* to 3*s.*; sometimes a payment on entering only, at others on departure as well as on entering; while some kinds of coasting vessels pay 5*s.* per annum, whatever may be the number of voyages. From the Thames buoys alone, the Trinity House receives £14,000 per annum as dues.

BU'PHAGA. See BEEFEATER.

BUPRE'STIS, a Linnæan genus of Coleopterous (q. v.) insects, now divided into a number of genera, and forming a tribe or family, *Buprestidæ*, of which some hundreds of species are known, most of them belonging to tropical countries, and remarkable for the splendor of their colors. The colors are generally metallic in

Buprestis Bicolor. Larva of Buprestis gigas.

their lustre, have frequently a burnished appearance, and are often beautifully irridescent. One of the largest species, *B. gigas*, is a native of Cayenne: it is about 2 inches long. The English and other European species are all comparatively small. Most of the species spend the night on trees, shrubs, and other plants, flying about during the hottest part of the day. Some of them are popularly known as GOLDEN BEETLES.

Plants are sometimes seen studded with them in the morning, as with gorgeous flowers. The golden *elytra* (wing-cases, see ELYTRA) of some species are used to enrich the embroidery of the Indian zenana; and the lustrous joints of the legs are strung on silken threads, and form necklaces and bracelets of singular brilliancy. The species of *Buprestidæ* found in England are few; none have yet been found in Scotland. The larvæ seem sometimes to be transported from one country to another in timber.

BUR, in an engraving, is a slight ridge of metal raised on the edges of a line by the *graver or the dry point*. As the bur produces an effect like a smear, it is usually regarded as a defect, and scraped off. Some etchers, however, take advantage of it to deepen their shadows, and Rembrandt made use of it in this way with telling effect.

BURANHEM, or BURUNHEM. See MONESIA BARK.

BU'RANO, an island and town of Northern Italy, in the Adriatic, about 5 miles north-east of Venice. The island supplies a large proportion of the vegetables consumed in Venice. B. has some lace-manufactures, boat-building, and an extensive ropework, but the inhabitants are chiefly employed in fishing. Pop. of town, 5000; of commune, 7000.

BU'RBOT (*Lota vulgaris*), a fish of the same genus with the Ling (q. v.), and of the same family with the Cod, Haddock, &c., being the only British fresh-water species of that family, *Gadidæ*. It is found in the Cam, the Trent, and other rivers of the eastern and midland counties of England, but is one of the most local of British fresh-water fishes. It is found also in various parts of the north of Europe, and at least as far south as Switzerland; in Siberia and other parts of Asia, even, it is said, in India. In English rivers, it often reaches 2 or 3 lbs. in weight, but has been taken of 8 lbs. weight; and in some parts of Europe, it is said to reach 10 or 12 lbs. weight. In appearance, the B. very much resembles the ling, but is rather thicker at the neck, and tapers rather more rapidly, although still of a somewhat elongated form. It has two dorsal fins, the first short, the second very long, and a very long anal fin. It differs from the ling in the form of the tail-fin, which is oval and slightly pointed; but agrees with it in having a single barbule on the lower jaw. It is of a yellowish-brown color, clouded and spotted with darker brown on the upper parts, the under parts lighter; the scales are small; and the whole body is

Burbot.

covered with a mucous secretion. The flesh is white, firm, and of good flavor; 'and as the B. is in its nature extremely hardy, few difficulties present themselves in the way of their increase in quantity, while the value of the fish would amply repay the trouble or the cost of the experiment.'—*Yarrell*. The B. is capable of living for a long time out of water. It is commonly taken by trimmers and night-lines, as it feeds principally during the night. Its food consists of small fishes, worms, mollusca, &c. Its liver yields an oil similar to cod-liver oil.

BURCKHARDT, JOHN LEWIS, an enterprising African traveler, was born at Lausanne, in Switzerland, November 24, 1784. In 1806, he came to London, and was introduced by Sir Joseph Banks to the African Association, which accepted his services to explore the route of Hornemann into the interior of Africa, and he embarked for Malta, February 14, 1809. He had previously qualified himself for the undertaking by a study of Arabic, and also by inuring himself to hunger, thirst, and exposure. From Malta he proceeded, under the disguise of an oriental dress and name, to Aleppo, where he studied about two years, at the end of which time he had become so proficient in the vulgar Arabic, that he could safely travel in the disguise of an oriental merchant. He visited Palmyra, Damascus, Lebanon, and other remarkable places, and then went to Cairo, his object being to proceed from thence to Fezzan, and then across the Sahara to Sudan. No opportunity offering itself at the time for that journey, he went into Nubia. No European traveler had before passed the Derr. In 1814, he traveled through the Nubian desert to the shore of the Red Sea and to Jeddah, whence he proceeded to Mecca, to study Islamism at its source. After staying four months in Mecca, he departed on a pilgrimage to Mount Arafat. So completely had he acquired the language and ideas of his fellow-pilgrims, that, when some doubt arose respecting his Mohammedan orthodoxy, he was thoroughly examined in the Koran, and was not only accepted as a true believer, but also highly commended as a great Moslem scholar. In 1815, he returned to Cairo, and in the following year ascended Mount Sinai. The Fezzan caravan, for which he had waited so long, was at last about to depart, and B. had made all his preparations for accompanying it, when he was seized with dysentery at Cairo, which terminated his life in a few days, October 15, 1817, at the early age of 33. As a holy *sheik*, he was interred with all funeral honors by the Turks in the Moslem burial-ground. His collection of oriental MSS., in 350 volumes, was left to the university of Cambridge. His journals of travel, remarkable alike for their interest and evident truthfulness, were published by the African Association. B. was a man born to be a traveler and discoverer; his inherent love of adventure was accompanied by an observant power of the highest order. His personal character recommended him to all with whom he came in contact, and his loss was greatly deplored, not only in England, but in Europe. His works are—*Travels in Nubia*, 1819; *Travels in Syria and the Holy Land*, 1822; *Travels in Arabia*, 1829; *Notes on the Bedouins and Wahabis*, 1830; and *Manners and Customs of the Modern Egyptians*, 1830.

BU'RDEN, a term of law in Scotland, used to signify any restriction, limitation, or encumbrance affecting either person or property. Burdens are said to be personal or real. Where a party is taken bound by acceptance of a right to pay a certain sum to another, but where there is no clause charging the subject conveyed with the sum, the burden is said to be *personal;* that is, it will be binding upon the receiver and his representatives, but will constitute no real encumbrance on the lands, or other subject conveyed, nor amount, indeed, to anything more than a mere personal obligation on the granter. But where the right is expressly granted under the burden of a specific sum, which is declared a burden or charge on the lands themselves, or where the right is declared null if the sum be not paid, the burden is said to be *real.*

By the 10 and 11 Vict. c. 48, real burdens need not be inserted in full in conveyances, if they have already been set forth in an instrument of title, in which case, they may be referred to in the terms, or as nearly as may be in the terms, set forth in schedule

C annexed to the act. A similar provision is made in regard to lands held in burgage tenure, by the 10 and 11 Vict. c 49.

BU'RDEN, or BU'RTHEN, of a ship. See TONNAGE.

BURDEN OF PROOF, in legal procedure, signifies the obligation to establish by evidence certain disputed facts; and, as a general rule, this burden lies on the party asserting the affirmative of the issue to be tried or question in dispute, according to the maxim *ei incumbit probatio qui dicit non qui negat*—that is, proof is incumbent on him who asserts, not on him who denies. The principle of the law is, that the B. of P. is on the party who would fail if no evidence were adduced on either side. Accordingly, it almost always rests on the plaintiff in an action, or on the party asserting the facts on which the result of the litigation must depend. In one case tried before the late Baron Alderson, that learned judge laid down that the proper test was, *which party would be successful, if no evidence at all were given?* the B. of P., of course, falling on the party not in that position. This test has since been generally adopted and applied; but Mr. Best, in his learned work on the *Principles of Evidence*, improves on it by the suggestion, that in strict accuracy the test ought to be, 'which party would be successful, if no evidence at all, *or no more evidence*, as the case may be, were given?' a consideration on which the discretion and judgment of counsel frequently depend.

But although such, in general, is the position of the plaintiff, it sometimes happens that the B. of P. is imposed on the defendant, in consequence of his having the affirmative of the material issue to be tried.

It is this rule as to the B. of P. that demonstrates the real nature of the plea of *not guilty* in a criminal prosecution, and which divests that plea of the objections to it which are frequently heard expressed by over-scrupulous sentimentalists; for the meaning of that plea is not necessarily an assertion by the prisoner that he is absolutely guiltless or innocent, but that he wishes to be tried, and that as the B. of P. is on the prosecutor, while he has meanwhile the presumption of innocence in his favor.—Besides the work referred to, see on the subject of this article Starkie on the *Law of Evidence in England*, and Dickson on the same subject in Scotland.

BURDENS, PUBLIC. See PUBLIC BURDENS.

BURDER, REV. GEORGE, an active and influential minister of the Congregational body, was born in London, June 1752. After studying some time as an artist, he devoted himself to the ministry, and in 1778 was appointed pastor of an Independent Church at Lancaster. He afterwards removed to Coventry, and in 1803 to London. Here he became secretary to the London Missionary Society, and editor of the *Evangelical Magazine*, the duties of which offices he discharged with great zeal, until failing health compelled him to resign. B. took a prominent part in all the religious movements of his time. He died May 1832. His *Village Sermons* have been translated into several European languages; and he was the author of other series of sermons and publications which have had an immense circulation.

BURDETT, SIR FRANCIS, Bart., the most popular English politician of his time, born January 25, 1770. Educated at Westminster School and Oxford University, he spent some years on the continent, and was a witness to the progress of the first French Revolution. In 1793 he married Sophia, youngest daughter of Thomas Coutts, Esq., the wealthy London banker, and in 1796 was elected M.P. for Boroughbridge, Yorkshire. In 1797, on the death of his grandfather, he succeeded to the baronetcy. In the House of Commons, he made himself conspicuous by his opposition to government and the war, and his advocacy of parliamentary reform, Catholic emancipation, and other liberal measures, most of which were afterwards carried. One of the most effective political speakers of that excited period, he for many years prominently occupied public attention, and was the idol of the London populace. Having succeeded in obtaining a parliamentary inquiry into the abuses of the metropolitan prisons, he became, in 1802, a candidate for Middlesex. He was first returned, then unseated, and after a second contest, defeated.

At the general election of 1806, B. again became a candidate for Middlesex, but was defeated. In May 1807, he fought a duel with Mr. James Paull, one of the candidates for Westminster the previous year. Soon after, he was returned, with Lord Cochrane, for Westminster, which he represented for nearly thirty years. B. having in 1810 published, in Cobbett's *Political Register*, a Letter to his Constituents, declaring the conduct of the House of Commons illegal in imprisoning John Gale Jones, the Speaker's warrant was issued for his apprehension, as being guilty of a breach of privilege. Refusing to surrender, he for two days barricaded his house; the populace supported him in his resistance, and in a street contest between them and the military some lives were lost; but on April 9, the sergeant-at-arms, aided by the police and military, obtained an entrance, and conveyed him to the Tower. The prorogation of parliament restored him to liberty. Prosecuted in 1819 for a libel contained in a Letter to his Constituents, strongly animadverting on the proceedings of the magistrates and yeomanry at the memorable Manchester meeting, he was sentenced to three months' imprisonment in the King's Bench, and to pay a fine of £1000. In 1835, he deserted the Liberal party, and joined the Conservatives. In 1837, he was returned for Wiltshire. He died in 1844.

BURDETT COUTTS, THE RIGHT HON. ANGELA GEORGINA, BARONESS, daughter of Sir Francis Burdett, was born in 1814. In 1837, she inherited much of the property of her grandfather, Thomas Coutts, the banker, on the death of his widow, who died Duchess of St. Albans. The liberal and public-spirited use she has made of this wealth, in her efforts to mitigate the sufferings of her fellow-creatures and the lower animals, has rendered her name well known and deservedly popular. Besides spending large sums of money in building and endowing several churches and schools, she endowed the three colonial bishopries of Cape Town, Adelaide, and British Columbia, at an outlay of about £50,000, and founded an establishment in South Australia for the improvement of the aborigines. In her zeal for the good of her own sex, she effected important reforms in the teaching of girls at the National Schools, and established a shelter and reformatory for fallen women. To the city of London she has presented, besides several handsome fountains, the Columbia Market, Bethnal Green, for the supply of good and wholesome food in a poor district. She also built Columbia Square, consisting of model dwellings at low rents, for about 300 families; and, taking great interest in emigration, has assisted many poor families in their passage and outfit. Her private charities have been on a corresponding scale; and she is also a liberal patroness of art. In 1871, she accepted a peerage from government. In 1872, the freedom of the City of London was conferred upon her; and in 1874 also that of Edinburgh. In 1881, she was married to Mr. Ashmead Burdett-Coutts Bartlett.

BU'RDOCK (*Arctium*), a genus of plants of the great natural order *Compositæ* (q. v.), tribe *Cynarocephalæ*. The heads of flowers are globose, or nearly so; and each of the scales of the involucre runs out into a long rigid prickle, which is hooked at the point. By means of these hooks, the flower-head, popularly called a *bur*, readily lays hold of the clothes of a passer-by, the wool of a sheep, or the like, and thus the seeds are transported from one place to another, the short hairy pappus being insufficient to waft them far on the wind. The common B. (*A. Lappa*), of which varieties very slightly distinguished have sometimes been described as species (*A. Bardana*, &c.), is abundant in waste and bushy places, by waysides, &c., in Britain and throughout Europe, scarcely, however, growing except in rich land. Its root is biennial, large and fleshy, somewhat carrot-shaped; the root-leaves large, stalked, heart-shaped; the stem stiff, upright, somewhat branched and leafy, three feet or more high. The whole aspect of the plant is coarse, and it is somewhat clammy to the touch. The root is sometimes used in medicine, being diaphoretic and diuretic, and acting upon the cutaneous system and the kidneys. It is capable of being made a substitute for sarsaparilla. When fresh, it has a disagreeable smell, but when dry, it is inodorous; it has a sweetish mucilaginous taste, becoming afterwards bitterish and rather acrid, and contains chiefly inulin, bitter extractive, mucilage sugar, and a little tannin. In many countries, the roots, young shoots, and young leaves of B. are used in soups; and the plant is cultivated for this use in Japan. The roots are said to resemble artichokes in taste. The leaves and their expressed juice are sometimes applied to burns and suppurations.

Burdock.

BURDWA'N, a city in the district and province of the same name, in the government of Bengal, on the Grand Trunk Road from the Hoogly to the N.W. Provinces, in lat. 23° 12′ N., and long. 87° 56′ E., 74 miles from Calcutta, with which it is connected by railway. In point of architecture it is a miserable place—an aggregate as it were, of second-rate suburbs. Pop. (1871) 32,321.

BURDWA'N, the district of the last-mentioned city, lying between Beerbhoom on the north, and Hoogly on the south. It stretches in N. lat. from 22° 52′ to 23° 40′, and in E. long. from 87° 21′ to 88° 23′. It has an area of 3523 square miles, with (1871) 2,034,745 inhabitants, or 577 to the square mile—a proportion which certainly seems to justify a name that signifies *productive-*

The district is largely engaged in the refining of sugar. It exports also iron and coal; chiefly, however, brought from the mines of Bancoorah, the district on the west. Next to the capital, Cutwa and Culna are the chief towns.—The *division* of B. has an area of 12,719 sq. m., and a pop. (1871) of 7,286,957.

BUREAU, a French word signifying a writing-table or desk; also an office for transacting business, a department of government, or the officials that carry it on. BUREAUCRACY is popularly applied to signify the kind of government, exemplified in many continental states, where a host of government officials, regularly organized and subordinated, and responsible only to their chiefs, interfere with and control every detail of public and private life—the evil which the Germans call 'much-government' (*vielregieren*).

BUREN, MARTIN VAN, a president of the United States of America (1837—1841), born at Kinderhook, in Columbia, New-York, December 5, 1782. Educated for the bar, he was elected, in 1812, senator in the legislative assembly of New York, and in 1821 took his seat in Congress, where he supported democratic measures. In 1829 he was made Secretary of State, and in 1837 he succeeded General Jackson in the presidency, being elected by a majority of twenty-four votes over his rivals, Clay, Webster, and Harrison. On beginning the duties of his office, he found himself involved in such financial perplexities, that he immediately summoned Congress to an extraordinary session, and proposed an entire separation of state finances from the banks of the Union, a proposition which was decisively rejected, and B.'s popularity was greatly damaged. In 1840, he had to yield his place to General Harrison, the Whig candidate; and in 1844, when he again stood for the presidency, he was defeated by Polk. The result of this vote divided the Democrats into two parties, one of which, at a convention at Utica, unanimously declared for Van B. as president for 1848; but his election was prevented by the military renown of General Taylor, who left both Van B. and Cass with minorities. In 1856, he was again named for the presidency; but the majority of the Democratic party preferred Mr. Buchanan. He died July 1862.

BURG, a town of Prussia, in the province of Saxony, situated on the Ihle, about 13 miles north-east of Magdeburg. It is walled, and has long been famous for its extensive woollen manufactures. It has also manufactures of linen, yarn, steel, pottery, and leather; dye-works, distilleries, foundries, &c., and a large trade in agricultural produce. Pop. (1880) 15,877.

BURGAGE TENURE is a species of holding in the law of real property which prevailed both in England and Scotland, although somewhat differently regarded in these two countries. In England, it is a species of free *socage* (q. v.) holding, and it prevails where the king or other person is lord of an ancient borough in which the tenements are held by a certain and determinate rent, and subject to a variety of customs, the principal and most remarkable of which is that called *Borough English* (q. v.). Among the other customs was a law that the wife shall be endowed with all her husband's tenements, and not with the third part only, as at common law.

In Scotland, by this tenure is meant a peculiar sort of military holding affecting property in royal burghs, the sovereign being superior or over-lord, and each individual proprietor or burgess holding direct of the crown, for the *reddendo* or service of *watching and warding* (q. v.). This service is otherwise termed 'service of burgh used and wont,' and is now merely nominal. Although the burgesses hold immediately of the crown, they do not receive their formal entry directly from the sovereign, but from the magistrates of the burgh, as the crown's commissioners. If the burgh, as such, ceases to exist, the crown does not thereby lose its rights over the proprietors, for they continue as crown vassals (q. v.). The statutes 31 and 32 Vict. c. 101, and 32 and 33 Vict. c. 116, abolished many useless forms in this tenure. See TENURE of LAND.

BURGAS, or BURGHAZ, a town of Turkey, in the province of Eastern Roumelia, on a promontory in the Black Sea, about 76 miles north-east of Adrianople. B., which is well built and clean, has manufactures of pottery of a superior kind and a good trade in agricultural produce. Pop. about 6000. The Gulf of Burgas, at the head of which the town is situated, is about 14 miles in length, and has a depth varying from 5 to 12 fathoms.

BU'RGEO ISLANDS, belonging to England, and lying between Newfoundland and Cape Breton, in lat. 47° 33′ N., and long. 57° 44′ W. Besides being valuable as a fishing-station, they occupy a commanding position with respect to British North America in general, and the Gulf of St. Lawrence in particular. The group has 700 inhabitants.

BURGER, GOTTFRIED AUGUST, one of the most popular German poets, was born, January 1, 1748, at Molmerswende, near Halberstadt, in Prussian Saxony. In his boyhood, he displayed no capacity for hard study, and was particularly averse to Latin; but he at the same time showed a relish for verse, though destitute of any other model than the Psalm-book. In 1764, he went to Halle, and applied himself to theology. In 1768, he abandoned this science for jurisprudence, which he studied at Göttingen. Here his conduct was careless and immoral, and he would probably have sunk into obscurity, if the intimacy which he happily formed with Voss, the two Stolbergs, and other young poets, had not stirred up his better nature, and inspired him with an earnest ambition to excel. He labored hard at the classics of ancient and modern times, but the study of Shakspeare and Percy's *Reliques* had the greatest influence in deciding the style of poetry which he was to adopt. With regard to the intrinsic merits of his poems, which consist chiefly of ballads and songs, even German critics—such as Schiller, Gervinus, and Vilmar—differ widely in their opinions; but all agree in praising the popular style and fluent, spirited versification of his ballads, *Leonora*, *Lenardo and Blandine*, the *Parson's Daughter of Taubenhayn*, the *Wild Huntsman*, &c. B.'s life was spent in great poverty and misery, partly the result of misfortune, and partly induced by his own errors. He married thrice, in two instances very unhappily; lost his property by an unfortunate speculation; and, though the favorite poet of the German people, was left to earn his bread by translations and similar literary labors. He died June 8, 1794. Though a popular writer, B. was very careful as to style, and was one of the first who wrote good hexameter verse in German. Since 1798 there have been numerous complete and partial editions of his works. See B.'s life by Döring (1826), and by Pröhle (1856).

BU'RGERMEISTER, the German title of the chief magistrate of a city or town, analogous to the French *maire*, the English *mayor*, and the Scotch *provost*.

BU'RGESS, or BU'RGHER, from the same origin as borough, means, when taken in a general sense, much the same thing as the word citizen, but has a variety of special meanings, according to local institutions. In French literature, the word *bourgeois* is generally used to personify the excess of plebeian vulgarity; while, on the other hand, in England, the aristocratic member of parliament for a city is technically called a burgess. In almost all parts of Europe, when used in a technical sense, the word means a person who holds some peculiar privilege in a town or municipal corporation. The burgesses of the European towns, indeed, were, and still nominally are, an interesting relic of ancient Roman institutions, existing in contest and rivalry with the institutions of feudality. The B., with a different name, is virtually the civis or citizen of the Roman municipality. It was a rank always of some moment, but especially valuable when the citizenship was of Rome, the metropolis. St. Paul, when he was to be scourged, raised the alarm of the chief captain by stating that he was a Roman. Such an event might often have happened in the middle ages, when a B., brought before the court of a feudal lord, claimed the privilege of pleading in his own burgal court, or the king's tribunal. The European monarchs found it their interest to support the burgesses, as a check on the influence of the feudal aristocracy; and thus was nourished the great system of city communities, which have exercised so important an influence on the fate of the world. See MUNICIPALITY.

In the law of England, a B. is a member of the corporation of a corporated town, or he may be described as a freeman duly admitted as a member of the corporate body. This privilege was, and, to some extent, still is, acquired by birth or servitude—that is, by being born of a freeman, or by apprenticeship for seven years within the borough to a freeman. It might also be obtained by gift or purchase; and the Municipal Corporation Act, the 5 and 6 Will. IV. c. 76—with the exception of abolishing the last-mentioned mode of admission by gift or purchase—expressly reserves the rights of such freemen and their families; and it also provides for making up and preservation of a list of burgesses so admitted, to be called the *Freeman's Roll* (q. v.). In that act, a burgess is defined to be a male person, who, on the last day of August in any year, shall have occupied any house, warehouse, counting-house, or shop within the borough, during that year and the whole of the two preceding years; and during such occupation shall also have been an inhabitant householder within the borough, or within seven miles thereof.

As the law now stands, every person of full age (and this includes females) who on the last day of July shall have occupied any house, warehouse, counting-house, shop or other building within the burough during the whole of the preceding twelve months, and also shall have resided within seven miles of the borough, shall, if duly enrolled, be a burgess and member of the body corporate of the mayor, alderman, and burgesses of such borough, provided he shall have paid his burough rates up to the preceding January, and shall not have been in receipt of parochial relief. The premises occupied need not be the same throughout the year if they are within the borough, 35 and 36 Vict. c. 55 See TOWN-COUNCIL. The vote is by ballot.

In the Scotch law, the old definition of B. is still maintained. This is very similar to the old English one above mentioned, with the addition of admission to the privilege *by election of the magistrates of the burgh*—the burgesses taking, on the occasion of their admission, a quaint form of oath, in which they confess the religion of the country, loyalty to the Queen, to the provost and bailies of the burgh and their officers, and declaring, *inter alia*, that they will 'make concord where discord is, to the utmost of their power.' By the Scotch Municipal Reform Act 3 and 4 Will. IV. c. 76, s. 14, it was enacted that councillors must be entered burgesses of the burgh before their induction, but now, any councillor is at once made a B. by minute of council. One of the peculiar privileges of a B. in Scotland, that of his heir having a right to *heirship movables*, was abolished by the statue 31 and 32 Vict. c. 101, s. 160, Titles to Land (Scotland) Act. An act assimilating the law of Scotland to that of England respecting the creation of burgesses was passed in 1876.

BURGESS LIST AND BURGESS ROLL are lists made under the provisions of the Municipal Corporation Act, 5 and 6 Will. IV. c. 76, amended by 20 and 21 Vict. c. 50, and 32 and 33 Vict. c. 55. The overseers of the poor of every parish wholly or in part within any borough, are directed to make out an alphabetical list, called the *burgess list*, of all persons who may be entitled or qualified to be enrolled on the burgess roll of that year, such list to be open for persual by any person, without the payment of any fee, at all reasonable hours, between the 1st (when the list must be signed and delivered) and 15th days of September in every year. This list is afterwards revised by the revising barrister, and the names of those persons allowed, on revision, to remain, are then transferred to the *Burgess Roll*, which is copied into a general alphabetical list in a book provided for that purpose by the town-clerk or clerk of the peace, and which book must be completed on or before the 22d of October in every year; every such book being the burgess roll of the burgesses entitled to vote for councillors, assessors, and auditors of the burough.

Copies of such burgess roll, so completed, shall be made in writing, or printed for delivery and sale to all persons applying for the same, on payment of a reasonable price for each copy. There are other regulations respecting these lists, and with respect to neglect and informality in making up the burgess roll. Every person of full age, who occupies a house, warehouse, counting-house, shop, or other building within the borough for twelve months, and resident in or within seven miles, shall, if duly enrolled, be a burgess, 32 and 33 Vict. c. 55.

In regard to Scotland, it has been already explained (see BURGESS), that persons entitled to the privileges of burgesses must be admitted according to the old form, and councillors, before induction, may, by a minute of council, be made burgesses, 23 and 24 Vict. c. 47. But the list, which corresponds to the English burgess roll, is the list of municipal *electors* qualified according to the provisions of the 3 and 4 Will. IV. cc. 76, 77; 31 and 32 Vict. c. 108; and 33 and 34 Vict. c. 92, relating to royal burghs in Scotland.

BURGH is a descriptive name of towns and cities in Scotland, corresponding to the English word *Borough* (q. v.). There were *burghs of barony*, *free burghs*, *burghs of regality*, and *royal burghs*. Since 1832, there have been what are called *parliamentary burghs*—that is, towns or burghs not being royal burghs, but sending or contributing to send representatives to parliament, under the Act 2 and 3 Will. IV. c. 65. By the General Police Act for Scotland, the word B. was declared to mean also any populous place, the boundaries of which are fixed by the act. Among parliamentary burghs are Paisley, Greenock, Leith, Kilmarnock, Falkirk, Hamilton, Peterhead, &c.; and by the 3 and 4 Will. IV. c. 77, 15 and 16 Vict. c. 32, 16 and 17 Vict. c. 26, 31 and 32 Vict. c. 108, 33 and 34 Vict. c. 92, 35 and 36 Vict. c. 33, a code is given for the election of their magistrates and councillors, and for the appointment of other officers; the election being with the persons qualified to vote for a member of parliament—to be concluded in Paisley, Greenock, Leith, and Kilmarnock, by open poll in one day, the polling-books to be summed up, and the result declared by the provost; in Falkirk, Hamilton, Musselburgh, Airdrie, Port-Glasgow, Peterhead, Portobello, Cromarty, and Oban, to be by signed lists: a third of the council to go out, and others to be elected every year; and the provost and magistrates to be chosen by the council from their own number.

The police of burghs, and everything regarding their draining, cleaning, lighting, &c., are regulated by the Police (Scotland) Act, 20 and 21 Vict. c. 72, and the Public Health (Scotland) Act, 30 and 31 Vict. c. 101.

BURGHS OF BARONY are corporations consisting of the inhabitants of determinate tracts of ground within the *Barony* (q. v.), and municipally governed by magistrates, whose election is either dependent on the baron or lord of the district, or vested in the inhabitants themselves. Sometimes their charter of incorporation gave them power to create subordinate corporations and crafts, as in royal burghs; but all exclusive privileges of trading in burghs are abolished by the 9 and 10 Vict. c. 17. In other respects, the general corporate law of the country applies to burghs of barony, as to which see below, BURGHS, ROYAL. They have power to administer their common good, to elect their burgh-officers, to make bye-laws, and their burgesses are entitled to challenge the sale or other disposition of the burgh's property.

BURGHS, FREE, were burghs of barony enfranchised by crown charter with rights of trade, both home and foreign, but subjected, at the same time, to the same class of public burdens and taxation which royal burghs had to bear as the price of their peculiar privileges. Since the gradual decay and ultimate suppression of commercial monopoly, this class of burghs has become extinct, or rather *all* burghs may now be said to be *free*.

BURGHS OF REGALITY were burghs of baronies, spiritual or temporal, enfranchised by crown charter, with regal or exclusive criminal jurisdiction within their own territories, and thence called *regalities* (q. v.). Some of these burghs of regality, especially those which were dependent on the greater bishops and abbots, were of high antiquity, and possessed jurisdiction and privilege of trade only distinguishable from those of royal burghs, by being more circumscribed in their limits. Since the abolition of hereditary jurisdictions, by the Act 20 Geo. II. c. 43, the distinction between burghs of regality and burghs of barony has ceased to be of any practical importance.

BURGHS, ROYAL. A royal burgh is a corporate body deriving its existence, constitution, and rights, from a royal charter—such charter being either actual and express, or presumed to have existed, and by the accident of war and time, to have perished. By a Scotch act passed in 1469, a constitution was given to royal burghs, by which the right of appointing their successors belonged to the old councils, the act also containing the singular provision, that when the new council was chosen, the members of it, *along with those of the old council*, should choose all the office-bearers of the burgh, each craft or trade corporation being represented at the election by one of themselves.

But this simple plan was not universally adopted, and the election gradually lost its former free and popular form—a close and exclusive proceeding being ultimately established in its place. This 'close system,' as it has been called, notwithstanding its repugnancy to the spirit of the times, and modern ideas of public administration, continued in force until the year 1833, when an act of parliament was passed, the 3 and 4 Will. IV. c. 76, amended by the 4 and 5 Will. IV. c. 87, and the 16 Vict. c. 26, by which it was abolished, and an entirely new constitution given to royal burghs, with the exception of nine of them, which, on account of the smallness of their population, were left unchanged till the passing of the Municipal Elections Amendment Act (Scotland) in 1868. These nine burghs were: *Dornoch*, *New Galloway*, *Culross*, *Lochmaben*, *Bervie*, *Wester Anstruther*, *Kilrenny*, *Kinghorn*, and *Kintore*. Of the other royal burghs, being those to which the reforming acts apply, the principal are—EDINBURGH, *Glasgow*, *Aberdeen*, *Dundee*, *Perth*, *Dunfermline*, *Dumfries*, and *Inverness*. The leading provisions of these acts are as follows: All persons within the burgh qualified under the Parliamentary Reform Act, 2 and 3 Will. IV. c. 65, in respect of property or occupancy of premises, and who have resided for six months next previous to the last day of June, within the royalty, or within seven miles of it, are entitled to vote in the election of councillors. In such burghs as do not now send members to parliament, property of the same value is required for the qualification, and claims for this privilege must be lodged with the town-clerk on or before the 21st of July, in a particular form. The councillors are chosen from among the electors residing, or personally carrying on business, within the royalty; and where there is a body of burgesses in the burgh, each councillor, before his induction, must be entered a burgess—a requisite clearly unnecessary for the purposes of the municipal administration contemplated by the act, and which, it is expected, will be done away. The number of councillors in each burgh is such as, by the *sett* or constitution existing at the passing of the act, formed the common council, or where this was variable, the smallest number making a full council.

The electors of Edinburgh, Glasgow, Aberdeen, Dundee, Perth, Dunfermline, Dumfries, and Inverness, are divided into wards or districts. At the election immediately succeding the passing of the act, each ward elected six councillors; but as every year the third part of the council goes out of office, in the order prescribed by the act, two councillors are now annually chosen by each ward, there being no bar, however, to the re-election of an outgoing councillor. The electors in other burghs choose the whole council exactly as these wards do their proportion of it, and consequently elect each year a third part in place of that which has retired. Upon the third lawful day after the election succeeding the passing of the act, the councillors meet and choose, by a plurality of voices, a provost, bailies, treasurer, and other office-bearers, as existing in the council by the sett or usage of the burgh; and vacancies occuring among such office-bearers, in consequence of the an-

nual retirement of the third part of the council, are directed to be supplied from the councillors in like manner, as soon as the election of the new third has taken place, the first attending magistrate having a casting vote in cases of equality. Vacancies taking place during the year by death or resignation are supplied, *ad interim*, by the remaining members of the council, and the persons so elected by the councillors retire at the succeeding election. The rights of the guildry, trades, &c., to elect their own dean of guild, etc., are still preserved; but they are now no longer recognized as official or constituent members of the council, their functions being performed by a member of the council, elected by a majority of the councillors. In Aberdeen, Dundee, and Perth, however, the dean of guild, and in Edinburgh and Glasgow, the convener of trades and the dean of guild are, *ex officio*, members of council; and the electors in all the above-named burghs choose such a number of councillors as, together with these officers, makes up the proper number. No magistrate or councillor can be town-clerk. The magistrates and council possess the same powers of administration and jurisdiction as were enjoyed by the magistrates and town-council before the passing of the act; and none of them is responsible for the debts of the burgh, or the acts of his predecessors, otherwise than as a citizen or burgess. The existing council in all burghs royal must every year make up, on or before the 15th of October, a state of their affairs, to be kept in the town-clerk's or treasurer's office.

The police of burghs and other populous places, and the paving, draining, cleansing, lighting, and improving the same, are regulated by the 25 and 26 Vict. c. 101, which repeals several previous acts. In this act 'burgh' is defined to mean all burghs and populous places whose boundaries have been fixed; and it is provided that the sheriff may fix the boundaries and so constitute a burgh in this sense, for purposes of improvement and police, at the instance of seven or more householders.

BURGHERS, a name popularly given to a religious denomination in Scotland. See UNITED PRESBYTERIAN CHURCH.

BURGH ACRES are acres or small patches of land lying in the neighborhood of *Royal Burghs* (q. v.), usually feued or leased out to burgesses or persons resident within the burgh. A Scotch act of parliament, passed in 1695, relating to the division or partition of lands lying runrig, excepts burgh acres, or, as the act calls them, 'burrow and incorporat acres,' from its provisions; but this is to be understood only of royal burghs, and not of burghs of barony or others.

BURGHS, CONVENTION OF. See CONVENTION OF ROYAL BURGHS.

BURGKMAIR, HANS, a noted old German painter and wood-engraver, was born at Augsburg, 1473. He was the father-in-law of the elder Holbein, and the friend of Albert Dürer, whose influence is manifest in B.'s works. Several excellent paintings by B. are preserved in the galleries of Munich, Berlin, Augsburg, and Vienna. But he is best known as a wood-engraver; his cuts amounting in all to nearly 700. Among the most celebrated of these is his 'Triumph of the Emperor Maximilian,' in 135 cuts, with a description by the emperor himself. Another fine series of 237 cuts, called 'The Wise King,' represents the deeds of Maximilian. B. is supposed to have died about the year 1559.

BU'RGLARY (through the old Fr. from Lat. *burgi latro*, a robber of a burg or enclosure), in the criminal law of England, is defined to be a breaking and entering the mansion-house of another in the night, with intent to commit some felony within the same, whether such intent be executed or not. It is peculiar to this crime, that it can only be committed in the *night-time*, which, by the 24 and 25 Vict. c. 96, s. 51, is considered as commencing at nine in the evening, and concluding at six in the morning of the next day. The next requisite of the crime, according to the definition we have given, relates to the *place* of its commission. It must be in a *mansion*-house, for such is the technical expression; but this is construed to mean any private dwelling, or any building temporarily or permanently used for that purpose. It cannot be committed in a distant barn, warehouse, or the like, unless there be a communication with the dwelling-house, nor in a house where no one resides.

But it is B. to break into a house which is used as an occasional residence, and which the owner is in the habit of leaving for a short period, with the intention of returning, even although no one be in the house at the time of the offence. A chamber in a college, or an inn of court, is also within the meaning of a mansion-house; so likewise is a room or lodging in any private house, if the owner and the lodger enter by different outer doors; but if they both enter by one outer door, then the house is described as that of the owner. For the same reason, a building belonging to a corporation, and separately inhabited by the officers of the body corporate, is the mansion-house of the corporation, and not of the officers. Again, a shop which is part of another man's house, and hired merely for the purpose of work or trade, is not a dwelling-house, but B. may also by express enactment be committed in it, though the punishment is not quite so severe. This offence cannot be committed in a tent or booth erected in a market or fair, though the owner may lodge therein, for his doing so makes it no more B. to break open such an erection, than it would be to uncover a tilted wagon under the same circumstances. But it may be committed by breaking open a church, which, according o Sir Edward Coke, is *domus mansionalis Dei*, that is, the mansion-house of God, and is now expressly protected.

As to the *manner* of committing B., it is laid down by Blackstone that there must be both a breaking and an entry to complete it. There must, in general, be an actual breaking, a substantial and forcible irruption—as, at least, by breaking, or taking out the glass of, or otherwise opening a window; picking a lock or opening it with a key; nay, by lifting up the latch of a door, or unloosening any other fastening, But if a person leaves his doors or windows open, it is his own folly and negligence, and if a man enters therein, it is no B.; yet if he afterwards unlocks an inner or chamber door, it is so. To come down a chimney is held a burglarious entry, for that is as much closed as the nature of things will admit; so also to knock at a door, and upon its being opened, to rush in with a felonious intent; or, under pretence of taking lodgings, to fall upon the landlord, and rob him If the servant conspires with a robber, and lets him into the house by night, this is B. in both.

The *intent* must also appear, otherwise the offence will amount only to a trespass; and it must be an intent to commit felony, which may be inferred from the conduct of the offender while in the house.

The punishment for this crime is now regulated by the act 24 and 25 Vict. c. 96, called the Larceny Consolidation Act. The provisions are to the effect, that any one convicted of B. shall be liable to penal servitude for life, or any term not less than five years, or to be imprisoned for any term not more than two years; and in the case of imprisonment, hard labor and solitary confinement may be superadded. It is further enacted, that whosoever shall burglariously break and enter into any dwelling-house, and shall assault with intent to murder any person being therein; or shall stab, cut, wound, beat, or strike any such person, shall be guilty of felony, and suffer penal servitude for five to seven years, or two years' imprisonment and hard labor. And by the same statute, section 58, it is enacted that any person found *by night*, armed with any dangerous or offensive weapon or instrument, or with housebreaking implements, or with face blackened or disguised, with intent to enter any buildings, and to commit felony therein; or if he be found by night in any building with intent to commit a felony therein—is liable to penal servitude for five years, or imprisonment not exceeding two years; and in case of a second conviction, is liable either to such imprisonment, or to penal servitude for a period not less than five years, and not exceeding ten years.

Blackstone observes, that this offence was anciently called Hamesecken, as, he adds, it is in Scotland to this day. But the Scotch law on this subject has some points of difference—hamesecken, or hamesucken, as it is spelled in the Scotch books, not being quite identical with B.: thus, the former is an offence exclusively against the *person*, and it may be committed in the daytime as well as at night; and there are other points of dissimilarity. The Scotch law relating to *housebreaking* and *stouthrief* affords analogies. See HAIMSUCKEN, HOUSEBREAKING, STOUTHRIEF, LARCENY, ROBBERY, ASSAULT.

BURGLEN, a village of Switzerland, in the canton of Uri, about two miles from Altorf. It is celebrated as the birthplace of William Tell. The supposed site of the patriot's house is now occupied by a chapel, upon the walls of which are represented certain well-known scenes from his history. Pop. about 1500.

BU'RGOMASTER. See GULL.

BU'RGOS, a city of Spain, capital of the new province of the same name, and of the former kingdom of Old Castile, is situated in a fertile valley at the foot of the Sierra d'Oca, and on the right bank of the river Arlanzon, in lat. 42° 20′ N., and long. 3° 45′ W. Pop. (1879) 29,683. B. is very ancient, having been founded in 844. Many of the gloomy old houses of its early history still remain. In the castle of B., Edward I. of England was married to Eleanor of Castile. The cathedral of B., founded in 1221, is one of the noblest specimens of Gothic architecture in Spain. Its various chapels are rich in fine sculpture and tombs. It was the birthplace of the Cid (q. v.). B. has manufactures of woollens, linens, and hats, but it depends chiefly on the traffic which its position on the great road from France and the northern Spanish provinces to Madrid secures it. B. has several charitable and educational institutions. It formerly had a much larger population—as many as 50,000—but on the removal of the court to Madrid in the 16th c., B. began to decline in population and importance. It was further greatly injured in November 1808 by the French, who sacked it. In 1812, the castle was four times unsuccessfully besieged by Wellington, who, however, took it in the following

year, when the French blew it up, as well as the fortifications.—The province of B. has an area of 5650 square miles, and a population, in 1877, of 332,461. The surface is elevated, the soil fertile, yielding grain and fruits. The hills afford rich pasturage; and the minerals gold, silver, iron, lead, and copper are found.

BURGOYNE, JOHN, a British general and dramatist, natural son of Lord Bingley, early entered the army, and in August 1759 was appointed lieutenant-colonel commandant of the 16th Light Dragoons. In 1761 he served at Belle Isle, and in 1762 commanded a force sent into Portugal for the defence of that kingdom against the Spaniards, when he surprised and captured Alcantara. In 1776 he served in North America, and in the summer of 1777 he was appointed to the command of a large force ordered to penetrate from Canada into the rebellious districts. The early part of the expedition was marked by his capture of Ticonderoga; but neglecting to preserve his communications with Canada, he encountered the greatest difficulties, and was at last obliged to surrender with his army to General Gates, at Saratoga.

Soon after his return to England, having been denied an audience of the king, and refused a court-martial, he went over to the opposition party, and voluntarily resigned all his appointments. On a change of ministry, at the close of the American war, he was appointed commander-in-chief in Ireland. This office he resigned two years after, and subsequently seems to have devoted his time to light literature. He was the author of some pamphlets in defence of his conduct, and of *The Maid of the Oaks* (1780), *The Heiress* (1786), and other stock dramatic pieces. B. was one of the managers for conducting the impeachment of Warren Hastings. He died in 1792. See *Episodes from the Life and Letters of B.*, by Barrington and Fonblanque (1876).

BURGOYNE, SIR JOHN FOX, Bart., an eminent engineer-officer, born in 1782, entered the Royal Engineers in 1798. From 1800 to 1807, he served in the Mediterranean; was with Moore at Corunna in 1809; and served under Sir Arthur Wellesley in the Peninsula till the conclusion of the war in 1814, being present at all its sieges. In 1814, he was commanding engineer of the expedition to New Orleans, and in 1826 of that sent to Portugal. In 1851 he obtained the rank of lieutenant-general, and in 1854 was made D.C.L. of Oxford University. In the Crimean war he was chief of the engineering department of the British army till recalled in 1855. For his services at Sebastopol, he received from the Sultan the order of the Medjidie, and from the French emperor that of grand officer of the Legion of Honor. He was made general in 1855, and created a baronet in 1856. He died 7th October 1871.

BU'RGUNDY, the name of a once independent kingdom of wide extent, but most frequently used of an old French province (Fr. *Bourgogne*), now divided between the departments of Côte-d'Or, Saone-et-Loire, and Yonne. The ancient Burgundians (*Burgundi* or *Burgundiones*), originally a German tribe, were at first settled on the banks of the Oder and the Vistula, and afterwards extended themselves to the Rhine and the Neckar, and, in 407 penetrated into Roman Gaul. Their conversion to Christianity took place in the course of eight days! They adopted a brief Arian confession of faith, and were baptized. From 407 to 534, the kingdom of B. was several times divided; and in 451, Gundicar, king of B., with 10,000 men, confronted Attila, but was defeated and slain.

In 534, B. passed under the rule of the Franks; but the weak government of the later Carlovingian kings allowed a part of it once more to assert a separate existence as a dependency of the empire under Boso of Vienne in 832. Boso's realm, known as Cisjuran B., or the kingdom of Arelate (Arles) lay mainly in the basin of the Rhone. A second Burgundian state arose about the same time in the country between the Saone and the Reuss, and was known as Transjuran or Upper Burgundy. These states united in 930, were for a time powerful and famous; but in 1038 on the extinction of the royal dynasty, B. became part of the German empire. It was afterwards broken into several fragments, which were gradually absorbed by France.

A similar fate befell the third Burgundian state, the dukedom of B. or lower B., which was formed by a brother of Boso. Yet the Dukes of B. played a large part in the history of mediæval Europe, and were long the dangerous rivals of the French kings. The nucleus of the dukedom was in Lower B., the region which afterwards became the French province of B., to the north and west of the other Burgundian realms; but the second line of dukes, beginning in 1363 with Philip the Hardy, son of the French king John, held under their sway not only Franche Comté and adjoining portions of France proper, but great part of the Low Countries. Charles the Bold (q. v.) was one of the most powerful sovereigns of Europe. Louis XI. of France succeeded in incorporating the duchy with the kingdom of France.

BURGUNDY, LOUIS, DUKE OF, the grandson of Louis XIV. of France, and Dauphin of France after the death of his father, was born at Versailles in 1682. Even in childhood he was ungovernable, and became excessively violent and haughty, and abandoned to all gross and sensual passions. Although educated under the care of the Abbé Fénélon, he used, when 30 years of age, to divert himself with drowning flies in oil, and blowing up living frogs with gunpowder. He had the misfortune to be deformed; his deportment and manners were undignified, and his mind imbued with bigotry. When only about 15 years of age, he was married to the Princess Adelaide of Savoy, and spent his time wholly in amusements in the company of his spouse and of the ladies of the court. Nevertheless, in 1701, he was nominally appointed generalissimo of the army, really under the command of the Duke de Vendôme, and is said to have shown some spirit in a cavalry-fight at Nimeguen; but he quarrelled with Vendôme, chiefly because he had once been compelled to establish his head-quarters in a nunnery. He lost the respect of the army, and was exposed to many humiliations, partly proceeding from intrigues set on foot against him out of envy by his father.

He returned to the court more eccentric, gloomy, and unsociable than before. But when he became, on his father's death, the second person in the kingdom, all his defects vanished from the sight of the courtiers, and flattery bestowed on him the title of the Great Dauphin. He died suddenly in the year 1712. A few days previously, his wife and her son, the Duke of Bretagne, had died, and the same hearse carried father, mother, and child to St. Denis. The Duke of Orleans, subsequently regent, and his daughter, the Duchess of Berri, were accused, but without reason, of having caused them to be poisoned.

BURGUNDY PITCH, a resinous substance prepared from common frankincense (q. v.), the spontaneous exudation of the Norway spruce-fir (*Abies excelsa*; see FIR) by melting it in hot water; by which means it is freed from a considerable part of the volatile oil which it contains. By straining it through a coarse cloth, impurities are also removed. B. P. is of a yellowish white color, hard and brittle when cold, but softening by the heat of the hand, and readily adhering to the skin. It has a not unpleasant resinous odor, and a slightly bitter taste. It is used in medicine as an external application only, and generally acts as a mild irritant. A very common application of it is as a plaster in complaints of the chest, and in rheumatic complaints. It enters also as an ingredient with resin, oils, &c., into a compound plaster of similar use. The B. P. of commerce is now principally brought from Hamburg; but the greater part of what is sold under the name is really manufactured of common rosin and palm oil, or from American turpentine. It has a fuller yellow color than the genuine B. P., and a less agreeable odor.

BURGUNDY WINES are chiefly the produce of vineyards cultivated on the hilly lands forming the Côte d'Or, between Dijon and Chalons. These hills average about from 800 to 1000 feet in height; the vineyards ascend up the slopes in terraces, and spread along the table-land on the summit. 'In richness of flavor and in perfume, and all the more delicate qualities of the juice of the grape, the wines grown here unquestionably rank as the finest in the world.' The most celebrated of the *red* wines of Burgundy are the Closvougeot (near Beaune), Nuits, Chambertin (the favorite wine of Louis XIV. as well as of Napoleon), the Romanée-Conti, Richebourg, Volmay, and Pomard. Of other red wines of Burgundy not grown on the Côte d'Or, those of Pitoy, Perrière, Preaux, and Auxerre, are held in most repute. The *white* wines of Burgundy are also the finest in France, but being produced in less quantity, they have less celebrity. The quantity of wine annually produced in Burgundy averages 3,500,000 hectolitres (77,000,000 gallons), of which only about a fifth is consumed in the district.

BURIAL, a word of Teut. origin (Ang.-Sax. *birgan*, to conceal), is applied to the prevalent method among civilized nations of disposing of the dead, by hiding them in the earth. As there is almost nothing else so deeply interesting to the living as the disposal of those whom they have loved and lost, so there is perhaps nothing else so distinctive of the condition and character of a people as the method in which they treat their dead. Hence, funeral customs associate themselves with a wide variety of sentiments, from gentle and rational sorrow, up to deification of the departed, accompanied sometimes with cruelty and ferocity towards the living. People of a low and barbarous type carelessly permit the remains of the dead to lie in the way of the living, and there are a few instances in which the object of artificial arrangements has been to preserve a decorated portion of the body—as, for instance, a gilded skull—among survivors. The general tendency of mankind, however, has always been to bury the dead out of sight of the living; and various as the methods of accomplishing this end have been, they have resolved themselves into three great classifications: 1. The simple closing up of the body in earth or stone; 2. The burning of the body, and the entombing of the cinders; and, 8. The embalming of the body. The first of these seems to be the earliest form of which we have any record, and it is the form most amply sanctioned by

the existing practice of the civilized world. It is the method referred to in the earliest Scriptures; and all are familiar with the touching scene in which Abraham buries Sarah in the cave in the land of Canaan which belonged to Ephron, but was, after a solemn and courteous negotiation, secured to Abraham for a possession to bury his dead in (Gen. c. 23). The horrible fate of being left unburied, either from scorn or neglect, is powerfully told in the prophecy of Jeremiah against Jehoiakim: 'He shall be buried with the burial of an ass, drawn and cast forth beyond the gates of Jerusalem.' There is frequent allusion in the later Scriptures, and especially in the New Testament, to the embalming of the body in antiseptics and fragrant substances; and the burning of the bodies of Saul and his sons is accounted for by commentators on the supposition that they were too far decayed to be embalmed. The Israelites may have learned the practice of embalming from the Egyptians, among whom it was an art so greatly cultivated and extensively practised, that Egyptian corpses, as inoffensive as any article of wood or stone, are scattered over Europe in museums, and are even to be found as curiosities in private houses. The soil and climate of Upper Egypt seem to have afforted facilities for embalming unmatched in any other part of the world; and in other places the vestiges of the practice are comparatively rare, though it is usual even yet to embalm royal corpses, and in some places to preserve a series of mummies, as in the vault of the monastery of Kreuzberg, at Bonn, where the monks have been successively preserved in their costume for centuries.

The practice of incremation, or of the burning of the body, and the entombing of the ashes, deserves more inquiry than it has yet obtained. In Greece, in Etruria—both before and after it came under the Romans—and in the north of Europe, the simple burial of the body, and its prior reduction to ashes, were both practised, and sometimes contemporaneously. The tombs of Etruria are rich in art, much of it going to the adornment of the urns of baked clay in which the ashes of the dead are kept. Vessels of *terra-cotta*, or cooked earth, containing human remains, have been found, often so large that they appeared to have served as coffins for containing the whole body. Vessels of this kind were found in the valley of the Scamander by some British officers while spending their leisure time after the siege of Sebastopol, upon the ground supposed to have been occupied by the besiegers of Troy. Smaller cinerary urns have been found over so extensive a portion of the world, that it is difficult to define the limits to which they belong. The Danish antiquaries say, that in their stone period, when the use of metals was unknown, the dead were all buried unburned in stone chambers, and that the burning of the bodies and the preservation of the ashes in urns came in with the age of bronze. These antiquaries associate with the older system those amorphous mounds of earth or stone called barrows or tumuli, which are to be found all over the north of Europe. Mr. Bremner, in traveling among the steppes of the Ukraine, saw multitudes of these small mounds, which reminded him at once of what he had seen on the plain of Troy, at Upsala in Sweden, in Scotland, and in Ireland. The Irish tumulus of New Grange is perhaps the most remarkable of all, forming a connecting link between the simple barrow on the moor and the pyramids of Egypt, which are the perfection of the same kind of structure applied to the same purpose—the burial of the distinguished dead. These structures open up a large field of curious inquiry. The simple theory, that they were raised over the dead, has lately been disturbed by the discovery that many of them are not artificial, but reiics of sheets of alluvial matter, the mass of which has been carried away; and even in these, human remains have been found, the natural mounds having been used as monuments. Even when human remains are connected with barrows, cromlechs, or the large shapeless pillars commonly called Druidical, it is often questionable whether the monument was made to receive such remains. It is certainly ascertained to have been a practice in ancient times to bury bodies in tombs which were themselves ancient when they received their inmates.

Some of the grandest buildings in the world have been tombs; such are the pyramids, the castle of St. Angelo, the tomb of Cæcilia Metella, and many temples scattered over Hindustan and other eastern countries. Thus, the respect paid by the living to the dead has preserved for the world many magnificent fruits of architectural genius and labor. A notion that the dead may require the things they have been fond of in life, has also preserved to the existing world many relics of the customs of past ages. The tombs of Egypt have supplied an immense quantity of them, which have taught the present age more of the manners of ancient nations than all the learned books that have been written. It is an awful remembrance, at the same time, that inanimate things were not all that the dead were expected to take with them. Herodotus tells us of favorite horses and slaves sacrificed at the holocaust of the dead chief. The same thing has been done in our own day in Ashantee. In many countries, the wives had the doom, or privilege, as it was thought, of departing with their husbands; and down to the present generation the practice has lived in full vigor in the Hindu sutti. Among the Jews, the Greeks, the Romans, and many ancient nations, the dead were buried beyond the towns. The 'stop, traveler!' was a usual memorandum on Roman tombs. In Christian countries, if the remains of the saint to whom a church was dedicated could be obtained—or anything passing for the remains—they were buried near the altar in the choir. It became a prevalent desire to be buried near these saints, and the bodies of men eminent for their piety, or high in rank, came thus to be buried in churches. The extension of the practice was the origin of churchyards. These, in crowded towns, became offensive and unhealthy. It can scarcely be said that this practice, so detrimental to the public health, as the burial within churches, was checked in this country until the whole system of intramural interment, as it was called, was attacked, about the year 1844, by Mr. Chadwick and other sanitary reformers. Measures were afterwards carried for shutting graveyards in crowded cities, and placing interments in open cemeteries under sanitary control. The first great measure was passed in 1850, when the Board of Health was made a Burial Board for the Metropolis, and power was given to the Privy Council to close the city graveyards. The act was modified two years afterwards, by transferring the duties of managing cemeteries to local boards appointed by the vestries. It was in London that the danger was most urgent and the remedy immediate. It was extended to the English provinces in 1853, and to Scotland in 1855. See CREMATION.

In England, burial in some part of the parish churchyard is a common law right, which may be enforced by mandamus—that is, every person may be buried in the parish where he dies. But the body of a parishioner cannot be interred in an iron coffin or vault, or even in any particular part of a churchyard, as for instance, the family vault, without an additional fee.

The fact that the only religious service which can at present be conducted at the grave is that of the Church of England, has led of late years to the repeated proposal in parliament of measures to permit dissenters to have their own services performed in the churchyard—as yet without result.

By the canons of the Church of England, clergymen cannot refuse or delay to bury any corpse that is brought to the church or churchyard; on the other hand, a conspiracy to prevent a B. is an indictable offence, and so is the wilfully obstructing a clergyman in reading the B.-service in a parish church. It is a popular error that a creditor can arrest or detain the body of a deceased debtor; and the doing such an act is indictable as a misdemeanor. It is also an error that permitting a funeral procession to pass over private grounds creates a public right of way. By the 3 Geo. IV. c. 126, s. 32, the inhabitants of any parish, township, or place, when going to or returning from attending funerals of persons in England who have died and are to be buried there, are exempted from any toll within these limits. And by the 4 Geo. IV. c. 49, s. 36, the same regulation is extended to Scotland; the only difference being, that in the latter case the limitation of the district is described by the word *parish* alone. The 6 and 7 Will. IV., c. 86, regulates the registry of deaths. The 4 Geo. IV. c. 52 abolished the barbarous mode of burying persons found *felo de se*, and directs that their B. shall take place without any marks of ignominy, privately in the parish churchyard, between the hours of nine and twelve at night, under the direction of the coroner. The B. of dead bodies cast on shore is enforced by 48 Geo. III., c. 75. See Wharton's *Law Lexicon*.

In Scotland, the right of B. in a churchyard is an incident of property in the parish; but it is a mere right of B., and there is not necessarily any corresponding ownership in the *solum* or ground of the churchyard. In Edinburgh, however, the right to special B.-places in churchyards is recognized.—For B. in cemeteries in England and Scotland, see CEMETERY.

BURIAL ACTS. These are the 15 and 16 Vict. c. 85, for London; the 16 and 17 Vict. c. 134, the 17 and 18 Vict. c. 87, and the 18 and 19 Vict. cc. 79 and 128, for places in England beyond the limits of the metropolis—all as amended by the 20 and 21 Vict. c. 81, and the 22 Vict. c. 1, 23 and 24 Vict. c. 64, 25 and 26 Vict. c. 100, 34 and 35 Vict. c. 33. These acts were rendered necessary when it was resolved on sanitary grounds to put a stop to burials in populous places, which could only be effectually done by giving power to parishes to acquire other burial-grounds in rural places. These statutes have long been proverbial for their confusion (e. g. 20 and 21 Vict., which proposes in the preamble to amend 18 and 19 Vict. c. 78, really amends c. 79), and relate to the appointment of burial-boards for parishes—the authorizing new burial places, proper sanitary regulations, the control by the government and by order in council, and many other details too numerous to specify here. Our readers must be content with our referring them to the acts themselves, or to their lawyers.

The corresponding acts for Scotland are the 18 and 19 Vict. c. 68, amended by the 20 and 21 Vict. c. 42, and 29 and 30 Vict. c. 50.

BU'RIAL SOCI'ETIES are friendly societies constituted in the usual manner, and with the express object of supplying a fund for paying the funeral expenses of the members on their death. See FRIENDLY SOCIETIES. It became customary to enter the names not only of adults, but of children, in such societies. The proceedings of the criminal courts have shown that, in some instances, children on whose lives such an insurance was effected have been killed or allowed to die of neglect, and the alarm created by such instances, was enhanced by the discovery that children were frequently insured in more than one society. To obviate this calamitous use of a beneficial arrangement, it was provided that no insurance of a child under six years of age in a burial society should be legal. It was attested to the Select Committee of the Commons on Friendly Societies in 1849, that the practice of such insurances continued in uncertified societies; and at the same time it was stated on behalf of the friendly societies: 'In our long experience with these societies in Liverpool, in which are nearly 100,000 members, approximating to nearly one-third of the population of this great town, we have not had one instance of death by violence for the sake of the burial money.' In the Friendly Societies Act of 1850, and in subsequent enactments, stringent arrangements for certifying the cause of death have been adopted as a sufficient protection from this crime.

BURIDAN, JEAN, a scholastic metaphysician of the nominalist party, was born at Bethune, in Artois, in the 14th c., and studied at Paris under Occam, where he also became a teacher of philosophy. The events of his life, as well as the manner of his death, are very obscure. One account states, that he was thrown into the Seine, by command of Marguerite de Bourgogne, daughter-in-law of Philippe le Bel, whose infidelities he had rebuked. Another, later, but less mythical-looking account, states that B. was driven from France as a disciple of Occam, and fled to Austria, where he founded a school. His elucidations of Aristotle are among his most useful writings. In his *Logic*, his great endeavor was to facilitate the discovery of middle terms for all kinds of syllogisms. The celebrated sophism known to the schoolmen under the name of BURIDAN'S ASS, has been discussed at superfluous length, and with needless ingenuity, by Bayle. It is not at all likely that it was ever adduced by B., but more probably by his adversaries, who wished to ridicule his metaphysical doctrine of *Determinism*—viz., that in every mental and bodily action the will must be determined by something out of itself. The sophism referred to is, that if a hungry ass be placed exactly between two bundles of hay of equal size and attractiveness, it must starve, as there is nothing to determine the will of the animal towards either bundle. His chief works are—*Summula Dialectica* (Paris, 1487), *Compendium Logicæ* (Venice, 1489; Oxford, 1637), *In Aristotelis Metaphysica* (Paris, 1518).

BU'RIN, or GRAVER, the principal instrument used in copper-engraving, is made of tempered steel, and is of prismatic form, the graving end being ground off obliquely to a short point. The style of a master is frequently described by the expressions *soft* B., *graphic* B., *brilliant* B., or whatever other character may belong to it.

BURITI PALM (*Mauritia vinifera*, see MAURITIA), a beautiful palm, which grows in great abundance in the swamps of some parts of the north of Brazil. It is one of the loftiest of palms. Its leaves are fan-shaped, and form a large globular head at the top of the stem. It produces a great number of nuts about the size of a small hen's egg, covered with rhomboidal scales arranged in a spiral manner. Between these scales and the albuminous substance of the nut, there is an oily reddish pulp, which is boiled with sugar, and made into a sweet-meat. An emulsion is also prepared from it, which, when sweetened with sugar, is a very palatable beverage, but if much used, is said to tinge the skin of a yellow color. The juice of the stem also makes a very agreeable drink; but to obtain it, the tree must be cut down, when several holes about 6 inches square, 3 inches deep, and 6 feet apart, are cut in the trunk with a small axe; and these in a short time are filled with a reddish-colored liquid, having much the flavor of sweet wine.

BURKE, EDMUND, a philosopher and politician, distinguished over all the men of his times for eloquence and political foresight, was born in 1730, in Dublin, where his father had an extensive practice as an attorney. As a school-boy, he displayed those traits of character and the germs of those powers which ultimately gave him greatness. In 1744, B. entered the university of Dublin, of which he became a scholar. His undergraduate course was not unmarked by the ordinary distinctions of successful application; but it would appear that he mainly devoted himself to his favorite studies of poetry, oratory, history, and metaphysics. In February 1748, he graduated B.A., and in 1751 took his degree as Master of Arts. In the interval (1750), being destined for the English bar, he proceeded to London, to keep his terms at the Middle Temple. To legal studies, however, he never took kindly, and ultimately he abandoned the idea of becoming a barrister. During the years 1750—1756 he would appear to have occupied himself in traveling through England, enjoying the society of literary men, in study, and finally in writing for various periodicals.

B., when yet at the university, had achieved a local reputation for literary talent and eloquence. Among the compositions of his undergraduate life, the most noticeable perhaps is his translation of the conclusion of the second Georgic of Virgil, which shows poetic talent of no mean order. His first important publication, however, was the celebrated *Vindication of Natural Society*, written in imitation and ridicule of the style and reasoning of Lord Bolingbroke, in which, with well-concealed irony, he confutes his lordship's views of society by a *reductio ad absurdum*. This work, published anonymously in 1756, at the age of 26, attracted considerable attention. Soon after, in the same year, appeared his well-known essay, *A Philosophical Inquiry into the Origin of our Ideas of the Sublime and Beautiful*—a work containing a comprehensive induction of the various *sources* of the ideas referred to, but which must be pronounced a failure, so far as it pretends to analyze into their primary elements the emotions of the sublime and beautiful.

The essay on the *Sublime and Beautiful* attained a rapid popularity, and its author soon found himself courted by all the eminent men of his time. Garrick was already one of his friends; among them he soon could count Reynolds, Soame Jenyns, Lord Lyttelton, Warburton, Hume, and Dr. Johnson. Notwithstanding this popularity, however, his progress continued slow; for three years yet, he had to occupy himself with periodical writing, devoting his leisure principally to political subjects. What is considered a joint work of B. and his cousin, William Bourke, appeared in 1757—viz., *An Account of the European Settlements in America*—and shows how carefully at this date he had studied the condition of the colonies. In 1761, Mr. W. G. Hamilton ('Singlespeech Hamilton'), then Secretary for Ireland, having appointed him his private secretary, he returned to Dublin, where, during two years' service, he demonstrated his aptitude for political business, receiving in 1763, in reward of his services, a pension on the Irish establishment of £300, which, however, he did not long enjoy.

Returning to London, B., in 1764, along with Reynolds, founded the Literary Club, the history of which is associated with almost every considerable name in the literature of the period. But literary society did not call off his attention from the chances of a political career. He became private secretary to the Marquis of Rockingham, on his becoming premier, and at the same time entered parliament as member for Wendover. Here his eloquence at once made him the reputation of being 'the first man in the Commons.' The Rockingham administration, however, lived only a few months, and with it terminated this his second political employment. To trace his subsequent career in parliament is more than the limits of this article will allow; it must suffice to state briefly that his parliamentary life extended from 1766 to 1794 without intermission; that he was successively member for Wendover, Bristol, and Malton; twice held the post of Paymaster of the Forces, once under Rockingham, and again under Lord North, with the standing of a privy councillor; that after a career in parliament remarkable for the laboriousness, earnestness, and brilliancy with which every duty was discharged, and extending over nearly 30 years, he retired at last, receiving the thanks of the Commons for his numerous public services, and rewarded by government, on the express request of his sovereign, with pensions amounting in all to £3700. It would be wrong, however, to omit that as Paymaster of the Forces he, with a scrupulous regard to public economy, sacrificed all the perquisites of his office, exhibiting a severe integrity unexampled among public men; and that in his relation with the constituency of Bristol, which was alienated from him by his advocacy of the claims of the Roman Catholics and of the opening up of the trade of Ireland, he was the first to maintain the doctrine of the independence of parliamentary representatives—that they are not machines to vote for measures approved by their constituencies simply for that reason, but men and thinkers chosen by them to calmly consider and legislate for the good of the commonwealth. It must also be mentioned, that during his career he rendered more important service to the cause of humanity than any man of his time: he prepared the way for the abolition of the slave-trade, a measure which was destined to ripen to success in the hands of Wilberforce; he advocated the cause of humanity in India against the voracious greed of stockholders, who regarded millions simply as materials for plunder, and largely contributed to improve the government of that country. Towards America he advocated a policy of justice and conciliation, which, had it been adopted, would have averted the horrors of the War of Independence, and retained the colonies in amity with the mother-country. And to the advocacy of every cause which he espoused, he brought a capacity for patient research that was unlimited, and an eloquence that has never been transcended.

Before proceeding to remark on the character and powers of B., a very brief notice must be taken of his leading literary efforts connected with his political labors. Little more than a catalogue

can here be given of them. Omitting a variety of letters—several on the condition of Ireland—notice must be taken of his *Observations on a Pamphlet on the Present State of the Nation*, being his first political pamphlet published in 1769, in answer to one variously ascribed to Fox or Grenville. In 1770, he published a pamphlet, *On the Cause of the Present Discontents*. On the 13th February 1788, he commenced his celebrated speech opening the trial of Warren Hastings (q. v.), the most remarkable trial, perhaps, in the history of the world. This speech lasted over four days, and has been characterized as 'a tempest of invective and eloquence.' No idea can be conveyed of the effect which it produced. The trial lasted seven years, and closed with another great and splendid oration from B., lasting over nine days. Hastings, it is well-known, was acquitted. While this trial was advancing, B. found time to take part in all the current business. In 1790 appeared his *Reflections on the Revolution of France*, which sold in tens of thousands, and it is said to have produced an effect never produced before or since by any political essay. Hereafter, the world showered honors on B., of which space forbids even the enumeration. Having, in 1791, withdrawn from the Whigs on the French question, he offered for the consideration of government, *Thoughts on French Affairs*, which, however, was not published till after his death. *Heads for Consideration on the Present State of Affairs*, and *Reply to a Noble Lord*, next followed, the latter being relative to himself personally. His last work, *Thoughts on a Regicide Peace*, showed that he retained to the end of his life his whole powers unimpaired.

Few men have been the subjects of higher panegyric than B., and on the whole, few have better deserved praise. He was noble minded, pure in his life, and a purist in politics. Intellectually, he was most richly endowed ; with much imagination, rare powers of observation, and indefatigable industry, there was no subject which he could not master, and none which, having mastered, he could not expound with unparalleled richness of language. But with these virtues and powers were conjoined defects, which, without bating their greatness, largely neutralized their influence

He was, it may be said, too literary to be a philosopher, and too philosophic to be a politician. His career would seem to illustrate this position. His oratory astounded by its brilliancy rather than persuaded by its tone and argument; and in the long-run, the eloquence which failed to command the reason, ceased to captivate the ear.

The man who at first evoked the enthusiasm of the House by the brilliancy and power of his eloquence, did actually at last empty it by persistence in the monotonous splendors of his speeches. Passionate, and in a great degree untractable, he was unsuited for party politics, and drifted from all his connections, breaking up slowly all party ties, and even the ties of friendship, till he reached at last a state of almost political isolation. At the same time, it must not be forgotten how great an influence he, half philosopher half politician, exercised on the counsels of the state; many of his views on politics and public economy were anticipations of science, as many of his previsions of the course of events were prophecies.

B. died on the 7th July 1797, in his 68th year. A collected edition of his works in quarto was published in 1827. The latest edition is that of the Clarendon Press, begun in 1866. The best biography of B. is Mr. J. Macknight's. See also Morley's *Edmund Burke, a Historical Study* (1869).

BURKING. See ANATOMY (in Law).

BURLEIGH, WILLIAM CECIL, LORD. See CECIL.

BURLE'SQUE (from Ital. *burla*, jest, mockery), denoting a style of speaking, acting, writing, drawing, is a low and rude grade of the comic. The legitimate comic brings together contrasts with a final view to harmonizing and reconciling them; the B. distorts and caricatures, and brings the incongruities into stronger relief. The farce is the B. of comedy. Deformities and monstrosities that excite disgust do not belong to the burlesque. The lofty and the abject, the great and the little are conjoined, with the sole view of exciting a laugh. Nor does the true B. turn real greatness and nobility into laughter, but only sham greatness —false pathos, and all hollow pretension and affectation. The B. style appears to have been unknown to the ancients; it originated among the Italians, more particularly with the poet Berni (q. v.). The genuinely national *buffone* of the Italians personates the burlesque. Carlo Gozzi, in his tragi-comedies, is perhaps the greatest in the B. vein. Scarron among the French, and *Hudibras* in English, are examples. Parody (q. v.) or Travesty (q. v.) is a species of burlesque. See FARCE.

BURLE'TTA, a comic operetta or musical farce.

BU'RLINGTON, the name of three cities of some note in the United States.—1. A port of entry in New Jersey, on the Delaware, about twenty miles above Philadelphia, with which, as well as with New York, it is connected by the Camden and Amboy Railway. It possesses an Episcopalian college, founded in 1846. Pop. (1880) 6090, with about 13,000 tons of shipping.—2. The second city in Vermont. It is beautifully situated on the east shore of Lake Champlain. It communicates with the St. Lawrence by means of the Richelieu River and the Chambly Canal; while through the Champlain Canal it has access to the Hudson. It has railway communication with all parts of the United States and Canada. The Vermont University crowns the slope on which the city stands. Pop. (1880) 11,364.—3. A city of Iowa, on the right bank of the Mississippi, 207 m. by rail W.S.W. of Chicago. It occupies a natural amphitheater formed by the limestone bluffs which slope backward from the river. It carries on a large commerce, and there are numerous foundries, breweries, soap-works, pork-packing establishments, flour-mills, and saw-mills. The city is the center of considerable railway communications, and possesses among its educational institutions Business College and Baptist University. Pop. (1870) 14,933; (1880) 19,450.

BURLINGTON. See BRIDLINGTON.

BU'RMAH, EMPIRE OF, called also the EMPIRE OF AVA, an important kingdom of the Indo-Chinese peninsula, formerly of great extent; but by two contests with the British power in India, it lost several provinces, and is now, in its widest sense and including tributary states, comprehended between 19° 29′ and 28° N. lat., and 93° and 100° E. long., having an area of about 188,000 square miles, and a scanty population estimated at from 3,000,000 to 4,000,000. It is bounded on the N. by mountains, separating it from Assam and Tibet; on the E., by China; on the S , by the British province of Pegu; and on the W., by Munipore and mountain ranges dividing it from Tipperah, Chittagong, and Aracan. The Burman empire, as it now exists, has three well-marked divisions : 1. Northern B., inhabited chiefly by Singphos, Shans, and other tribes; 2. B. proper; 3. the Eastern Shan tributary states. The area of B. proper, from lat. 24° N. to the frontier of Pegu, is 44,450 square miles, with a population of about 1,200,000.

Physical features.—From the eastern extremity of the great transverse mountain-barrier of Northern India, longitudinal ranges strike away southwards and between, two of these the Burman territories are situated. The country slopes from the highland regions of the north towards the coast, and has been fitly described as 'a varied surface of rolling upland, interspersed with alluvial basins and sudden ridges of hill.'

The principal river, the Irrawaddy (q. v.), having its source amid the snowy mountains from which descends the Brahmaputra, is the great commercial highway of the country, through the heart of which it takes its course. Passing Amarapura, Ava, and other towns, it enters Pegu, and, 90 miles below Prome, divides into an eastern and western branch, the former flowing past Rangoon, the latter forming the Bassein river. The Kyen-dwen is its principal tributary. To the east of the Irrawaddy, the Salween, after an almost parallel course, enters the British territories in nearly the same latitude.

Climate.—On the coast, only two seasons are known—the dry and the rainy, which are regulated by the north-east and the south-west monsoons; but in B. proper, less rain falls, and there are three seasons—the cold, the hot and the rainy. Some showers fall in May or June, but the great rains last from the middle of August to the end of October. The cool season is from the middle of October till the beginning of April, and from this month till the great rains is the hot part of the year, the thermometer ranging from 85° to 100°. The climate is, on the whole, healthy, but the jungles are very pestiferous.

Minerals.—B. has vast fields of mineral wealth, but little enterprise and capital are brought to bear upon them. There are gold mines at Bamo, near the Chinese frontier. Auriferous sand is found in many of the streams. Silver is obtained at Bau-dwen, likewise on the confines of China, and also in the Shan country, from whence comes the chief supply of lead. Iron is quarried at Poukpa, a lofty mountain a few miles east of Pagan. The celebrated ruby mines of B. are situated 60 or 70 miles north-east from the capital, and are jealously guarded. Sapphires of great size are found in the same stratum, but are more rare. The annual value of the gems is estimated at from £12,000 to £15,000 sterling, and they are the property of the king. Wells of the mineral oil, petroleum, are worked at Ye-nan-gyoung, on the Irrawaddy, above Prome. Marble, noble serpentine, and amber are likewise found in large quantities.

Vegetable productions.—A few only of the most striking of these can be noticed. Of the graceful palm-tribe (*Palmaceæ*), the cocoa-nut, the betel, the palmyra, and the nipa, or water-palm, are the most prized. The useful bamboo is widely diffused. The teak, of which B. possesses inexhaustible forests, and the hopæa, are amongst the most valuable of the timber-trees. Forests of pine grow to the eastward of Amarapura. The wood-oil tree is found on the higher Salween, one trunk of which will produce from 30 to 40 gallons of oil every season.

The staple fruit of the country is the plantain or banana. The

jack is prized by the natives. The mango reaches the height of 100 feet, and produces a delicious fruit. Rice, wheat, tobacco, indigo, and cotton are cultivated.

Animals.—The *Felidæ*, or cat family, abound, tigers, leopards, and tiger-cats being met with in every part of the country. Of the *Pachydermata*, the elephant and rhinoceros are the most noteworthy. The elephant, buffalo, and Indian ox have been domesticated.

Ethnology.—The Burmans belong to that branch of the Mongolidæ characterized by a monosyllabic language; they are short-headed, broad-skulled, and flat-faced. The hair is black, and the skin of a deep brown color. Their *dress* is simple, but peculiar. The *in-gie*, a white linen jacket, is common to both sexes. Wrapped round the lower part of the body, the men wear the *put-so*, which is several yards in length; the women the *te-mine*, a scant garment of cotton or silk. Silks, muslins, and valuable gold ornaments are worn on special occasions. Betel-nut chewing and cigar-smoking are greatly practised by both men and women. The Burmans are, generally speaking, fine, well-made men, and excel in wrestling, boxing, rowing, football, and other athletic exercises; they are clever as carpenters and smiths. Burman houses are made of a framework of bamboo, thatched with the leaf of the water-palm, and are invariably raised on posts several feet from the ground. The women are more industrious than the men; they buy, sell, weave, and attend to the domestic concerns. Both sexes delight in merry-making, feasting, buffoonery, and sightseeing. A *pooay*, or theatrical representation, is a very favorite amusement, and a buffalo-fight attracts crowds of spectators. The Burman has little patriotism, but is attached to his home. Without individual cruelty, he is indifferent to the shedding of blood by his rulers. Though temperate and hardy, he dislikes discipline and continued employment; and when in power, is too often arrogant, arbitrary, and corrupt.

Besides the true Burman, a great variety of races inhabit the Burman territories. *Talaings*, or *Mons*, descendants of the ancient Peguans, are pretty well amalgamated with the Burmans. The *Shans*, or *Tai*, perhaps the most numerous and widely diffused of the Indo-Chinese peoples, are scattered over the peninsula, from Munipore to Bangkok. Of the eastern Shan states, some are tributary to B., others to Siam, while those west of the Irrawaddy are wholly under Burman rule.

The *Singphos* cluster round the mountains of the north, and along the western mountain-boundary of Burmah, wild *Kyhens*, and many tribes under different names, live in varying degrees of civilization. The *Karens* are met with chiefly in Southern Burmah.

Religion.—Buddhism (q. v.) is the prevailing religion of B., where it has been preserved in great purity. Its monuments—temples, shrines, and monasteries—are innumerable; its festivals are carefully observed, and its monastic system is fully established in every part of the kingdom. While directing the reader to the special article on BUDDHISM for an account of its doctrines, history, &c., we may here glance at its development, institutions, and edifices among the Burmans.

The members of the monastic fraternity are known in B. as *pon-gyees*, meaning 'great glory;' but the Pali word is *rahan*, or holy man. The pon-gyees are not priests, in the usual acceptation of the term, but rather monks. Their religious ministrations are confined to sermons, and they do not interfere with the worship of the people. They are a very numerous class, living in monasteries, or *kyoungs*, and may at once be known by their yellow robes (the color of mourning), shaven heads, and bare feet. They subsist wholly by the charity of the people, which, however, they well repay by instructing the boys of the country. The kyoungs are thus converted into national schools. The vows of a pon-gyee include celibacy, poverty, and the renunciation of the world; but from these he may at any time be released, and return to a secular life. Hence, nearly every youth assumes the yellow robe for a time, as a meritorious act, or for the purpose of study, and the ceremony of making a pon-gyee is one of great importance. The ostensible object of the brotherhood is the more perfect observance of the laws of Buddha. The order is composed of five classes—viz., young men who wear the yellow robe and live in the kyoungs, but are not professed members; those on whom the title and character of pon-gyees have been solemnly conferred with the usual ceremonies; the heads or governors of the several communities; provincials, whose jurisdiction extends over their respective provinces; and, lastly, a superior general, or great master, who directs the affairs of the order throughout the empire.

No provision is made for religion by the government, but it meets with liberal support from the people. A pon-gyee is held in profound veneration; his person is sacred, and he is addressed by the lordly title of *pra* or *phra;* nor does this reverence terminate with his death. On the decease of a distinguished member, his body is embalmed, while the limbs are swathed in linen, varnished, and even gilded. The mummy is then placed on a highly decorated cenotaph, and preserved, sometimes for months, until the grand day of funeral. The Burman rites of cremation are very remarkable, but we cannot here enlarge upon them. On the whole, a favorable opinion may be passed on the monastic fraternity of B.; although abuses have crept in, discipline is more lax than formerly, and many doubtless assume the yellow robe from unworthy motives.

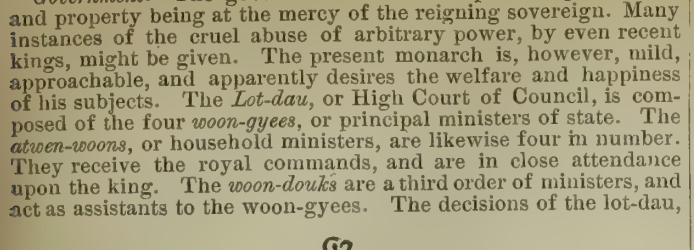
In B., the last Buddha is worshiped under the name of Gautama. His images crowd the temples, and many are of gigantic size. The days of worship are at the new and full moon, and seven days after each; but the whole time, from the full moon of July to the full moon of October, is devoted by the Burmans to a stricter observance of the ceremonies of their religion. During the latter month, several religious festivals take place, which are so many social gatherings and occasions for grand displays of dress, dancing, music, and feasting. At such times, barges full of gaily-dressed people, the women dancing to the monotonous dissonance of a Burman band, may be seen gliding along the rivers to some shrine of peculiar sanctity. The worship on these occasions has been described by an eye-witness, in 1857, as follows: 'Arrived at the shrines and tempels, the people suddenly turn from pleasure to devotion. Men bearing ornamental paper-umberellas, fruits, flowers, and other offerings, crowd the image-houses, present their gifts to the favorite idol, make their *shek-ho*, and say their prayers with all dispatch. Others are gluing more gold-leaf on the face of the image, or saluting him with crackers, the explosion of which in nowise interferes with the serenity of the worshipers. The women for the most part remain outside, kneeling on the sward, just at the entrance of the temple, where a view can be obtained of the image within.' On another occasion, we read: 'The principal temple being under repair, was much crowded by bamboo scaffolding, and new pillars were being put up, each bearing an inscription with the name of the donor. . . . . The umbrellas brought as offerings were so numerous, that one could with difficulty thread a passage through them. Some were pure white, others white and gold, while many boasted all the colors of the rainbow. They were made of paper, beautifully cut into various patterns. There were numerous altars and images, and numberless little Gautamas; but a deep niche or cave, at the far end of which was a fat idol, with a yellow cloth wrapped round him, seemed a place of peculiar sanctity. This recess would have been quite dark, had it not been for the numberless tapers of yellow wax that were burning before the image. The closeness of the place, the smoke from the candles, and the fumes from the quantity of crackers constantly being let off, rendered respiration almost impossible. An old pon-gyee, however, the only one I ever saw in a temple, seemed quite in his element; the shaven bristly head and coarse features looking ugly enough to serve for some favorite idol, and he seemed a fitting embodiment of so senseless and degrading a worship. Offerings of flowers, paper-ornaments, flags, and candles were scattered about in profusion. The beating a bell with a deer's horn, the explosion of crackers, and the rapid mutterings of prayers, made up a din of sounds, the suitable accompaniment of so misdirected a devotion.'

The rosary is in general use, and the Pali words *Aneitya! doka! anatta!* expressing the transitory nature of all sublunary things, are very often repeated. The Burman is singularly free from fanaticism in the exercise of his religion, and his most sacred temples may be freely entered by the stranger without offence; indeed, the impartial observer will hardly fail to admit that Buddhism, in the absence of a purer creed, possesses considerable influence for good in the country under consideration. 'It teaches man to combat, control, and master the passions of his heart, to make reason predominate over sense, mind over matter, and to practise the virtues required for the attainment of these objects.'

The sacred edifices are of three kinds: 1. The tope, dagoba, or *shrine* (*Zadee* or *Tsa-dee*), a monument erected to the last Buddha, is a solid, bell-shaped mass of plastered brickwork, tapering to the summit, which is crowned by the *tee*, or umbrella, of open ironwork. 2. The *temple*, in which are many images of Gautama. The most remarkable specimen of Burman temple-architecture is the *Ananda* of Pagan. The ground-plan takes the form of a perfect Greek cross; and a tapering spire, with a gilded tee at the height of 168 feet from the foundation, crowns the whole. 3. The *kyoung* or monastery (*vihara*) is generally constructed with a roof of several diminishing stages, and is often elaborately adorned. Burman architecture 'differs essentially from that of India in the frequent use of the pointed arch, not only for doors and windows, but also in the vaulted coverings of passages.'

Cities.—Mandalay, the present capital of B., and seat of royalty, is situated 3 miles from the Irrawaddy, a little to the north of Amarapura and Ava. It is laid out in three parallelograms, one within another, of which the inner two are walled; the palace occupies the center. Ava and Amarapura, each at one time the capital of the empire, are now almost entirely deserted. Pagan represents the past of B., and is remarkable for its magnificent ruins of temple-architecture extending over 8 square miles; the prevailing type is the cruciform vaulted temple.

Government.—The government of B. is a pure despotism, life and property being at the mercy of the reigning sovereign. Many instances of the cruel abuse of arbitrary power, by even recent kings, might be given. The present monarch is, however, mild, approachable, and apparently desires the welfare and happiness of his subjects. The *Lot-dau*, or High Court of Council, is composed of the four *woon-gyees*, or principal ministers of state. The *atwen-woons*, or household ministers, are likewise four in number. They receive the royal commands, and are in close attendance upon the king. The *woon-douks* are a third order of ministers, and act as assistants to the woon-gyees. The decisions of the lot-dau,



Specimen of Burmese Writing.

when sanctioned by the king, become law. The *Dam-a-that*, a Burman translation of the *Institutes of Menu*, is also in force. White umbrellas and white elephants are regarded as insignia of royalty. The 'Lord White Elephant,' indeed, is looked on as an estate of the realm, a mark of universal sovereignty, and a sacred being. It has a palace, a minister, and numerous attendants.—The *military power* of the country is not great, and of musketeers it is probable that the king could not command more than 18,000.

The *civilization* of B., is not retrograde—which the ruins of Pagan would almost seem to indicate—is stationary and stereotyped, like that of China. All the wealth of the country is lavished on the sacred edifices, £10,000 sterling being sometimes expended on the gilding and beautifying of a single shrine or temple, whilst roads, bridges, and works of public utility are neglected.

The *vernacular tongue* of B. belongs to the monosyllabic class of languages, and is without inflection; the character is formed of circles and segments of circles. It is engraved on prepared strips of palm-leaf, and a number of these form a book. Printing is unknown except where introduced by the missionaries. *Pali* is the language of the religious literature.

Commerce.—Since B. was deprived of its harbors and maritime districts, its foreign commerce has been very limited. The principal exports (from B. Proper) consist of Sesamum oil, teak-timber, petroleum, sweet-oil, tobacco, lackered boxes, gold-leaf, silver, lead, copper, stick-lac, indigo, cocoa-nuts; ponies, wheat, pulse, and cotton. The imports (into the Burman Empire) are *ngapee* (a paste of rank pickled fish, which is eaten with rice, the staple food of the Burman), paddy, rice, dried fish, salt—all these being imported by thousands of tons annually; cotton piece-goods, silk do., and woollens. B. carries on an overland traffic with China, exporting cotton and importing silk. A commercial treaty with Britain was concluded in 1867, but has remained almost a dead letter.

The standard *currency* of B., called *yowet-ni* (red-leaf), is silver, but there is no coinage. This metal is used, however, of varying degress of purity, which complicates mercantile transactions, and assayers are employed to find the value of the metal.

History.—Of the early and mythical history of B., nothing need here be said. The kingdoms of Ava and Pegu long centended for mastery. The latter was in its zenith in about 1580 A.D. Passing on to 1752, it appears that the Peguans, after a period of subjection, obtained the advantage. At this time, however, Alompra, or *Aloung Pra*, the most celebrated warrior-king in Burman history, rose to power, founded the present dynasty, subdued the Peguans, and incorporated their country, as well as many neighboring states, with his own. The Burman empire attained its greatest expansion in 1822. The wars of 1822—1824 and 1852 with the British, reduced B. to its present limits. The savage excesses of the king of B. led in 1879 to the withdrawal of the British ambassador and his staff. See Yule's *Narrative of the Mission in* 1855; Fytche's *Burma Past and Present* (1878); the excellent work, *The Burman: his Life and Notions*, by Shway Yoe (1882); Vincenti's *Land of the White Elephant* (1874); Gordon's *Burmah and its Inhabitants* (1876); Anderson's *Mandalay to Momien* (1876); M'Mahon's *The Karens and the Golden Chersonese* (1876).

BURMAH, BRITISH, includes the three maritime provinces of India beyond the Ganges, which were united under one local administration in 1862. It extends along the eastern side of the Bay of Bengal, from 20° 50′ to 10° 50′ N. lat. It has a coast-line of fully 900 English miles, and a total area of 88,556 sq. m., distributed as follows: Aracan, 14,526; Pegu, 27,300; Tenasserim, 46,730.

The whole of this territory was taken from the king of Burmah in the two wars provoked by him.

Akyab, Rangoon, and Maulmain are the principal seaports of Aracan, Pegu, and Tenasserim respectively. Pegu is the most prosperous of these three divisions, and has made the most progress within recent times. Pop. of B. (1881) 3,704,253. The Burmans (including Aracanese and Talcins, or Peguens) number about two millions. Of the other races—Karens, Shans, Chinese, and Hindus—the Karens are the most numerous and interesting. —See Forbes *British Burma* (1879).

BURMANN, PETER, the most important member of a Dutch family celebrated for learning, was born at Utrecht 1668, studied law at the university of that city and of Leyden, and, after taking his degree in 1688, traveled through Germany and Switzerland. After practising as an advocate for some years, he was appointed professor of history and rhetoric in the university of Utrecht; which office he subsequently exchanged for the professorship of Greek. In 1715, after the death of Perizonius, he removed to the university of Leyden, where he died 31st March 1741.

His literary career was very active, and his hot temper and intolerant spirit involved him in many controversies. Among his most distinguished adversaries were Le Clerc and Bentley. His chief works are editions of the Latin classics—Petronius, Velleius Paterculus, Quintilian, Valerius Flaccus, Phædrus, Ovid, the Poëtæ Minores, Suetonius, Lucan. The first of these appeared in 1709, and the last in 1740. They are characterized less by taste and critical acumen than by learning, fulness of matter and beauty of type.

BURN, RICHARD, was born in 1720 at the village of Winton, in Westmoreland. After being educated at Queen's College, Oxford, he received the living of Orton, in his native county, which he continued to hold until his death in 1785. He is widely known as the compiler of two very useful law-books, the *Justice of the Peace* and *Ecclesiastical Law*, which have each passed through many editions. He also published a *History of the Poor-laws*, an edition of Blackstone's *Commentaries*, and several sermons and works of a religious nature.

BURNES, SIR ALEXANDER, a distinguished traveler in Central Asia, was born at Montrose, in Scotland, 1805, where his father, who was a cousin of Robert Burns the poet, was an active magistrate. He early entered the Indian army, and his knowledge of Oriental languages gained him rapid promotion. After performing some important missions for the Indian Government, he was, at his own suggestion, sent on an expedition into Central Asia. Starting from Lahore on the 11th February 1832, B., having adopted the dress and usage of the Afghans for greater safety, passed through Peshawur and Cabul, and crossing the Indian Caucasus, reached Balkh on the 9th June.

Thence he passed on to Bokhara, Astrabad, and Teheran, and journeying through Ispahan and Shiraz, reached Bushire on the Persian Gulf, from whence he embarked for India. He received the special thanks of the governor-general for his travels; and on his return to England in 1833, he received a warm welcome from the India House and Board of Control, and was highly honored by the Royal Geographical and other societies. In September 1839, having previously, for his important services, been knighted and promoted to the rank of lieutenant-colonel, he was appointed political resident at Cabul, where he was murdered on the breaking out of the insurrection in that city in November 1841—a tragedy re-enacted in 1879, when Sir Louis Cavagnari, newly appointed resident in Cabul, was massacred with his staff and guards. B. was author of *Travels into Bokhara* and a work on *Cabul*.

BURNET, the English name of two genera of plants, *Sanguisorba* and *Poterium*, belonging to the natural order *Sanguisorbeæ* (q. v.)—very generally regarded as a sub-order of *Rosaceæ*—which have much resemblance to one another, and receive a common name also in other languages. *Sanguisorba* has hermaphrodite flowers with four stamens; in *Poterium*, the flowers are polygamous, and the stamens indefinite in number. In both, the calyx is 4-fid, and the corolla wanting.—GREAT B. (*Sanguisorba officinalis*) is common in meadows in all parts of Europe, and not unfrequent in some parts of England, particularly where the soil is calcareous. It has a stem 1—2 feet high, pinnate leaves, with about four pair of ovate serrated leaflets and an odd one; the flowers are crowded in dark red spikes. It is cultivated in Germany for feeding cattle, and is much esteemed for this use, as it grows well even on very

poor soils, and the produce is abundant. Cattle are very fond of it. The root is astringent, and was formerly used in medicine.—COMMON B. (*Poterium Sanguisorba*) grows in sunny places on hills in the middle and south of Europe, and is common in England,

Great Burnet (*Sanguisorba officinalis*): *a*, a leaf; *b*, spikes of flowers; *c*, a flower.

Common Burnet (*Poterium Sanguisorba*).

especially in the chalk districts. In habit and foliage, it much resembles the Great B., but the leaflets are smaller, and the flowers are in heads of a dull purplish color.

It has been much cultivated in some parts of England as a substitute for clover on chalky soils, and is relished by cattle. It forms great part of the natural pasture of the South Downs, and of the excellent sheep-walks of Salisbury Plain. It is regarded as a plant particularly suitable for poor arid soils. It is sometimes cultivated in gardens, and its leaves, which are slightly astringent, are used in salads or soups. They are said to form one of the ingredients of the famous *cool tankard*, and the name *Poterium* is from a Greek word signifying a drinking vessel.—Both this and the preceding are perennial plants.—There are several other species both of *Sanguisorba* and *Poterium*, some of the latter shrubby, natives chiefly of the warmer temperate parts of the world.

BURNET, GILBERT, Bishop of Salisbury, was born at Edinburgh on the 18th September 1643. He was educated at home, and afterwards at Marischal College, Aberdeen, where he pursued his studies so diligently, that he took his degree of M.A. before he was fourteen. In the course of a year he made up his mind to enter the church, and read so hard at theology, that in less than three years he had mastered the chief systems of divinity, besides having gone over the Old and New Testaments in the original, with all the Commentaries of note in his time. In 1663, he visited Cambridge, Oxford, and London, where he met with many of the leading divines of England. Next year, he passed over into Holland, and perfected his knowledge of Hebrew under a learned rabbin of Amsterdam. In 1665, he was presented to the parish of Saltoun, where he remained five years. In 1669, he was appointed Professor of Divinity in the university of Glasgow, but having mixed himself up in the politico-ecclesiastical affairs of the time, he brought upon himself the enmity of Lauderdale, and found it prudent to resign his chair in 1674. He now removed to London, and was made preacher at the Rolls' Chapel by Sir Harbottle Grimston, and afterwards lecturer at St. Clement's. In 1676, he published his *Memoires of the Dukes of Hamilton*, and in 1679, the first volume of his *History of the Reformation*, which procured him a vote of thanks from both Houses of Parliament. Next year appeared *Some Passages in the Life and Death of the Earl of Rochester*, in which B. records the religious interviews which he had with that profligate nobleman during his last illness, and which led to the latter's conviction of the truth of Christianity. In 1681, he published his second volume of his *History of the Reformation*, and in 1682, his *Life of Sir Matthew Hale*. The efforts which had previously been made, were now repeated, to induce him to break with the liberal and moderate party, and to attach himself to the king. He was offered the bishopric of Chichester, but refused it. In 1683, he narrowly escaped being brought into trouble in regard to the Ryehouse plot.

He conducted the defence, attended the execution, and vindicated the memory of his friend Lord William Russell. The king exhibited his unkingly spite by depriving B. of his St. Clement's lectureship. On the accession of James II., he went to the continent, and traveled through France, Italy, Switzerland, and Germany. In 1684, he was introduced to the Prince of Orange, with whom he became a great favorite, and by whom he was frequently consulted in reference to the great scheme for the deliverance of England. When William came over, B. accompanied him in the capacity of royal chaplain, and shortly after, was appointed Bishop of Salisbury. He entered on the duties of his diocese with great ardor; but his first pastoral letter, in which he founded the right of William to the throne on conquest, gave so much offence to both Houses of Parliament, that they ordered it to be burned by the hands of the common hangman. William, however, who knew the excellent qualities of the bishop, was not greatly impressed by this solemn performance, and continued to trust B. to the end of his life. In 1698, B. was appointed preceptor to the Duke of Gloucester; in 1699, he published his celebrated exposition of the 39 Articles, which was condemned as heterodox by that not very competent assembly, the House of Lords. In 1714, appeared the third volume of his *History of the Reformation*. In the spring of 1715, he was attacked by a pleuritic fever, and carried off on the 17th of March, in the 72d year of his age. B. was thrice married: his first wife was remarkable for her beauty; the second, for her fortune; and the third, for her piety.

Soon after B.'s death, appeared *Bishop B.'s History of his Own Time, from the Restoration of King Charles II. to the Conclusion of the Treaty of Peace at Utrecht, in the Reign of Queen Anne* It was sarcastically but foolishly abused by the Tory writers of the day—Swift, Pope, Arbuthnot, and others. B. was a man of strict, almost of puritanic virtue; yet his charity, geniality, and moderation of sentiment might be imitated with advantage even in our own day. His style is neither elegant nor correct, and his judgment is not always reliable, yet, the honesty, earnestness, simplicity, and vigor of his writings, as well as their fulness of details, make his works very valuable to the student of history.

BURNET, JOHN, a painter, engraver, and author, was born at Fisherrow, near Edinburgh, March 1784. He was first brought under the notice of the public through his engravings of Wilkie's works, which he executed in a most admirable manner. Of his own paintings, the best known engraving is that of 'Greenwich Pensioners receiving News of the Battle of Trafalgar.' He has written several works on art, illustrated by drawings and engravings of his own, the most important of which is a *Practical Treatise on Painting*. He is also the author of *Rembrandt and his Works*, 4to, 1849; and in conjunction with Mr. Peter Cunningham, of *Life and Works of J. M. W. Turner*, 1852. He died in 1868.

BURNET, THOMAS, best known from his *Theory of the Earth*, was born in Yorkshire, 1635, and studied at Cambridge. After acting as traveling-tutor to several noblemen, he was elected Master of the Charter-house (1685), and later, succeeded Archbishop Tillotson as clerk of the closet to William III. But having (1692) published a work, *Archæologiæ Philosophicæ, sive Doctrina Antiqua de Rerum Originibus* (also in English), displaying great learning, but treating the Mosaic account of the Fall as an allegory, he was obliged to retire from the clerkship, and lived in the Charter-house till his death, in 1715. His *Telluris Theoria Sacra* (first part 1680; second, 1689) was written in Latin, but translated, or rather recomposed in English, by the author. It is an ingenious speculation, written in ignorance of the facts of the earth's structure, and is therefore a mere system of *cosmogony*, and not geology. But it abounds in sublime and poetical conceptions and descriptions, conveyed in language of extraordinary eloquence, and called forth the highest applause at the time.

BURNETT PRIZES, THE, are two theological premiums, founded by Mr. Burnett of Dens, Aberdeenshire. This gentleman (born 1729—died 1784) was a general merchant in Aberdeen, for many years during his lifetime spent £300 annually on the poor. On his death, he bequeathed the fortune he had made to found the above prizes, as well as for the establishment of funds to relieve poor persons and pauper lunatics, and to support a jail-chaplain in Aberdeen. He directed the prize-fund to be accumulated for 40 years at a time, and the prizes (not less than £1200 and £400) to be awarded to the authors of the two best treatises on 'The evidence that there is a Being all-powerful, wise, and good, by whom everything exists; and particularly to obviate difficulties regarding the wisdom and goodness of the Deity; and this independent of written revelation, and of the revelation of the Lord Jesus; and from the whole to point out the inferences most necessary and useful to mankind.' The competition is open to the whole world, and the prizes are adjudicated by three persons appointed by the trustees of the testator, together with the ministers of the Established Church of Aberdeen, and the principals and professors of King's and Marischal College, Aberdeen.

On the first competition in 1815, 50 essays were given in; and the judges awarded the first prize, £1200, to Dr. William Lawrence Brown, Principal of the Marischal College and University of Aberdeen, for an essay entitled *The Existence of a Supreme Creator;* and the second prize, £400, to the Rev. John Bird Sumner, afterwards Archbishop of Canterbury, for an essay entitled *Records of Creation*. On the second competition, in 1855, 208 essays were given in; and the judges, Rev. Baden Powell, Mr. Henry Rogers, and Mr. Isaac Taylor, awarded the first prize, £1800, to the Rev.

R. A. Thompson, Lincolnshire, for an essay entitled *Chrtstian Theism;* and the second prize, £600, to the Rev. Dr. John Tulloch, Principal of St. Mary's College, St. Andrews, for an essay on *Theism*. The above four essays have been published in accordance with Mr. Burnett's deed. It is expected that £10,000 will be available in 1895.

BURNETT'S DISINFECTING LIQUID AND ANTISEPTIC FLUID is a liquid introduced by Sir W. Burnett for the purpose of deodorizing the bilge-water of ships, sewerage-water, &c. It is a strong solution (sp. gr. 2) of chloride of zinc, accompanied by a small amount of chloride of iron; and when intended to be used, it is mixed with water in the proportion of one pint to five gallons of water. The liquid acts only as a *deodoriser* and *antiseptic* (see ANTISEPTICS), and does not yield any vapor which can exhibit the properties of a disinfectant (q. v.). It is of service in preserving dead animal tissues, as in the dissecting-room, and in jars containing anatomical specimens. It has little action on knives or steel instruments. When added to bilge or sewerage-water, the chloride of zinc (ZnCl) mainly acts by decomposing the offensive sulphide of ammonium (NH_4S), which it does by forming the sulphide of zinc (ZnS) and chloride of ammonium (NH_4Cl), both of which are odorless. The strong solution of chloride of zinc has also been applied to the preservation of timber, and the process of so treating wood is called, after its inventor, *Burnettising*. *Crewe's* disinfectant liquid is chemically the same as the above.

BURNEY, DR. CHARLES, a musical composer, celebrated as the author of the *General History of Music*, was born at Shrewsbury, 1726. Having studied music in his native city, in Chester, and under Dr. Arne in London, he commenced giving lessons in music himself. After composing three pieces—*Robin Hood*, *Alfred*, and *Queen Mab*—for Drury Lane, B. left London, and settled at Lynn, in Norfolk, where he designed his work on the *History of Music*. In 1770—1772, he traveled in France, Italy, the Netherlands, and Germany, collecting materials for his proposed work, and published an essay on the *Present State of Music in France and Italy*, &c. (2 vols., Lond. 1772). This was followed by his *General History of Music from the earliest Ages to the present Period* (4 vols., Lond. 1776—1789). Besides other minor works, B. wrote a *Life of Handel*, and nearly all the musical articles in *Rees's Cyclopædia*. He was appointed organist to the Hospital at Chelsea in 1789. He died in 1815.

He was intimately acquainted with many of the most eminent men of the day, including Edmund Burke and Dr. Johnson.—His second daughter, FRANCISCA B. (afterwards Madame D'Arblay), became distinguished as authoress of *Evelina*, *Cecilia*, *Georgina* and *Camilla*—novels formerly very popular, and still retaining some interest.

BURHAUNPU'R, a large town of India, in the territory of Gwalior, or possessions of Scindia's family, on the right bank of the Tapti, in N. lat. 21° 18′, E. long. 76° 20′, 280 miles north-east from Bombay. The banks of the Tapti are here bold, rising 60 or 70 feet above the stream. The town is surrounded by a rampart of brickwork, and contains a palace built by Akbar. A few of the wealthier merchants have good houses, built of teak, and profusely decorated with carvings. The most wealthy and influential are the Borahs, a Mohammedan tribe, who inhabit a distinct ward, which they shut up at night, excluding all other persons. There are manufactures of muslins, flowered silks, and brocades, for which the place was formerly famous, so that, in the 17th c., they were exported in great quantities to Persia, Egypt, Russia, and Poland.

BURNING GLASSES AND MIRRORS. See HEAT, LENS, and MIRROR.

BU'RNLEY, a thriving town and parliamentary borough in Lancashire, situated in a narrow vale on the banks of the Brun, near its junction with the North Calder, and 24 miles north of Manchester. Pop. (1871) of p. b., 44,320; (1881) 63,502. It has manufactures of cottons and woollens, calico-printing works, iron and brass foundries, machine-making works, breweries, tanneries, and rope-works. There are collieries in the vicinity, and traffic is facilitated by railways and canals, which unite it with the principal centers of trade in Lancashire and Yorkshire. B. returns one member to parliament.

A Roman vicinal way passed through the town, part of which is still known and used as the 'Long Causeway.' Roman coins, pottery, urns, &c., have been found near the town, and an extensive series of beacons, encampments, dikes, &c., occupy the slopes of the hills in the neighborhood for a linear distance of more than 10 miles. From the name of the river, *Brun*, and other circumstances, these slopes are supposed to furnish a very probable site of the battle of Brunnanburh, so celebrated in Saxon history.

BURNOUF, EUGENE, one of the most distinguished orientalists of modern times, was born at Paris, April 1, 1801, and after entering on the study of law, betook himself to the oriental languages, especially those of India and Persia. In conjunction with Professor Lassen of Bonn, he published, in 1826, *Essai sur le Pali*, which was followed, in 1827, by *Observations Grammaticales sur quelques Passages de l'Essai sur le Pali*. His great aim, however, at this time, was to obtain a complete knowledge of the remains of the religious literature in the Zend, or old Persic language, which had been neglected since the time of Anquetil du Perron, or, at least, not philologically and critically examined. B. undertook to decipher those curious MSS. which Anquetil du Perron had brought home with him, and which lay unregarded in the *Bibliothèque Impériale*. He commenced by causing the *chef-d'œuvre* of old Persic literature, the *Vendidad-Sadé* (one of the books of Zoroaster), to be lithographed with great care, and published from time to time in the *Journal Asiatique* the brilliant results of his laborious studies, which drew upon him the regard of the learned world. In 1834, he published the first volume of his *Commentaires sur le Yaçna l'un des Livres Liturgiques des Perses*, a work which, for the first time, rendered possible a knowledge not only of the dogmas, but also of the language of Zoroaster. It is a master-pieee of conscientious industry, united with copious lingual and antiquarian lore. His studies in the Zend language induced him to make an attempt to decipher the cuneiform inscriptions of Persepolis, in his *Mémoire sur deux Inscriptions Cunéiformes* (Par. 1836). In 1840, he published the text along with a translation of the *Bhâgavat-Purâna*, a system of Indian mythology and tradition. As the fruit of his study of the Sanscrit books of the Buddhists, appeared in 1845 the *Introduction à l'Histoire du Boudhisme*. See BUDDHISM. This great work absorbed for six years, the whole energies of B., who was now the recognized successor of Silvestre de Sacy. It is to be regretted that death did not permit him to continue his labors further. He died May 28, 1852.

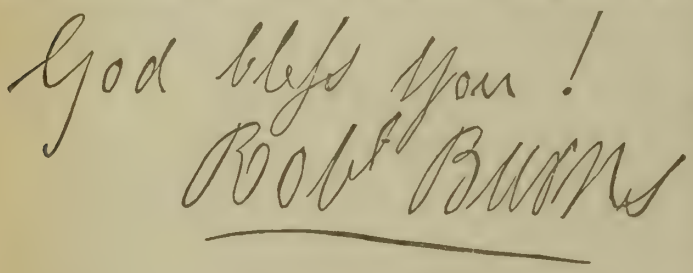
BURNS, REV. JABEZ, D.D., a Baptist minister, and one of the most prolific religious writers of the 19th century, was born at Oldham, near Manchester, in 1805, and was educated at Chester, and afterwards at Oldham Grammar-school. After helping his father as a medical practitioner, and acting as assistant in a drapery establishment, he joined the Methodist New Connection, and removed at the age of 21 to London. In 1828 and 1829, he published his first two works, *The Christian Sketch-book and the Spiritual Cabinet*, which gained him much popularity among the religious public. After having exercised the functions of the ministry at Perth, in Scotland, for a few years, he returned to London in 1835, to become minister of the General Baptist congregation assembling in New Church Street Chapel, Marylebone. Here his fame increased so much, that it was found necessary twice to enlarge his chapel during the first 25 years of his ministry, in order to afford room for the large numbers who flocked to hear him. He was elected by the body to which he belonged to fill various posts of honor, and lectured in all parts of the United Kingdom on temperance, peace, abolition of capital punishment, &c. In 1839, Dr. B. became editor of the *Temperance Journal*. About 1846, he received the degree or D.D. from the Wesleyan University of Middelton, Connecticut. Meantime his pen had not been idle, the number of his separate works being upwards of thirty, some of them consisting of a number of vols., and one of them, *Sketches and Skeletons of Sermons*, of 15 vols., having reached the 14th edition. The following are the names of a few: *Christian Exercises for every Lord's Day* (1858); *Christian Philosoyhy* (1849); *Deathbed Triumphs of Eminent Christians; Light for the House of Mourning* (1850); *Pulpit Cyclopædia*, 4 vols. (1846—1860); *Marriage Gift-book and Bridal Token* (1862); &c., which are all highly popular among a large section of the English and American evangelical religious world. Dr. B. died in 1876.

BURNS, ROBERT. the great lyric poet of Scotland, was born 25th January 1759, in a small cottage near Ayr. His father, then a nursery-gardener, and afterwards the occupant of a small farm, had to struggle all his life with poverty and misfortune, but made every exertion to give his children a good education; and the young poet enjoyed an amount of instruction and miscellaneous reading which, to those unacquainted with the habits of the Scottish peasantry, would seem incompatible with the straitened circumstances and early toil which were his lot. About his sixteenth year, he began composing verses in the Scottish dialect, which attracted notice in the vicinity, and extended the circle of his acquaintance; and thus he became exposed to temptations which, acting on an extremely sociable and passionate disposition, broke in upon the previous sobriety and correctness of his life. A small farm, on which he had entered with his brother in 1781, proved far from a prosperous undertaking; and being harassed and imbittered by other misfortunes—the results of imprudence—he resolved to leave his native land, and go to Jamaica. Partly to procure the means of paying his passage, he published a collection of his poems at Kilmarnock in 1786. The reception these met with was highly favorable, and his genius was recognized in quarters where he had not looked for notice. While preparing to embark,

he received a letter encouraging him to go to Edinburgh, and issue a new edition. This was the turning-point of his life. During his stay in the Scottish metropolis, he associated with all that was eminent in letters, rank, and fashion, and his conversational powers excited little less admiration than his poetry. The profits of the publication were considerabie, and enabled him to take the farm of Ellisland, near Dumfries, where he settled in 1788, having publicly ratified his marriage with Jean Armour. With his farm he conjoined the office of an exciseman; but after three or four years, he was obliged to give up farming, and from that time lived in Dumfries, dependent on his salary from the Excise, which, at first, only £50, never rose above £70. The striking contrasts in the lot of the rich and the poor with which his residence in Edinburgh had impressed him, made him hail the French Revolution with enthusiasm; and some imprudent expressions of his having been reported to the authorities, destroyed his prospects of promotion in the service, and only the interference of an influential friend prevented him from losing his office.

Such was then the terror of innovation, and the hatred of everything like liberal opinions, that many of the better classes, who had féted the poet, now shunned the 'Jacobin,' as they stigmatized him. Imbittered by what he felt to be injustice, he recklessly allowed those habits of dissipation to grow upon him which made the more respectable of all classes look coldly on him; and the remorse thus occasioned in his calmer moments aggravated that tendency to melancholy which the gloom and toil of his early years had probably implanted in his constitution. Broken in health, he died 21st July 1796.

The poetry of B. is purely the outpouring of the moment—the response of the feelings to the immediate circumstances of life. Its charm and power lie in the justness of the feelings expressed, and in the truthfulness and freshness which it derives direct from life. Seldom have such manliness, tendernes, and passion been united as in the songs of Burns. They formed the first awakening of



Autograph of Burns.

the spirit of true poetry in Britain after a long slumber. The popularity that B. instantly acquired has continued unabated, not only in his native Scotland, but wherever English is spoken; his poems have also been translated into every European tongue. Dr. Currie, of Liverpool, published the first collected edition of his poems and letters, with a life (4 vols. Lond. 1800). Several more complete collections have appeared since, such as that by Allan Cunningham (8 vols. Lond. 1834), and that by Mr. Scott Douglas, of which the first volumes appeared in 1877. A life of B., by Lockhart, appeared, Edin. 1828. In *The Life and Works of Burns* (Edin. 1851-2), by R. Chambers, the poems are incorporated in the narrative in chronological order.

In 1859, the centenary of B.'s birth was celebrated with unparalleled enthusiasm, not only in every city and almost every village of Scotland, but in the chief cities of England, and throughout America, the British colonies, and India.

BURNS AND SCALDS are injuries to the surface of the living body arising from excessive heat—a scald implying that the heat proceeded from a fluid medium, as boiling water; a burn, from a solid. The injury is much the same in both cases; therefore, the directions for the treatment of burns will be applicable also to scalds. These injuries may be divided into three classes: 1. Burns resulting in simple redness of the skin; 2. Burns resulting in vesication or blistering; 3. Burns resulting in sloughing, or death of the part. The first object, after the accident has occurred, is to relieve the suffering; and cold applied either in the form of ice or water seems in most cases to have almost a specific power in allaying pain and checking the advance of inflammation. In other cases, moderate warmth is found more efficacious, and we must be guided mainly by the sensations of the sufferer as to which of these remedies we make use of. In very severe cases, opium or chloroform may be employed. But if the injury the body has received be very serious, the patient complains less of pain than of cold; he shivers, is much depressed, and must be well supplied with stimulants, to prevent his dying from the shock.

The best local application is the Carron-oil, which derives its name from the famous ironworks, where it has been used for many years. It consists of equal parts of olive-oil and lime-water, and should be applied on linen rags or cotton wool. Blisters may be pricked, and the contained serum allowed to trickle away, but on no account is the raised skin to be removed. The dressings should not be changed oftener than cleanliness requires; and as each portion of the old dressing is removed, it must at once be replaced with fresh, so that as little exposure as possible of the burnt surface may take place. The main principle of treatment is exclusion of the air from the injured part; and so long as this is effected, it matters but little what remedial agent is employed. Great care must be taken in the trêatment of a sore resulting from a burn, that the contraction of a scar does not cause distortion of the neighboring parts.

When the clothes catch fire, the person should lie down on the floor, and roll herself, or be rolled, in the rug, table-cover, or anything sufficiently voluminous to stifle the flames; and afterwards the clothes, especially stockings, should be removed with great care, lest the cuticle should separate with them, which would materially increase the sufferings of the patient.

Extensive scalds or burns are very fatal to young children; and it must be remembered that their skin is more susceptible to external impressions, and will suffer from a degree of heat innocuous to an adult. Infants have frequently been scalded to death in too hot baths, or by too hot fomentations. The principles of treatment for burns produced by the contact of chemical agents to the skin, are the same as those for burns by fire.

BURNT OFFERING. See SACRIFICE.

BURNT SIE'NNA, a fine orange red pigment, transparent and permanent, used both in oil and water color painting. It is obtained by simply burning the ferruginous ochreous earth known as Terra di Sienna. Excellent greens are produced by mixing it with Prussian blue. It mixes well with other pigments generally, and dries quickly.

BURNT STONES, antique carnelians found in ruins, and seeming to have been acted upon by fire, having a dull appearance externally, but exhibiting a beautiful red color when held up to the light. They are sold at a very high price, particularly if to the natural beauty of the stone is added the merit of fine workmanship. They were once, however, more esteemed than now, and an imitation of them, by burning the upper surface of carnelians with a hot iron, was very fashionable.

BURNT U'MBER, a pigment of a russet-brown color, is semi-transparent, mixes well with other pigments, and dries quickly. It is obtained by burning umber, an ochreous earth containing manganese, and deriving its name from the place where it was first discovered—Umbria in Italy.

BURNTI'SLAND, a seaport town of Fifeshire, on the north shore of the Firth of Forth, about 8 miles north-north-west of Edinburgh. It consists of one long street, clean and well kept, with a back street running parallel, and some diverging lanes. B. is an important station of the North British Railway, having a steam-boat ferry connecting it with Granton, the station on the opposite side of the Forth. It has a commodious harbor which was greatly improved in 1876, and dock. Its trade consists principally of distilling, and the shipping of coal and iron; and in summer it is considerably resorted to as a convenient watering-place. It unites with Kinghorn, Dysart, and Kirkcaldy to send one member to parliament. Pop. (1871) 3422; (1881) 4271.

BURNU'GGUR, a town of India, in Guzerat, the territory of the Guicowar, 52 miles north from Ahmedabad, in N. lat. 23° 48', E. long. 72° 38'. It is a place of considerable trade, which is mostly in the hands of wealthy Brahmans. Pop. 12,000.

BURRIA'NA, a town of Spain, in the province of Castellon-de-la-Plana, about 8 miles south from the town of that name, is situated on the left bank of the Rio Seco, about one mile from its mouth in the Mediterranean. Pop. (1877) 10,058, who are chiefly engaged in agriculture and fishing; and exports wine, oil, and fruit.

BURRITT, ELIHU, a distinguished advocate of the doctrines of the Peace Society, and widely known as 'the learned blacksmith,' was born at New Britain in Connecticut, United States, in 1811. He was brought up to the trade of a blacksmith; but devoted all his leisure to study, especially to mathematics and languages. In the latter field of study, his range has been very wide, embracing more or less Latin, Greek, Hebrew, Arabic, and other oriental tongues, and almost all modern European and Slavonic languages. He is, however, much better known to the world as an earnest apostle of peace than as a scholar. To preach the doctrine of 'universal brotherhood,' he has traveled through Europe and the United States. His chief works are, *Sparks from the Anvil*, *Olive Leaves*, *Peace Papers*, and *Lectures and Speeches*. He has taken a prominent part in the Peace Congresses of Brussels, Paris, Frankfort, London, and Edinburgh; and in advocating an ocean penny-postage. For many years he resided in England,

part of the time as U. S. consul at Birmingham. He died 7th March 1879.

BURSARY (Fr. *bourse*, Lat. *bursa*, a purse), the annual proceed of a sum permanently invested for the maintenance of a student at a university. A number of small bursaries were till lately the only equivalents at the Scotch universities for the scholarships of the English. Their large number, and the small amount of each was, in course of time, found to have a prejudical effect, more particularly at Aberdeen, which possessed the largest number, and where a practice had obtained of multiplying bursars on the foundation, at the discretion of the senatus or patrons. Both the University Commissioners of 1831 and those of 1863 expressed their opinion that it was less provision for encouraging learning in its earlier stages than adequate inducements to persons who have passed the preliminary class to make learning the business of their lives, that was wanted in Scotland. The general effect of the ordinances issued by the Commissioners of 1863, in carrying out the directions of Act 21 and 22 Vict. c. 83, was to consolidate some of the smallest bursaries into others of greater value, and in some instances to remove restrictions that had proved injurious, while a large number was thrown open to competition. There are, however, still a large proportion of purely presentation bursaries, and in some there is a preference given to a particular name, or to natives of a particular district.

At Aberdeen, the commissioners founded eight scholarships of £65 annual value; at St. Andrews they so modified the Ramsay foundation as to found two scholarships of £60; and in Edinburgh they acquired funds sufficient to establish the Pitt and Mackenzie scholarships of £60 and £120 annual value. Since 1863, a large number of scholarships, tenable by graduates, and fellowships, have been founded by private individuals on a more liberal scale than the old bursaries, particularly in Edinburgh and Glasgow. At Edinburgh there are at present about 200 bursaries, of which above 100 are in arts, and 30 in theology; they vary in amount from £2, 15*s*. 6*d*. to £100. Among the most considerable of them are two of £90, founded in 1809 by Dr. Donald Grant, for students of his own surname; one founded by Sir John Macpherson in 1821, worth £88, for Highland students; the Jardine competition bursary of £40, four Lennie bursaries of £48, four Bruce bursaries of £30, and three of £40; two competition bursaries of £100 and £50 respectively, founded in 1860 by Mr. Patrick of Roughwood, for young men educated in Ayrshire; two bursaries founded in 1865 by Miss Scott of Horseliehill, and one by Miss Harrison in 1867, for £40 each; and two founded by the Rev. John Spence in 1867, for £50. The scholarships for graduates are about thirty, varying in amount from £60 to £120; and there are about eight fellowships varying from £100 to £160. Of 190 bursaries at Glasgow, many of them small, the most considerable are six founded by Lord Dundonald in 1672, four in philosophy, and two in divinity, of £40; two by Mr. Patrick, of £100 and £50 respectively; and the Brisbane medical bursary of £50, founded in 1877. Glasgow has also 14 exhibitions to Balliol College, Oxford, on the Snell foundation (q. v.), and about 30 scholarships of from £50 to £200, the highest being the four founded by George A. Clark, in 1872. At St. Andrews there are 81 bursaries belonging to the United College, varying in amount from £5 to £50; 20 belonging to St. Mary's, varying from £6 to £50; and 20 of the same value transferable from the United College, when the bursars proceed to the study of divinity; two Ramsay scholarships of £50; one Guthrie scholarship worth £100 the first year, and afterwards £50; one Patrick Kidd scholarship, worth about £40; and two scholarships of £50, founded by Mrs. Tyndal Bruce. At Aberdeen there are about 250 bursaries, varying from £5 to £50; and 11 scholarships of £65 to £70, tenable for four years, also some valuable exhibitions to Cambridge.

BU'RSLEM, a town of Staffordshire, on the Trent and Mersey Canal, in the pottery district, is on the branch of the North Staffordshire Railway. It forms part of the parl. burough of Stoke-upon-Trent. Pop. (1871) 25,562; (1881) 27,108. The abundance of coal and the variety of clays have made B., since the 17th c., one of the chief seats of the fictile manufacture. Porcelain and pottery of all kinds—Parian, iron and stone ware, &c.—are produced on a large scale, as well as encaustic tiles. There is also a glass manufactory here. The affairs of the town are managed by a 'local Board of Health.' At Birche's Head, a mile and a half from B., stands a large service reservoir of the Staffordshire Waterworks Company, from which the town and neighborhood are supplied with excellent water. A fine new town-hall was erected in 1865, which, besides the usual municipal offices, contains lecture rooms and news rooms. B. was the native place of Josiah Wedgwood, who in the middle of the 18th c. greatly improved the manufacture of pottery. A Wedgwood memorial institute was founded in 1863, to serve as a school of art, a free library, and a museum. An appropriate character is given to it by introducing into the ornamentation of the façade terra cotta mouldings, Wedgwood's jasper ware, &c.

BURTON, John Hill, advocate (member of the Scottish Bar), achieved for himself a place in the world of letters by a variety of works, all remarkable for ability, and several for original thought. B. was born at Aberdeen on the 22d of August 1809; his father was an officer in the army, and his mother the daughter of an Aberdeenshire laird. Having graduated at Marischal College, Aberdeen, he became an apprentice to the profession of law in his native city; which, however, he afterwards abandoned for the higher sphere of the Edinburgh bar. Here, with time on his hands, he devoted himself to study and letters. For a long series of years, from 1833 downwards, he was a contributor to the *Westminster Review* of articles on law, history, and political economy; and for several years he contributed to *Blackwood's Magazine* literary sketches. Among his original works may be mentioned, *The Life and Correspondence of David Hume*, 2 vols. (1846); *Lives of Simon Lord Lovat and Duncan Forbes of Culloden* (1847), both excellent biographies; *Political and Social Economy* (1849), which is a valuable, condensed and lucid contribution to the literature of social science; *Narratives from Criminal Trials in Scotland; A Manual of Scottish Law; A Treatise on the Law* (Scottish) *of Bankruptcy; The History of Scotland from the Revolution to the Extinction of the Last Jacobite Insurrection*, 2 vols. (1853); *The History of Scotland from Agricola's Invasion to the Revolution of* 1688, 7 vols. (1867—1870); *The Book-Hunter* (1862); *The Scot Abroad*, 2 vols. (1864); *The Cairngorum Mountains* (1864). A new edition of the *History of Scotland*, enlarged and partly rewritten, appeared in 8 vols., 1873. He edited vols. i. and ii. of the *Register of Privy Council* (Scotland) for 1545—1578; and issued *A History of the Reign of Queen Anne* in 1879. The high merits of B.'s historical works have been universally admitted.

He further edited the works of Jeremy Bentham (nominally in conjunction with the late Sir John Bowring), with an able introduction; and published a volume of *Benthamiana*. B. was, in 1854, appointed Secretary to the Prison Board of Scotland; and on the abolition of that Board in 1860, he remained as Stipendiary Manager and Secretary in connection with the Home Office. In 1877, B. was appointed one of the Prison Commissioners for Scotland. He held the old office of Historiographer Royal for Scotland, was LL.D. of Edinburg University, and D.C.L. of Oxford. He died 10th August 1881.

BURTON, Richard Francis, one of the most daring and successful of modern travelers, was born in 1821 in Norfolk. He is the son of Colonel J. N. Burton, and was educated in France and England. In 1842, he entered the Indian army, and served many years in Sindh. While in this employment, he exhibited a remarkable facility in acquiring the Eastern languages, and a still more remarkable dexterity in imitating the appearance and habits of the natives of India. In 1851, he published his first important work—*Sindh, and the Races that inhabit the Valley of the Indus*—full of graphic description, and interesting to all readers. B. had acquired a very familiar acquaintance with Hindustani, Persian, and Moultani. He had devoted special attention to Arabic, and had made such progress as to be able to speak it like a native. Possessed of these qualifications, he resolved to explore Arabia in the disguise of an Afghan pilgrim; and after a visit to England, he set out on his journey. Political commotions prevented him from traversing the whole country, as he intended; but his *Personal Narrative of a Pilgrimage to El Medinah and Meccah* (1855) records one of the most daring feats on record. A perpetual strain on the ingenuity was necessary to keep up his assumed character, most difficult in moments of fatigue, and in the midst of shrewd and observant fellow-travelers. The next journey undertaken by B. was into the country of the Somaulis, in Eastern Africa. It proved less successful than was anticipated. B.'s companion, Lieutenant Stroyan, was killed, and B. himself was wounded. He succeeded, however, in reaching Harar (q. v.), a most important town in Eastern Africa, not before visited by any European, and in penetrating a vast and populous region scarcely known to geographers. The journey led to a still more important series of expeditions—those to the country of the Upper Nile. Towards the end of 1856, B. set out in company with Lieutenant Speke, also of the Indian army, to ascertain the truth of the reports collected by the missionaries, that a vast sea existed in the heart of the continent. The journey is one of the most memorable of our time. It led to the discovery and exploration of the great lake of Tanganyika, and the opening up of the eastern part of the continent. B. was rewarded with the medal of the Geographical Society. His health had been affected by his African journeys, and he sought to recover it by a journey in North America, from which he brought the first reliable account of the Mormons.

In 1681, B. was appointed consul at Fernando Po, on the west coast of Africa, and while holding this appointment, he visited Cameroons Mountains, and went on a mission to the king of Dahomey, the incidents of both journeys being recorded in two of his most interesting works. B. has subsequently been consul at Santos in Brazil, and at Damascus; and on the death of Mr. Charles

Lever in 1872, B. succeeded him in the post of British consul at Trieste. In 1882, B. visited the gold-producing country of the Guinea coast, along with Captain Cameron.

The following is a list of the principal works of Captain B. not mentioned above: *Sindh, or the Unhappy Valley* (1851); *Goa and the Blue Mountains, or Six Months of Sick-leave* (1851); *Falconry in the Valley of the Indus* (1852); *First Footsteps in East Africa, or an Exploration of Harar* (1856); *The Lake Regions of Central Africa, or a Picture of Exploration* (1860); *The City or the Saints, and Across the Rocky Mountains to California* (1861); *Abeokuta, or the Cameroon Mountains* (1863); *The Nile Basin; A Mission to Gelele, King of Dahome, with notices of the so-called Amazons*, &c.; *Explorations in the Highlands of Brazil; Vikram and the Vampire; Zanzibar; Two Trips to Gorilla Land; Ultima Thule, or a Summer in Iceland; Etruscan Bologna* (1876); *Sind Revisited* (1877); *The Gold Mines of Midian* (1878); a translation of *Os Lusiadas* of Camoens (1881); *To the Gold Coast for Gold* (with Cameron, 1882); and a history of *The Sword* (1883).

BURTON, ROBERT, author of the *Anatomy of Melancholy*, was born at Lindley, in Leicestershire, in 1576, and studied at Brasenose and Christ Church, Oxford. In 1616, he was appointed to the vicarage of St. Thomas, and in 1628, to the rectory of Segrave in his native county. He appears, however, to have continued all his life at Christ Church, where he died in 1640, leaving legacies of £100 each to the Bodleian and Christ Church libraries, and as many of his books as they did not already possess. A monument was erected to his memory in Christ Church Cathedral. B. is described by Anthony Wood as a good mathematician, a dabbler in nativities, a well-read scholar, and a thorough-paced philologist. 'As he was by many accounted a severe student, and a melancholy and humorous person, so by others who knew him well, a person of great honesty, plain-dealing, and charity. I have heard some of the ancients of Christ Church often say that his company was very merry, facete, and juvenile.' His *Anatomy of Melancholy*, in which he appears under the title of Democritus Junior, is one of the most curious *melanges* of heterogeneous elements ever put together. It consists mainly of an extraordinary mass of quotations from old and obscure writers, strung on a thread of rambling reflection; often tiresomely pedantic, but relieved by quaint touches of humor and feeling. In his own lifetime, it was highly popular, and went through five editions; after that, it fell into comparative oblivion, but is now again popular among lovers of quaint literature. Dr. Johnson said it was the only book that ever took him out of bed two hours before his usual time.

BURTON-ON-TRENT, a market-town in Staffordshire, on the river Trent and the Midland Railway. The Grand Trunk Canal also passes the town, and enters the Trent below. A bridge of 34 arches, built before the Norman Conquest, here crossed the river, but was replaced in 1864 by a new one of 29 arches. The population of B. has been more than doubled within the last 20 years, being, in 1861, 18,745; in 1881, 39,285. This is owing to the rapid extension of the brewing of ale, which is the staple produce of the place. There are upwards of thirty breweries in B., some of them on a scale of unparalleled magnitude. The two establishments of Bass and Allsopp cover together more than 250 acres of ground, and can produce yearly about two million barrels of ale. There are, of course, extensive cooperages, and also iron-foundries. The public edifices are not particularly noticeable.

BU'RTSCHEID, or BORCE'TTE, a town of Rhenish, Prussia, about half a mile distant from Aix-la-Chapelle, with which it is connected by an avenue of trees. It has manufactures of woollen cloths and cassimeres, and celebrated sulphur springs, and baths, with a temperature of 106° to 155° F. Pop. (1880) 10,989.

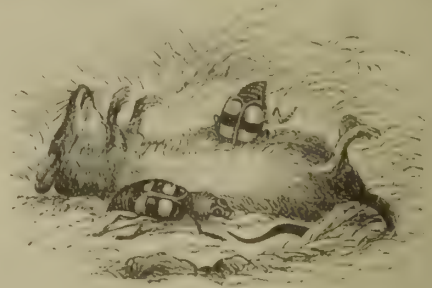
BU'RWHA, or, as Dr. Barth spells it, BA'RUWA, a town of Bornu, Central Africa, situated on the west bank of Lake Tchad, about 80 miles north-north-west of Kuka. The town, which consists of closely packed huts, is surrounded by high clay walls, which, however, 'owing to the high mounds of rubbish imbedding them on all sides,' afford no protection whatever from the attacks of the Tawarek, to whom the inhabitants have to pay tribute. Fish in great quantities are caught in the adjoining lake, and form the chief food of the inhabitants, as well as their only article of commerce. Pop. about 6000.

BU'RY, a flourishing manufacturing town in the south-east of Lancashire, on a rising ground backed by hills on the north and east, between the Irwell and the Roche, 9 miles north-west of Manchester. It was early a seat of the woollen manufactures, carried on by Flemings, but these, though still considerable, now yield in importance to those of cotton. Besides spinning and weaving factories, there are important print, bleach, paper, and dye works, and some large foundries and engine manufactories. In the vicinity are excellent freestone quarries, and abundant coal-mines. The town has been much improved in drainage, and an ample supply of water has been secured from a distance. Pop. (1871) 41,344; (1881) 49,746. B. returns one member to parliament. Some improvements in the cotton manufacture arose here—notably, the invention by John Kay of the fly-shuttle. The late Sir Robert Peel was born in B., where his father established his great print-works. A bronze statue of Sir Robert has been erected in the old market-place.

BURY ST. E'DMUNDS, or ST. E'DMUNDSBURY, an ancient borough in Suffolkshire, on the Upper Larke, 26 miles north-west of Ipswich. It is well built, and delightfully situated. Pop. (1871) 14,928; (1881) 16,211. It returns two members to parliament. It has a trade in agricultural produce, but no manufactures. A very complete system of drainage has been carried out, the sewage being conveyed to a distance, and, by means of pumps, applied to irrigation. A new Corn Exchange was erected in 1862; in 1864, the Suffolk General Hospital was rebuilt. B. received its name from Edmund, the Saxon king and martyr, who was crowned here on Christmas Day, 856; taken prisoner, and put to death by the Danes. On the site of his tomb, six priests founded a monastery; and here Canute raised a Benedictine abbey, which in time became the richest and most important in England, save that of Glastonbury. From 1020 to its dissolution by Henry VIII., it was ruled over by a line of 33 abbots. The abbot was a spiritual baron of parliament, had judicial authority in all causes within the liberty of B., had the power of inflicting capital punishment, and the privilege of coining. At the dissolution, the annual income was equivalent to £50,000 of our money. Of this magnificent establishment, little now remains but the western gate, erected in 1327, a noble relic of the decorated Gothic style; and the 'Church-gate,' a quadrangular tower of massive simplicity, 86 feet high. The churchyard, to which this tower formed the portal, includes, besides the abbey ruins and some other buildings, the fine old churches of St. Mary and St. James.

The celebrated grammar-school of B. was founded by King Edward VI. in 1550, and is free to sons of the inhabitants of the town. It has two scholarships at Cambridge, and 6 exhibitions to each university, and has produced many eminent scholars. Among the many religious and charitable institutions connected with the abbey, of which portions still exist, is St. Saviour's Hospital, founded by that notable abbot, Samson, whose life and actions, as recorded by Jocelyn of Brakelond, Mr. Carlyle has so vividly recalled in his *Past and Present*. The poet Lydgate was a monk in this abbey; and Sir Nicholas Bacon was born here. At B., King John first met his indomitable barons before he signed Magna Charta. Parliaments were held here in 1272, 1296, and 1446, the last of which ordered the arrest of Humphrey, the good Duke of Gloucester, who was found dead in his bed the morning after his arrest; and sovereigns, as late as Elizabeth's time, were often nobly entertained at St. Edmund's town. Three miles south-west of B., the Marquis of Bristol has a splendid seat, Ickworth Park, a circular pile 90 feet in diameter, and 140 feet high.

BU'RYING BEE'TLE (*Necrophorus*), a genus of Coleopterous (q. v.) insects, of the tribe or family *Silphales*, with short club-shaped antennæ, remarkable for their habit of burying the bodies



Burying Beetle.

of mice, moles, and other small animals, in order to deposit their eggs in them, and to provide a supply of food for their larvæ. Some of the species are natives of Britain, among which is *N. Vespillo*, the species of which the habits were first observed, which is, however, more common in some parts of continental Europe. It is a black beetle, about an inch long, with two bright orange bands across its back, and having an excessively fetid smell, which long adheres to whatever it touches.

Its sense of smell would seem to be extremely acute, and a dead animal soon attracts it, a pair generally arriving together, male and female, to feed upon the body, and the male to proceed to its interment, if sufficiently small, previous to which, however, they have sometimes to drag it to some distance to a place suitable for their purpose. The head of the insect is the only tool employed in the operation, and is held sloping outwards, and employed in a manner which exhibits great muscular power. A furrow is first made around the body, then another within the first, and so on till the earth is so excavated from beneath, that the body begins to

sink, when the insects, by great efforts, drag it down into the hole, and when it is fairly in, the excavated earth is thrown back over it. The female then lays her eggs in it; and when this is accomplished, and the cravings of appetite are satisfied, it is left for the larvæ, which are of a lengthened form, with six feet, whitish, and a brown head.—The known species of B. B. are mostly natives of Europe and of North America.

BUSACHI'NO, or BISAQUI'NO, a town of Sicily, in the province of Palermo, about 29 miles south-south-west of the city of that name. It has manufactures of linen, and a population of 9100.

BUSA'CO, a ridge or serra on the north side of the river Mondego, in the province of Beira, Portugal, about 20 miles north-north-east of Coimbra. Here Wellington, with 40,000 British and Portuguese troops, repulsed the attack of Massena with 65,000 French, 27th September, 1810. Unable to force the position, Massena turned it by a pass over an adjoining ridge, and Wellington retired behind the lines of Torres Vedras, which indeed it was his intention to do, even if there had been no battle.

BUSBY, RICHARD, the most famous of English schoolmasters, was born at Lutton, Northamptonshire, September 22, 1606. Educated at Westminster School, and Oxford, he was, in 1640, appointed head-master of Westminster School, the duties of which office he continued to discharge until his death in 1695. He is the type of Pedagogues alike for learning, assiduity, and the application of the birch. He was a most successful teacher, and at one time could point to no less than sixteen occupants of the bench of bishops who had been educated in his school; and altogether, he has the reputation of having 'bred up the greatest number of learned scholars that ever adorned any age or nation.' He published several works, but they were chiefly for school use.

BU'SCA, a town of Piedmont, situated on the left bank of the river Maira, an affluent of the Po, about 9 miles north-west of Coni. Excellent wine is produced in the vicinity. Pop. 9375.

BUSCHING, ANT. FRIEDR., a celebrated geographer, was born 27th September 1724, at Stadthagen, in the principality of Schaumburg-Lippe, Germany. He studied theology at Halle, where he enjoyed the friendship of Baumgarten. In 1754, he was appointed extraordinary professor of philosophy in Göttingen, but soon incurred the displeasure of the Hanoverian government by his religious heterodoxy. Göttingen thus becoming an unpleasant residence to him, he accepted an invitation, in 1761, to St. Petersburg as preacher to a Protestant congregation there. In 1765 he returned to Germany, and in 1766 was called to Berlin as Upper Consistorial Councillor and Director of a *gymnasium* in Berlin, where he died, 28th May 1793. Until the appearance of B.'s *Erdbeschreibung*, the first volume of which was published at Hamburg in 1754, neither Germany nor any other nation possessed a geographical work which made any pretension to scientific treatment or completeness of execution. The changes in the political arrangements of the world have, however deprived the work of its original value, but it has been corrected and edited by subsequent writers. Of his other numerous publications, the most important is the *Magazin für Historie und Geographie* (25 vols. Hamburg, 1767—1793).

BUSEMBAUM, HERMANN, a theologian of the order of the Jesuits, was born in 1600 at Nottelen, in Westphalia. About 1640, he taught ethical philosophy at Cologne, and later, was appointed rector of the College of Jesuits at Münster. He died 31st January 1668. His work entitled *Medulla Theologiæ Moralis* (1645), was celebrated as a standard authority in the seminaries of the Jesuits, though several of its propositions were condemned by the pope. It has gone through more than fifty editions. It was enlarged by the Jesuit Lacroix (1707), and re-edited, with improvements and additions, by the Jesuit Montausan in 1729, and again by Alfonso de Ligorio in 1757. As it was found that the work contained doctrine in favor of regicide, it was burned, by order of the parliament of Toulouse, on the occasion of an attempt made on the life of Louis XV. by Damiens in 1757. Subsequently, the Jesuits Zacharia and Franzoja of Padua wrote in defence of B.'s work.

BUSH ANTELOPE, BUSH BUCK, and BUSH GOAT, names common to a number of species of Antelope (q. v.), natives chiefly of the southern and western parts of Africa, forming a section of the genus *Antilope*, which some naturalists have attempted to erect in a distinct genus (*Philatomba* or *Cephalopus*). They are animals of more compact form, shorter limbs, and greater strength, but much less agility, than the true or typical antelopes. They are remarkable for the arched form of the back. They have short, straight, or slightly curved horns, situated far back, and generally peculiar to the male sex, with usually a long tuft of hair between them. They have no tear-pits, but instead of them, a naked glandular line, formed of two series of pores, on each cheek. They frequent jungles, thick forests, and beds of reeds, and when pursued, seek to escape by diving into a thicket. The common or white-backed B. A. of Sierra Leone (*Antilope sylvicultrix*) is about three feet high at the shoulder: it is a dull, heavy, awkward-looking animal; keeps concealed in the thickets during the day, living singly or in pairs, and feeds in the open spaces in the early mornings only. To shoot it, sportsmen place themselves on the margin of the woods, and watch their opportunity as it comes out to graze. Its flesh is more esteemed than that of the more agile antelopes. Nearly twenty other species are usually ranked in this section of antelopes, among which is the *Kleene Boc* (*Antilope pygmæa*) of South Africa, a species abundant in many parts of Cape Colony, of very small size, not more than one foot in height at the shoulder, and with horns only about 1½ inch in length. It is a timid, gentle animal, easily domesticated. It differs from the typical Bush Antelopes in the great activity which it displays.

BUSHEA'B, a low flat island in the Persian Gulf, about 11 miles from the Persian coast, in lat. 26° 50′ N., long. 53° 12′ E. It is about 18 miles long, narrow, and well peopled, with a town and harbor at its western extremity. Its proper name is *Khoshaub*, signifying 'good water.'

BU'SHEL [Fr. *boisseau*, allied to *boi(s)te*, box, butt; Lat. *butta*, a measure in general], a dry measure used in Britain for grain, fruit, &c. The quarter contains 8 bushels, and the bushel 8 gallons, the gallon measuring 277·274 cubic inches, and holding 10 lbs. avoirdupois of distilled water. Hence the imperial bushel contains 80 lbs. of water, and measures 2218·2 cubic inches.

BUSHIRE. See ABUHEHR.

BUSHMEN, or BOSJESMANS, are a nomadic race found in South Central Africa, especially in the Kalahari desert, where they subsist on game and the desert roots. In appearance the B. are thin and wiry; of low stature, poor and debased when found near the Cape, but of improved appearance and intelligence farther northwards. They do not cultivate the soil, build no huts, and do not gather round a king or chief; at one time a numerous race, they are now rapidly becoming extinct. In some of the mountain caves which they have inhabited, rude paintings are to be seen displaying real artistic talent. Although they resemble the Hottentots (q. v.) in color and features, the relationship between these two races is by no means clear. The languages of both abound in curious and unpleasant clicking sounds, but have little or nothing else in common.

Buskin.

BU'SKIN, a kind of half-boot, lacing tight to the leg. The ancient tragedians wore buskins (*cothurni*), often with thick soles, to add to their stature. Hence the B is often put for Tragedy, as the sock (*soccus*, a flat-soled shoe) for Comedy.

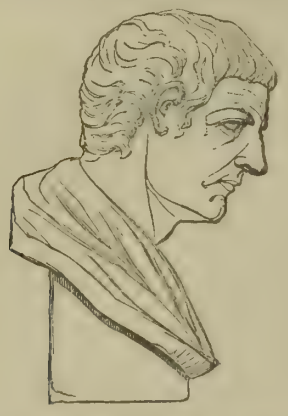
BUSSAHIR (better spelled *Bashahr*), one of the Punjab hill-states, on the lower slopes of the Himalayas (32° N. and 78° E. cross in its area). Much of its area is from 7000 to 12,000 feet above the sea. The Sutlej flows through the country from east to west. The district on the north of the Sutlej is called Kunawur, that on the south is B. Proper. The climate in the lower parts on the southern frontier is almost tropical, and there are many genial and fertile districts of mild temperate climate; other districts are near, and within the limits of perpetual snow. The vine succeeds admirably in many places, and it is supposed that some parts of this state, are extremely suitable for the culture of tea, which, indeed, is cultivated to some extent. Very rich deposits of copper ore have been discovered in Kunawur, and copper-mining is prosecuted near the south-west frontier. The inhabitants are little advanced in civilization; many of those in the more northern parts have strongly marked Mongolian features. Polyandry prevails among them, and the females left unmarried take refuge in Lamaic convents. The rajah and upper classes in the southern parts are Rajpoots, and the people generally are of Hindu race. Their observance of Hinduism, however, is very partial. The Rajah of B. holds his dignity by a grant from the East India Company, made on the expulsion of the Ghoorkas in 1815. The tribute paid is £340. The pop. is estimated at 90,000. Principal productions are opium, grain and woollen manufactures.

Bussu Palm.

BUSSU PALM (*Manicaria saccifera*), a South American palm-growing in the tidal swamps of the Amazon, the only known

species of its genus. The stem is only 10—15 feet high, curved or crooked, and deeply ringed. The leaves are simple or undivided, and are the largest of the kind produced by any known palm, being often 30 feet long, and 4 or 5 feet wide. They are simply branched, drooping, and the fruit is of an olive color, large, hard, and three-seeded. The leaves make excellent and durable thatch, being split down the midrib, and laid obliquely on the rafters, so that the furrows formed by the veins lie in a nearly vertical direction, and serve as so many little gutters to carry off the water. The spathe, taken off entire, is used by the Indians as a bag, or the larger ones are stretched out to make caps.

BUST (Ital. *busto;* Fr. *buste*), in plastic art, the name given to a sculptural representation of the head and upper part of the human body. The earliest busts formed by the ancients were probably those heads of Mercury which, when elevated on tall square blocks of stone, received the name of Hermæ (q. v.). These hermæ were afterwards frequently surmounted by representations



Bust of Aristotle.

of other divinities, such as Minerva; and as they gradually assumed more and more of the human form, they passed into busts, which were made of marble, bronze, &c. But it was not till very late in the history of art that busts, in the sense of portraits of individuals, came to be used, either in Greece or Rome; and it is remarkable that neither Greeks nor Romans designated them by any special name, for the Latin word *bustum* had a quite different meaning.

It was not till Alexander's time that busts were used for purposes of portraiture in Greeee; and most of the Roman busts which we possess belong to the period of the emperors. During the learned period of Greece, which commenced with Aristotle, portraits of men of letters formed an important department of art; and it became an object with the founders of museums and libraries to procure complete sets of them. The artists of this period exhibited remarkable ability in expressing the characters of the individuals whom they represented. In this way, we have well authenticated busts of Socrates, Plato, Zeno the Stoic, and other philosophers; of poets and orators, such as Isocrates and Demosthenes; of Athenian statesmen and distinguished women. In Rome, representations of the kings, and persons of distinction belonging to the earlier period, were probably made from the *imagines majorum* which every patrician preserved in his atrium, and which were commonly made of wax. These, no doubt, were often merely fanciful representations, partly taken, it may be, from the more prominent features which belonged to the existing members of the family. The earliest well authenticated Roman B. which we possess, is probably that of Scipio Africanus the Elder. During the empire, busts for the most part were accurate portraits, and still furnish us with the means of becoming acquainted with the features, not only of the emperors themselves, but of most other persons of distinction. Busts of poets and men of letters are far less frequently met with amongst the Romans than amongst the Greeks. The chief marks of the authenticity in these busts are the names which very frequently are inscribed on them, and, where these are not found, the comparison which we are enabled to make between them and coins. Private collectors of busts were not unknown in antiquity, as for example, M. Terrentius Varro and Pomponius Atticus. In our own time, King Louis I. of Bavaria made, in his celebrated Valhalla, the most remarkable collection of busts which perhaps anywhere exists. The first complete collection of engravings from antique busts was made by Fulvius Ursinius in his *Illustrium Imagines* (Rome, 1569, and Antwerp, 1606). Recently, we have been indebted to Visconti's *Iconographie Grecque* (Paris, 1811) and *Iconographie Romaine* (Paris, 1817) for a similar collection.

BU'STARD (*Otis*), a genus of birds, sometimes made the type of a family, *Otidæ*, usually ranked in the order *Grallæ* (q. v.). The general structure seems to agree best with that of the *Grallæ;* but there are points of strong resemblance to gallinaceous birds, both in the appearance and habits of the bustards; while their power of running, and the use which they make of their wings to aid in running, are indicative of a relation to the *Struthionidæ*, or ostrich tribe. They differ, however, from these birds in possessing wings quite capable of flight, although even when pressed by danger they often seek to escape by running, and the great B. of Europe has been pursued and taken by greyhounds.—Bustards are birds of bulky form, with long neck and long naked legs; the toes, three in number, all directed forward, short, united at the base, and edged with membrane; the wings rather rounded; the bill of moderate length, straight, or nearly so. They are mostly inhabitants of open plains, to which all their habits are adapted.—The GREAT B. (*Otis tarda*) was at one time plentiful in some parts of England, and was also an inhabitant of the south-east of Scotland; but extending cultivation, and the persecution to which it has been subjected, have now rendered it a very rare British bird. It is common in the south and east of Europe, and abounds in the wide steppes of Tatary. It is the largest of European birds, the male sometimes weighing nearly 30 lbs. The female is much smaller than the male. The plumage is of a pale chestnut color on the upper parts, beautifully varied with black—much white and black on the wings, the tail tipped with white. The tail is short, spreading, and rounded.

Great Bustard (*Otis tarda*).

A tuft or plume about seven inches long, springing from the chin, passes backwards and downwards on each side, in the summer dress of the male, partly concealing a long stripe of bare skin on each side of the neck. The anatomy of the male exhibits a remarkable peculiarity in a large bag or pouch, capable of holding several pints, the entrance to which is between the under-side of the tongue and the lower mandible. The use of this bag is unknown; but it has been conjectured to be for conveying water to the females and young, in wide arid plains. The Great B. feeds indiscriminately on animal and vegetable food, swallows frogs, mice, worms, &c., and is very fond of turnip-tops. Its flesh is highly esteemed for its flavor. It is polygamous. No difficulty is found in taming it, but all attempts to reduce it to a state of true domestication have hitherto failed, from its not breeding in the poultry-yard.—The LITTLE B. (*O. tetrax*), frequent in the south of Europe and north of Africa, is only an accidental visitant in Britain. It is not half the size of the Great Bustard. The BLACK-HEADED B. (*O. nigriceps*) is found in large flocks in the open plains of the Mahratta country. Its flesh is esteemed one of the greatest delicacies which India produces.—The KORI B. (*O. Kori*) of South Africa, a magnificent bird, standing upwards of five feet in height, has a similar reputation as one of the best kinds of game.—Australia possesses a B. (*O. Australasianus*) somewhat exceeding the Great B. of Europe in stature. It is called Wild Turkey by the colonists of New South Wales. Its plumage is finely freckled or spotted; the prevailing color is brown. It has become comparatively rare in the more settled districts, its flesh being particularly delicate and well flavored, but may be seen stalking majestically in the grassy plains, wherever human footsteps are still rare.

BUSTO-ARSI'ZIO, a town of Northern Italy, in the province of Milan, and 20 miles north-west from Milan. It stands in a fertile plain, which produces much wine. In one of the churches are numerous statues and fine paintings, by Daniel Crespi, a native of the town. Remains of ancient buildings show that B. was in ancient times of considerable importance. It is a place of active trade, and has a cotton-thread factory. Pop. of town and suburbs, 12,909.

BU'TCHER BIRD. See SHRIKE.

BUTCHERS' BROOM (*Ruscus*), a genus of plants of the nutural order *Liliaceæ*, with male and female flowers on separate plants, a perianth of six leaves, filaments united, one style, and the fruit a berry. The common B. B. (*R. aculeatus*) is a shrubby, or almost shrubby evergreen plant, with a biennial stem, 1—3 feet high, sending out many short branches and many ovate alternate sharp-pointed false leaves of the same substance as the branches, the flowers minute and arising from the disk of the false leaves, soli-

tary; the berries red, almost as large as wild-cherries, and of a sweetish taste. It is common in many parts of the south of Europe, and in the south of England, in woods and hedges. The English name is derived from the use made of the plant by butchers, to sweep their blocks. It grows well under trees or shrubs, and can often be advantageously introduced for ornamental purposes. The root was formerly used in medicine. It is aperient and diuretic.—*R. hypophyllum*, a native of Italy, had once a considerable reputation as a stimulant of the uterus.

Butchers' Broom (*Ruscus aculeatus*). *a*, branch, with flowers; *b*, a berry; *c*, a seed; *d*, a female flower.

BUTE, an island in the Firth of Clyde, Scotland, separated from the coast of Argyle by a narrow winding strait, called the Kyles of Bute, mostly under a mile wide, about 6 miles distant from the west coast or Ayrshire, and 8 miles north of Arran. It is about 16 miles long, of irregular breadth, and with an area of 60 square miles. The surface to the north is high, rugged, and barren; in the center and south, it is low and undulating, and comparatively fertile. The highest point rises 875 feet. The coast is rocky, and has some bays. The island has several small lakes. The climate is milder than in any other part of Scotland, and though moist, less so than on the west coast generally; hence, it is much resorted to by invalids. In the south, the soil is sandy; towards the north clay predominates. Most of the arable land is under tillage, and agriculture is in a good state. The chief crops are oats, turnips, and potatoes. Pop. (1881) 10,998. The principal town is Rothesay.

Most of the island belongs to the Marquis of Bute, whose beautiful seat, Mount Stuart, is about 4 miles south from Rothesay. Among the antiquities of B. are Rothesay Castle, Kames Castle, Kilmorie Castle, St. Blaine's Chapel, Dungyle, a remarkable vitrified fort on a high crag on the south-west coast, and the Devil's Caldron, a circular erection, the original purpose of which is not well known. B. and the neighboring isles were for many centuries subject to the Norwegians.

BUTESHIRE, a county in the southwest of Scotland, comprising the isles of Bute (q. v.) and Arran (q. v.), and the Cumbraes, Holy Isle, Pladda, Inchmarnoch, and other smaller islands. The area of the whole, according to the Ordnance Survey, is 225 square miles, or 143,977 statute acres. Pop. (1871) 16,977; (1881) 17,657. B. returns one member to parliament. The county town is Rothesay, in the island of Bute.

BUTE, JOHN STUART, third EARL OF, was born in 1713, and died in 1792. About 1737, he attracted the favorable notice of Frederick Prince of Wales, who made him one of his Lords of the Bedchamber. After the death of the prince, he became Groom of the Stole to his son, afterwards George III., over whose mind he obtained a strong influence. In March 1761, he was appointed one of the principal Secretaries of State; and from the 29th May 1762 to the 8th April 1763, he was Prime Minister. His government is memorable only as one of the most unpopular that ever held office in Britain, its fundamental principle being the supremacy of the royal prerogative, of which the executive government were merely the humble servants. Lord Bute was given to scientific pursuits, especially botany, and showed himself a liberal patron of literature and art. He married the only daugther of Lady Mary Wortley Montagu.

BU'TEA, a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, remarkable for the great length of the *standard* of the flower, and having a compressed one-seeded pod, membranaceous at the apex. The best known species are *B. frondosa* and *B. superba*, natives of India; and the former very widely diffused throughout that country, generally appearing as a sort of shrub in the neighborhood of villages, but in the jungles growing into a small tree. These trees present a gorgeous sight when covered with racemes of large deep scarlet flowers. They have trifoliate leaves, with roundish leaflets, velvety beneath. They yield a resinous exudation, which occurs in the form of lurid red tears, often covering the twigs, and is one of the kinds of Lac (q. v.) brought to the market in India. The juice of the tree is not red, and the lac is supposed to be elaborated by insects, but of what species is unknown.—*B. frondosa* is called the *Dhak* Tree in India. The bark and roots are very fibrous, and the fibre is used for calking boats. The flowers, called *Teesoo* or *Keesoo*, yield a beautiful yellow or orange dye.

BUTERA, a town of Sicily, in the province of Caltanisetta, and 8 miles north-north-west from Terranova. It stands on a height on the left bank of the Manfria. Ruins of great antiquity exist in the neighborhood, but the ancient name is unknown. In 853, B. was besieged for five months by the Saracens, who raised the siege on the surrender of 6000 people as slaves. B. was almost the last town in Sicily taken by the Normans, having held out against Count Roger till 1089. The present castle is of Norman erection, and contains a number of medieval antiquities. Pop. 5150.

BUTLER, BENJAMIN FRANKLIN, general of Volunteers, U. S. army, was born at Deerfield, New Hampshire, November 5, 1818. He graduated at Waterville College, Maine, in 1838, studied law at Lowell, Massachusetts, where he was admitted to the bar in 1841, and became distinguished as a criminal lawyer and democratic politician. He was a member of the state legislature in 1853, of the state senate in 1859—1860, and a delegate to the Democratic National Convention at Charleston and Baltimore in 1860, where he supported the nomination of Jefferson Davis and John C. Breckenridge, and was nominated as the Democratic candidate for governor of Massachusetts. B. had risen to the rank of brigadier-general of militia; and at the outbreak of the War of Secession, April 17, 1861, he marched with the 8th Massachusetts Brigade, and after a check at Great Bethal, was appointed to the command of Baltimore, and subsequently of Eastern Virginia with his head-quarters at Fortress Monroe. In February 1862, he commanded the military forces sent from Boston to Ship Island, near the mouth of the Mississippi; and after New Orleans had surrendered to the naval forces under Commander Farragut, he held military possession of the city, and by his severity, and especially by an, at least apparently, atrocious order respecting the treatment of women, brought upon himself the intense detestation of the Southern people, and a very general feeling of reprobation. Relieved of his command he returned to Fortress Monroe, acted under General Grant in his operations against Petersburg and Richmond, and, June 13, 1865, by his refusal to co-operate with the naval forces, caused the failure of the first attempt to take Fort Fisher, the chief defence of Wilmington. Returning to Massachusetts at the end of the war, he took an active part in politics as an extreme Radical, advocated the impeachment of President Johnson; In 1866 he was elected member of the House of Representatives, and has been repeatedly elected until 1878. See BUTLER, BENJAMIN F., in AM. SUPP.

BUTLER, JOSEPH, one of the most eminent of English divines, was born in 1692 at Wantage, in Berkshire, where his father kept a shop. With a view to the ministry of the Presbyterian Church, he attended a dissenting academy at Tewkesbury, in Gloucestershire. At the age of 22, he gave proof of high metaphysical ability in a letter to Dr. Samuel Clarke, usually appended to that celebrated writer's *a-priori* demonstration, to which it offers some objections. About this time, he made up his mind to join the Church of England, and in March 1714 entered Oriel College, Oxford. Soon after, he took orders. In 1718, he was appointed preacher at the Rolls Chapel, where he preached those remarkable sermons which he published in 1726. The first three, *On Human Nature*, constitute one of the most important contributions ever made to moral science. The scope of the reasoning is briefly, that virtue is consonant with, and vice a violation of, man's nature. In 1725 B. was presented to the rich benefice of Stanhope, in the county of Durham, to which he removed in the following year. Here he resided in great retirement till 1733. His friend Secker, the archbishop, desired to see him promoted to some more important position, and mentioned his name once to Queen Caroline. The queen thought he had been dead, and asked Archbishop Blackburne if it were not so. 'No, madam,' said the archbishop; 'but he is buried.' In 1733, B. became chaplain to his friend Lord Chancellor Talbot, and at the same time a prebendary of Rochester. In 1736, he published the great work of which the germs were contained in his three sermons, and which has entitled him, in the eyes of his eloquent disciple Chalmers, to be called 'the Bacon of theology.' The leading aim of the *Analogy* is to show, that all the objections to revealed religion are equally applicable to the whole constitution of nature, and that the general analogy between the principles of divine government, as revealed in the Scriptures, and those manifested in the course of nature, warrants the conclusion that they have one Author. Soon after the publication of this work, B. was appointed clerk of the closet to the queen, who greatly prized his conversation. In 1738, he was made Bishop of Bristol; in 1740, Dean of St. Paul's; and in 1750, he was translated to the see of Durham. He lived only to make one visitation of his diocese. His 'charge' on the occasion, in which he pointed out, with characteristic depth of insight, the importance of a due maintenance of the externals of religion, as a means of keeping alive the thought of it in the minds of the people, subjected him to much censure as betraying a tendency to Roman Catholicism—a charge unworthy now of serious notice. B.'s private character was such as became a Christian prelate: grave and judicious he was at the same time meek and generous.

His intercourse with his clergy and people was frank and hu-

mane; his episcopal treasures were wisely and munificently distributed, as not his own; and no anxious legatee looked with hope to his death. That event took place at Bath, June 16, 1752, and the good bishop's remains were buried in Bristol Cathedral. His works, notwithstanding a dry and uninteresting style, have gone through numerous editions. The best is that edited with a life, &c., by Fitzgerald.

BUTLER, SAMUEL, poet, was born at Strensham, Worcestershire, 1612. His father was a farmer in that place, and said to be a person of some education. Young B. after acquiring the rudiments of his education at home, was placed at the college school at Worcester. His progress there was rapid, and on leaving it he proceeded to one of the universities. After finishing his education, he was appointed clerk to T. Jeffreys, Esq., justice of the peace, and in his leisure hours devoted himself to the study of music and poetry. He afterwards entered the household of the Countess of Kent, which he left, and went to live with Sir Samuel Luke, who resided in the same county. After the king's restoration, he was made Secretary to the Earl of Carberry, which office he held till 1661. About this time, B. married a Mrs. Herbert, a lady of good family and some property, which, however, was afterwards lost by being invested in bad securities. He published the first part of *Hudibras* in 1663, and its reception at court was immediate and triumphant. It received all the favor Charles could spare from his spaniels and his mistresses, and he deigned even to garnish his royal conversation with its wit. The courtiers took up the fashion, the coffee-houses and taverns followed suit, and finally the mob went into raptures, in imitation of its betters. *Hudibras* was pirated within four weeks of its publication. The king had wit enough to see the merit of the work, but he lacked generosity to relieve the necessities of the writer. There seems to be no good reason to believe that B.'s palm ever tingled to the touch of royal pension or gratuity. Poverty is almost the only thing in B.'s life that one is certain of. In 1664, he published the second part of his book, and a third part appeared in 1678. He died in Rose Street, Covent Garden, in 1680; and while some say that he starved from pride, all agree that at his death he was very poor.

Hudibras is a kind of metrical *Don Quixote;* and if the work of Cervantes stands at the head of its class in the literature of Spain, *Hudibras* occupies the same place in the literature of England. The Puritans are the subjects of B.'s derision, and King Charles must have felt that the poet avenged for him the battle of Worcester. The weight, compression, and plenteousness of the wit is wonderful. *Hudibras* is like a mass of crystals, every point flashes. It is beyond any other book, of wit 'all compact.' B. thinks in witty couplets, he argues in them, he spears his foes with a jest, he routs and chases them into oblivion with unextinguishable laughter. His best things have become proverbs. His mass of wit has been grated down into common speech, and particles of it may be found any day glittering in the talk of English ploughmen and artizans.

BUTLER, WILLIAM ARCHER, a religious and philosophical writer of singularly high promise, was born in 1814, at Annerville, near Clonmel, Ireland. He was originally a Roman Catholic, but subsequently became a Protestant, and studied at Trinity College, Dublin, where he was appointed Professor of Moral Philosophy in 1837. He died in 1848. The principal work on which his reputation is based, is the *Lectures on the History of Ancient Philosophy*, edited with notes by W. Hepworth Thomson (Cambridge, 1856, 2 vols). These lectures are remarkable for their great learning, eloquence, and depth of judgment. Besides his lectures, there have appeared, *Sermons*, with a memoir by the Rev. Thomas Woodward (Dublin, 1849); *Letters on the Development of Christian Doctrine* (Dublin, 1850); *Letters on Romanism* (Lond. 1854).

BU'TLERAGE OF WINE, as described by Blackstone and Stephen, is a very ancient hereditary duty belonging to the crown, and is otherwise called the *prisage* of wines. This duty is taken notice of in the Great Roll of the Exchequer, 8 Richard I., still extant. Under the right to levy it, the crown should take two tons of wine from every ship (English or foreign) importing into England twenty tons or more, one before, and one behind the mast; which, by charter of Edward I., was exchanged into a duty of two shillings for every ton imported by merchant strangers, and called butlerage, because paid to the king's butler.

BU'TOMUS, a genus of aquatic plants, of which one species, *B. umbellatus*, is frequent in ditches and ponds in England, Ireland, and many parts of Europe, but is very rare in Scotland. It is popularly called Flowering Rush, and is one of the plants to which the praise has been assigned of being the most beautiful in the British flora. The leaves are all radical, 2—3 feet long, linear, triangular, their sharp edges sometimes cutting the mouths of cattle, whence the generic name (Gr. *ox-cutting*). The scape, or flowering stem, is longer than the leaves, terminating in a large umbel of rose-colored flowers, readily distinguished from those of all other British plants by having nine stamens, six in an outer, and three in an inner row.

Flowering Rush (*Butumous umbellatus*).

BU'TTER (Ger. *butter;* Fr. *beurre;* Lat. *butyrum*) is the fatty substance present in the milk of the mammalia, and capable of being extracted from it. In ancient times, the Hebrews seem to have made copious use of butter as food; but the Greeks and the Romans used it only as an ointment in their baths, and it is probable that the Greeks obtained their knowledge of the substance from the Scythians, Thracians, and Phrygians, whilst the Romans obtained it from Germany. In Southern Europe, at the present time, B. is very sparingly used; and in Italy, Spain, Portugal, and Southern France, is sold by apothecaries as a medicinal agent for external application. The amount of B. in cow's milk (q. v.) is about 4 per cent., though the kind of pasture, quantity of milk, and general condition, influence the relative quantity of the several ingredients of milk.

In the extraction of B., the milk is allowed to cool, and the cream which rises to the surface is skimmed off, and put into a large, deep, earthenware vessel, where it lies for several days till enough has been collected for a *churning*. (For the swifter methods of obtaining the cream by separators, see DAIRY.) Difference in treatment makes difference in butter. The B. and cream of Devonshire, famed for their superior richness, owe this in greater part to the mode of manipulating the milk, and not to the special character of that fluid, or to the richness of the pastures in those districts. The milk in Devonshire is not allowed to cool slowly, as elsewhere, but is at once placed in large deep pans, and carefully heated. A scum quickly rises, which is pushed to the side; and whenever the bubbles of steam appear, the milk is removed, and allowed to cool in the ordinary way, when a good deal of the milk thickens to the consistence of B., and is skimmed off as the celebrated *Devonshire clouted cream*. In England, the B. of Epping and Cambridge is highly esteemed; the Dutch B., in a salted form, is very largely consumed; of one-third of the foreign B. consumed in Great Britain, the largest supply is imported from Holland, France stands next, then Denmark and the United States.

In order to separate the B. from milk, recourse is always had to the process of agitation in CHURNS (q. v.). The principle involved in each and all of the forms of this apparatus is the thorough agitation of the contents, so as to cause the rupture of the minute fat globules present in the milk, and the incorporation or kneading of these ruptured fat globules into larger or smaller masses of butter. The cream is strained through cloth into the churn, to remove any foreign matter; and the agitators being set in motion, the friction of the movement, combined with the admission of air, and the chemical changes it induces, raises the temperature of the whole contents. At one time, it was thought that one great object of the agitation was the admission of the oxygen of the air, which becoming thoroughly incorporated with constituents of the milk, combined therewith, and, as a consequence, led to the separation of the butter. It is found, however, that B. can be obtained from milk by mere agitation, without the admission of the oxygen of the air. At the same time, in the ordinary way of churning, oxygen does play a subordinate part by combining with the sugar of the milk, and forming lactic acid, which in its turn *sours* the milk, and separates therefrom the caseine (q. v.)—cheese-matter—in minute clots or flakes, yielding what is commonly called *sour* or *butter milk*. The process of churning must be conducted at a medium rate. If too quickly performed, the B. is soft and frothy, and is said to be *burst;* whilst when too slowly made, it is highly tenacious, strong tasted, and badly flavored.

When all the B. has *come*, which is known by the particles agglutinating into irregular masses, the B. is *made* by taking the lumps, and well washing and kneading them on a wooden board in a tub of pure spring-water till all the butter-milk has been expressed; it is then divided into the requisite size of lumps, fashioned into rolls, or moulded into forms, and usually stamped with some device. In the making up of the B., the hands of the operator must be scrupulously clean, and be free from the slightest taint of soap. Persons who are subject to moist hands should

never knead B., as it is very liable to be contaminated by the slightest foreign matter, especially animal secretions; and it is better always for the operator to wash the hands with water containing some oatmeal before commencing. So important is this source of contamination regarded in our milk factories here, and in America, that every endeavor is made to get quit of manual labor in working the B., and *butter-workers* are commonly used. When newly prepared, the B. is called *fresh* or *sweet* B., and is of a yellow color, which is well known to be deeper as the pasture on which the cows have been fed is richer, and hence the poorer kinds of B. are often artificially colored with Arnotto (q. v.).

A large quantity of the B. sent into market has more or less common salt added, for the purpose of preserving it. For use within a week or two, the proportion of common salt employed is about half an ounce to two pounds of B., though, where it has to be kept for some time, as much as one ounce of salt to one pound of B. is used. The incorporation requires to be carefully and dexterously done, so that the resulting material may be uniform; and the better plan is to add only a portion of the salt at a time, and to knead and re-knead the B. till the whole is thoroughly mixed. When the less amount of salt has been employed, the result is *powdered* B., and the larger quantity yields *salt* butter. Much of the latter is closely packed in small wooden firkins or *kits*, and occasionally in stoneware, and sent into market. Great care must be taken to have these kits, and indeed to have every vessel used in the preparation, as clean or *sweet* as possible. Constant rinsings with cold water, and scaldings with boiling water, are resorted to. Attention must likewise be paid to the air of the apartments in which the operations are carried on, as a tainted air is very injurious.

The adulterations liable to be present in B. are an undue proportion of salt and water, and these run up occasionally to upwards of 33 per cent., or one-third of the total weight. Another adulteration is the presence of lactate of zinc, derived from the milk being placed in zinc pails and basins, from the impression that by some imaginary electrical influence an increase in the amount of cream will be the result; but though this is not attained, yet the milk tending to form lactic acid, the latter attacks the zinc vessel, and forms lactate of zinc, which dissolves in the milk, and thereby contaminates it, imparting an unpleasant taste, and, when present in larger quantity, leading to violent spasmodic vomiting. When B. is allowed to get old, it becomes rancid, and tastes and smells disagreeably. To some extent, an acid is formed, called Butyric Acid (q. v.). For the use of B. in diet, see FOOD and NUTRITION.

BUTTER, in Chemistry, is often applied generically to any substance of the consistence of B., and is therefore used to designate palm, cocoa-nut, shea, and nutmeg oils. It is also applied to certain metallic substances which have an oily aspect and consistence resembling melted B.; thus we have B. of antimony, bismuth, zinc, and tin.—BUTTER of Antimony is a thick, dense, oily compound, produced by acting upon the native sulphuret of antimony (SbS_3) by concentrated hydrochloric acid (HCl) and heat, when the oily chloride of antimony ($SbCl_3$) is formed. See ANTIMONY.

BUTTERINE, a substitute for butter, first manufactured in France, is now extensively produced in Holland and America. It is composed of OLEOMARGARINE (q. v.), amalgamated with milk, to which is sometimes added a small proportion of real butter.

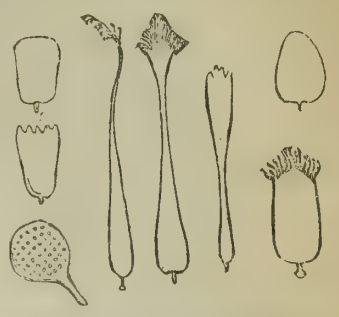
BUTTER, ROCK, a mineral which may be regarded as a variety of Alum (q. v.)—an iron alum, appearing as a pasty exudation from rocks that contain alum or its constituents, particularly alum-slate and other schistose rocks. It occurs at Hurlet alum-work, near Paisley, Scotland, and in a number of places on the continent of Europe. It is not unlike butter in color, varying from yellowish white to sulphur yellow. It is rather greasy to the touch, and is easily broken in pieces.

BUTTER TREE, a name given to several tropical trees, of different natural orders, the fruits of which yield concrete fixed oils, having the appearance and used for the purposes of butter. The B. trees of India and Africa belong to the genus *Bassia* (q. v.), of the natural order *Sapotaceæ;* the B. trees of Guiana and Brazil to the genus *Caryocar* (q. v.), of the natural order *Rhizobolaceæ*. The Oil-palms (q. v.), and the *Cocos butyracea* (see COCOA NUT), may also be regarded as B. trees, although not generally receiving that name.

BU'TTERCUP. See RANUNCULUS.

BU'TTERFISH. See GUNNEL.

BU'TTERFLY, the common English name of all the diurnal Lepidopterous (q. v.) insects, corresponding with the genus *Papilio*, as originally defined by Linnæus, but forming many genera in the most recent entomological systems. Butterflies exhibit a great similarity in almost all respects to other lepidopterous insects, the common characters of which will be found in the article on that order; but are distinguished even more than the rest of them generally, by brilliancy of coloring, which in butterflies also belongs to the under as well as the upper side of the wings, whilst the beauty of moths and hawk-moths appears chiefly on the upper side. Accordant with this circumstance, is the further peculiarity, that almost all butterflies, when at rest, usually hold their wings erect, the under side being thus chiefly exhibited; whilst the other lepidopterous insects, when at rest, hold their wings in a horizontal or somewhat inclined position, and some have them wrapped round the body. Butterflies are also the only lepidopterous insects which have no spines, bristles, or hooks on the margins of their wings, by which the second wing on each side can be attached to the first, but both when flying and at rest, have all their wings quite separate. The manner in which the scales of the wings are imbricated, gives those of butterflies a smoother appearance than those of moths and hawk-moths. The antennæ of butterflies are generally simple, slender, and elongated and terminated by a little club. Their caterpillars have always sixteen feet (see CATERPILLAR). The pupa or chrysalis is angular; is seldom enveloped in a cocoon; is generally suspended by the tail, by means of a silky substance, often to a leaf or twig, but is sometimes supported by bands around the middle; and generally exhibits more or less of that golden coloring from which both the names *aurelia* (Lat. *aurum*) and *chrysalis* (Gr. *chrysos*) are derived.



Various forms of Scales [highly magnified] from the Wings of Butterflies.

Butterflies are found in all parts of the world; they are to be seen during the sunshine of the brief summer extracting nectar from the flowers even of Greenland and Spitzbergen, but they are most numerous in the warmest regions; where however, many of them live chiefly in the shade of moist foliage, in woods and jungles. Dr. Hooker, describing the scenery on the banks of the Great Runjeet in the Sikkim Himalaya, says, that 'by far the most striking feature consisted in the amazing quantity of superb butterflies, large tropical swallow-tails, black, with scarlet or yellow eyes on their wings. They were seen everywhere, sailing majestically through the still hot air, or fluttering from one scorching rock to another, and especially loving to settle on the damp sand of the river edge, where they sat by thousands, with erect wings, balancing themselves with a rocking motion, as their heavy sails inclined them to one side or the other, resembling a crowded fleet of yachts on a calm day.'

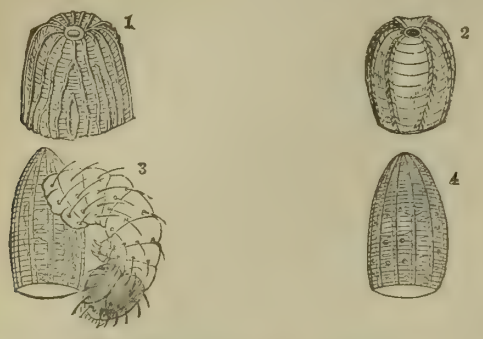
Butterflies possess no small power of wing; some of them, indeed, of which the wings are comparatively thin and delicate, are inferior in this respect, and have a sort of zigzag flight; but others soar in the air with a steady and continuous motion. Short-lived as they are all generally believed to be, some of the tropical species perform wonderful migrations; concerning which, however, nothing but the fact is yet well known. 'Frequently,' says Sir James Emerson Tennent in his work on *Ceylon*, 'the extraordinary sight presents itself of flights of these delicate creatures, generally of a white or pale yellow hue, apparently miles in breadth, and of such prodigious extension as to occupy hours and even days uninterruptedly in their passage, whence coming no one knows, whither going no one can tell.'

The number of species of B. is very great, and the arrangement of them has been found difficult, chiefly upon account of the great similarity in all important respects which prevails among them all. They are divided, however, into two well-marked sections, of which the first is characterized by having only a single pair of spurs or spines on the *tibiæ* (or fourth joints of the legs), placed at their lower extremity; whilst in the other section, the tibiæ of the hinder legs have two pair of spurs, one pair at each extremity. This distinction, seemingly unimportant in itself, is accompanied by other differences. The second section of butterflies may be regarded as forming a sort of connecting link between butterflies and hawk-moths. A few British species belong to it, but the species are generally tropical, and some of them, found in tropical America, are remarkable for their rapidity and power of flight, and for the migrations which they perform, besides being amongst 'the most splendid insects in creation,' a resplendent green, inimitable by art, relieving the velvet black of their wings, and varying with every change of light. The beautiful iridescence of the wings of these and many other butterflies is owing to the peculiar position of the scales.

Some groups of butterflies are remarkable for the imperfect development of the first pair of legs, so that they are generally described as having four legs instead of six.

The eggs of butterflies are deposited on the plants, the leaves of

which are to supply the food of the caterpillars. In cold and temperate climates, the eggs deposited in autumn are not hatched till the following spring; but it is believed that many species produce several broods in a year, as the eggs in summer may be hatched in a few days. The caterpillars of each species are generally confined to some particular kind of plant, the leaves of which they devour; their ravages are well known, but the excessive increase of their numbers is in part restrained by many enemies, and by none more than by the ichneumons (q. v.) and other insects which deposit their eggs in them, and the larvæ of which feed on them. The annexed cut represents a common species of B., with its larva and pupa; an account of B. transformations will be given under INSECT TRANSFORMATIONS.



Eggs of Butterflies, highly magnified:

1. Egg of Queen of Spain Fritillary (*Argynnis Lathonia*); 2. Egg of Peacock Butterfly (*Vanessa Io*); 3. Larva of Large Garden White Butterfly (*Pieris Brassicæ*), in the act of bursting from the egg; 4. Egg of same insect, ready to hatch, showing the head and curved body of enclosed caterpillar through the transparent envelope —For these illustrations we are indebted to Westwood's excellent treatise on British Butterflies.

Butterflies vary in size from less than an inch to almost a foot across the expanded wings. The largest species are tropical. Some of the species are very widely distributed: *Cynthia cardui*, of which the caterpillar feeds on the leaves of thistles, is found not only throughout Europe, but in Egypt, Barbary, Senegal, Cape Colony, Madagascar, China, Java, Australia, Brazil, and North America, being, in fact, one of the most widely distributed of all insects. The geographical limits of other species appear to be very restricted. The diversity of coloring is almost endless, but a prevalence of certain hues, or of certain modes of the disposal of them, is observable throughout large groups. The caterpillars of many species are variously furnished with spines, those of others—none of them British—have long fleshy prominences, horny at the tip, probably intended as means of defence. The hinder wings of many butterflies are curiously prolonged into tail-like appendages, one or more on each wing, which vary in form, being sometimes long and linear, sometimes broad and widening towards the extremity. These are, however, little seen in British species.

Large Garden White Butterfly (*Pieris Brassicæ*).
a, caterpillar; *b*, chrysalis: *c*, perfect insect.

Butterflies are chiefly known to us as objects of admiration and of pleasing contemplation, enhancing the charms of the most delightful weather, and always associated with the most lovely scenes, or—it must be added—as a cause of annoyance and vexation by the ravages of their caterpillar young in our fields and gardens. There is, however, one small species (*Euplæa humata*) which affords a supply of food to some of the wretched aborigines of Australia. Butterflies of this species congregate in such vast numbers on the masses of granite in the mountains, that they are collected by simply making smothered fires under the rocks, in the smoke of which they are suffocated. Bushels of them are thus procured, and they are baked by placing them on the heated ground, the down and wings removed, and the bodies made into cakes which resemble lumps of fat. The months of November, December, and January are quite a season of festivity from the abundance of this food.

Brief notices of a few of the principal kinds of B. will be found in other parts of this work. See CABBAGE BUTTERFLY, CAMBERWELL BEAUTY, PURPLE EMPEROR, &c.

BUTTERFLY FISH. See BLENNY.

BUTTERFLY WEED, or PLEURISY ROOT (*Asclepias tuberosa*, see ASCLEPIAS), a plant found in all parts of the United States, and which has obtained a considerable reputation for the medicinal virtues of its root. The root is large, formed of irregular tubers or spindle-shaped branches, externally yellowish brown, internally white, with a somewhat acrid nauseous taste when recent, merely bitter when dried.

It yields its properties to boiling water, and is usually administered in the form of a decoction, sometimes in that of a powder. It is diaphoretic and expectorant, and has been found useful in the commencement of pulmonary affections, in rheumatism, and in dysentery.—The stem of the plant is erect and hairy, with spreading branches; the leaves oblongo-lanceolate, alternate, hairy, and somewhat crowded; the flowers orange-yellow, forming numerous umbels.

BU'TTERMILK is the form of milk from which the butter or oily matter has been extracted. See BUTTER. Buttermilk contains the caseine, sugar and salts of ordinary milk, and is only deficient in oily matters. It is therefore nutritious, and is largely used in Ireland and Scotland as an article of food, being very generally partaken of with porridge and with potatoes. It may be drunk *ad libitum*, is a very agreeable cooling beverage, and is therefore useful in certain febrile and inflammatory conditions.

Butterwort (*Pinguicula vulgaris*):
a, the entire plant; *b*, a flower.

BU'TTERWORT (*Pinguicula*), a genus of plants of the natural order *Lentibulariaceæ* (q. v.), distinguished by a two-lipped calyx, the upper lip trifid, the lower bifid; a spurred corolla, two-lipped and gaping, the upper lip arched; and a globose germen. The species are small plants with only radical leaves, found in the bogs and marshes of different quarters of the world. Some of them possess much beauty when in flower, particularly *P. grandiflora*, a rare native of the south of France and of Ireland. The common B. (*P. vulgaris*) is abundant in the northern parts of Britain and of Europe. It has the power of coagulating milk. The Laplanders pour reindeer milk warm from the animal, upon the leaves of this plant, instantly strain it, and set it aside for two or three days, till it acquires the consistence of cream, and some degree of acidity, when it is with them a favorite article of food. A little of it in this state will produce the same effect on warm reindeer milk which was at first produced by the leaves of the plant. The origin of the English name B. is sometimes referred to the power of coagulating milk, sometimes to the peculiar sliminess of the leaves.

BU'TTISHOLZ, a village of Switzerland, in the canton of Lucerne, and 11 miles north-west from the city of that name. Near to B. is a large mound called the English Barrow, because here are buried 3000 Englishmen, followers of De Coucy, son-in-law of Edward III. of England, who, while devastating the cantons were defeated and killed by Swiss peasants in 1376.

BUTTMANN, PHILIPP KARL, one of the most distinguished philologists of modern times, was born at Frankfurt-on-the-Maine in 1764, and studied at Göttingen under Heyne. He became, in 1789, assistant in the Royal Library in Berlin, and rose successively to be secretary and librarian (1811). He held at the same time (1800—1808) a professorship in the Joachimsthal Gymnasium in Berlin, which he afterwards exchanged for a professorship in the newly founded university of that city. He died 21st June 1829. B. is best known by his Greek grammars, the *Griech. Grammatik* (Berl. 1792; 21st ed. by his son, Alexander Buttmann, 1863), and an abridgment of it, *Griech. Schulgram.* (14th ed. 1862); both have been translated into English. His *Lexilogus* (translated by Fishlake) and *Ausführliche Griech. Sprachlehre*, or Larger Greek Grammar, which have gone through several editions, are designed for scholars. In his *Mythologus*, he has collected his essays on the myths of the ancients.

BU'TTON. The term B. is applied to the well-known appendages to dress used for fastening or for ornament; and to a sort of oblong latch moving upon a pivot in the middle, used by joiners and cabinet-makers for fastening the lids of boxes, doors of presses, &c. The mass of fused metal found at the bottom of a crucible or cupel, after fusing or assaying, is also technically called a button.

The history of button-making is in many ways a curious one. Dating no further back as a trade of any importance than the reign of Elizabeth, it has undergone several extraordinary changes, produced chiefly by the ever-varying fashions in dress, but also by some simple, though ingenious inventions, as well as by foreign competition. In Great Britain, Birmingham has always been the principal seat of the button-manufacture. What has been called the 'Augustan age' of button-making in that city included the latter portion of last and the early part of the present century, when even tradesmen wore coats 'loaded with innumerable gilt buttons,' and when employers on a moderate scale in this manufacture were making incomes of from £2000 to £3000 a year, and their workmen from £2 to £4 per week.

Early in the present century, Mr. B. Sanders introduced the cloth-covered button, which initiated the change from those made of metal, and by which he rapidly made a fortune. His son, in 1825, effected the apparently trivial but really ingenious improvement of making it with a canvas tuft instead of a metal shank, by which both the button-holes and the garment itself were less subject to injury. This kind of button had an enormous sale, and is still much used. A further alteration was made on it by Mr. W. Elliott, who patented, in 1837, a mode of covering the button with silk, having a pattern in the center, the demand for which was at one time so great, that sixty looms were employed in London in making the special material required for them. In 1841, the old Dorsetshire wire and thread button was replaced by the 'three-fold linen button,' still considered by house-wives indispensable for underclothing, since neither washing nor mangling destroys it. It is said to be the invention of Mr. H. Jeffries, of Birmingham, but was patented by Mr. J. Aston, and continues to be made in vast numbers. A single English firm recently consumed in one year for this kind of button, 63,000 yards of cloth and 34 tons of metal, upon which 250 hands were employed.

Turning now to other materials which have had a great 'success' in their day, we find that buttons made of hoof, under the name of 'horn-buttons,' as introduced nearly 40 years ago by Mons. E. Bassot of Paris, were for a great many years most extensively manufactured at Birmingham, and sent to all parts of the world. In hoof-buttons the trade is now comparatively insignificant, and the French makers possess the market for what of it remains. Tweed clothing and fabrics in imitation of it have, through the necessity of matching their various colors, led to the buttons for them being made of a rather uncommon material, namely, vegetable ivory (q. v.). This substance, which is the fruit of a palm, somewhat resembles true ivory, but is rather softer. It can be readily turned in the lathe, and dyed of various colors. More than twenty tons of it, valued at from £25 to £30 per ton, are weekly consumed in Birmingham in making buttons, and it is also largely used for the same purpose in France and Germany.

What we have hitherto said refers principally to what manufacturers call the revolutions of the trade; but there are other important branches which have been less subject to change, chief among these being the so-called 'pearl buttons'—that is, buttons made of mother-of-pearl shells. This has long been a leading branch, and employs a greater number of hands than any other. Metal buttons, too, although not relatively so important as formerly, have never ceased to form a prominent section of the trade. They are a numerous class, and include all sorts for uniforms, trouser buttons, fancy buttons which are gilt, stamped, chased, or enamelled, and many cheap varieties in iron and other metals for export. Numerous kinds of composite buttons are also partly composed of metal. Glass buttons form another interesting branch, carried on to a considerable extent in Birmingham, but more largely in Bohemia and Paris; so also do porcelain buttons, which, although an English invention, are now almost exclusively made in France. Vulcanite (q. v.) buttons have been extensively made in the United States. As to other materials, a Birmingham manufacturer says it were easy to write out a long list from which buttons have been made, but very difficult to name one from which they have *not* been made.

We shall now describe briefly some of the processes in button-making, beginning with metal buttons. Circular discs, called 'blanks,' are first cut out of sheet brass or other metal by means of fly-presses, usually worked by girls. The fly-press consists of a verticle iron screw with a triple-thread, to which screw is attached a horizontal arm, bending downwards at the end to form a handle. A punch attached to the press rises and falls with the motion of this handle, and rapidly cuts out the blanks. When large quantities of one pattern are required, a self-feeding, self-acting machine is used, which cuts out the blanks in rows at one blow, turning them out at the rate of 2000 gross per day. After being annealed, the blanks are next made convex by a blow from a stamp. The shanks are formed of wire by a separate machine, which cuts off pieces, and bends them into loops of the required form. When these are soldered on, the buttons are dressed on a lathe. They are then gilded and burnished; some, however, are only lacquered; and some, though gilt, are finished in a dead or frosted style.—'Shell' buttons are those with a convex face, a flat or convex back, and hollow. These are made of two blanks, that forming the face being larger than the back to which the shank is attached.

These blanks are pressed into the required shape by dies worked in the fly-press, and then, by another die, the edge of the larger blank is lapped over the smaller, and thus attached without soldering. Livery and other buttons having a device in strong relief are stamped by a die placed in a stamping-press. See STAMPING OF METALS.

In making covered buttons, a metal blank is punched, and its edge is turned up by a die in a fly-press; then a smaller metal blank is punched with a hole in the middle, and of such size, that, when flat, it shall fit into the upturned edge of the first: this perforated blank, or *collet*, is next pressed into a concave or dished shape. Two cloth blanks—the face one of silk, and the other for the tuft of thin canvas—are now punched, one considerably larger than the front metal blank, the other somewhat smaller; the larger cloth blank is laid upon the flat face of the metal blank, which is filled with a disc of millboard or paper, and its edges turned over; these edges are covered by the smaller cloth, and then the collet laid upon them with its concavity towards the cloth. They are now all pressed together in a sort of die or mould, by which means the collet is flattened and spread out, while the upturned edge of the metal blank is turned forcibly over it, thus securing the collet, and with it the cloth which is strained tightly on the face, and its edges bound between the blank and the collet, so that the whole is firmly held together. The linen-covered button for underclothing, above referred to, is formed of a single brass ring with a groove or canal on one face. Into this the edges of the two round linen blanks are placed, so that when the edges of the groove are pressed firmly down, the button is entirely covered with linen.

Buttons with holes, technically called 'four-holes,' 'three-holes,' and 'two-holes,' when of pearl-shell, wood, bone, or ivory, are cut with a tubular saw, turned separately in a lathe, and drilled. When of metal, the blanks are punched, then stamped in dies to the required form; the holes are punched, and 'rymered,' to round the sharp edges that would otherwise cut the thread.—Glass buttons are most largely made by taking a rod of glass of any color, softening the end by heat, and pressing it into a mould, each half of which is fixed to one limb of a pair of pincers. The shank is placed into a hole in the mould before the melted glass is inserted.

According to an estimate published a few years ago by Mr. J. P. Turner of Birmingham, to whose paper we have been much indebted, the number of artisans employed in the button manufactures of that city was then as follows:

Making metal buttons of all kinds	1200
" covered buttons, including linen	1500
" pearl buttons	2000
" vegetable ivory buttons	700
" other kinds, as glass, horn, bone, wood, &c.	600
Total	6000

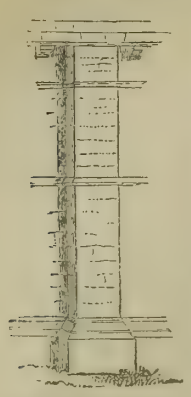
Probably about 1000 more are employed in London and elsewhere in Great Britain, and a large proportion of the whole are females. At that time, which was before the war with Germany, about 20,000 persons were employed in France, showing how much more largely the button industry has been developed in that country. Germany is a still greater producer, the cheaper kinds of fancy buttons made in the Rhenish provinces of Prussia, the glass buttons of Bohemia, and the pearl buttons of Vienna being more extensively exported than those of any other country. Buttons of various kinds are made on a large scale in the United States, but that country still imports them largely from Europe.

BU'TTONWOOD. See PLANE.

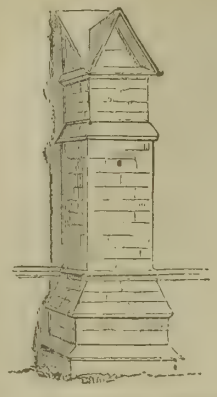
BU'TTRESS (Old Eng. *botress;* Fr. *buttée*), a projection for the purpose of giving additional support or strength to a wall. In the classical style, there were no buttresses, their place being, to a certain extent, supplied by pilasters, antæ, &c. The different stages of Gothic architecture are marked by the form of buttresses employed, almost as distinctly as by the form of the arch. The Norman B. was broad, often semicircular, sometimes dieing into the wall at the top, and never projecting from it to any great extent. Early English buttresses project much more boldly, and are considerably narrower, than the Norman. They are frequently broken into stages, which diminish in size as they ascend. In the decorated style, this division into stages is almost invariable,

the B. being often supplied with niches terminating in pinnacles, and very highly ornamented with carving, statues, &c. In the perpendicular style, they retain the forms which had been intro-

VARIOUS FORMS OF BUTTRESSES.



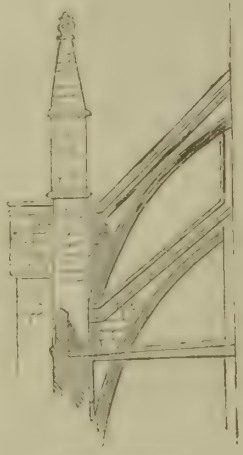
Fountains Abbey, c. 1170.



Dorchester, Oxfordshire, c. 1300.

duced during the decorated period, the ornamentation, of course, being varied to suit the character of the style. Flying buttresses —i. e., buttresses in the form of a sloping arch, connecting the upper and central portions of an arched structure with the vertical

Canterbury Cathedral.



Flying Buttress, Westminster Abbey.

buttresses of the outer walls—were introduced into England at the period of the Early English, though they existed on the continent previously, where they continued to be used to a greater extent. They were also very common in Scotland. In England, they are generally called arch-buttresses.

BU'TUA ROOT. See CISSAMPELOS.

BUTY'RIC ACID may be best obtained by saponifying butter with potash, then adding dilute sulphuric acid till an acid reaction is attained, and distilling about one half of the mixture, adding a little water, and continuing the distillation till the residue is not acid. B. A. may also be obtained by allowing a small quantity of milk-curd to act upon a solution of sugar at a temperature of 77° to 86°, which excites a peculiar process of fermentation resulting in the formation of butyric acid. Some chalk is added to take up the B. A. whenever produced, and the better proportions to employ are 100 sugar, 8 to 10 fresh curd, and 50 chalk, with sufficient water to make a thin liquid. The butyrate of lime is left in the vessel, and on acting upon that by dilute hydrochloric or sulphuric acid, and redistilling, the free B. A. passes over in vapor, and is condensed. B. A. is a transparent, thin, oily liquid, with a most persistent rancid odor. It is mixable in all proportions in water, alcohol, ether, and oil of vitriol; has the specific gravity 973 (water being 1000), boils at 314°; though it volatilizes at ordinary temperatures, as appears from the rancid odor of its vapor. Its chemical symbol is $HO.C_8H_7O_3$, and it combines with bases, such as lime, soda, &c., to form salts.

BUTYRIC ETHER, or PINE-APPLE OIL, is an exceedingly fragrant oil obtained by distilling butyric acid (or the butyrate of lime), alcohol, and sulphuric acid. The material which passes over is the B. E., and is generally mixed with alcohol, and sold in commerce as *Artificial Pine-apple Oil*. It possesses the same very pleasant flavor which belongs to pine-apples, and there is little doubt that pine-apples owe their flavor to the presence of natural butyric ether. The artificial variety is now extensively used for flavoring confections, as pine-apple drops, for sophisticating bad rum, and for flavoring custards, ices, and creams, as also an acidulated drink or lemonade named Pine-apple Ale. B. E. alone cannot be used in perfumery for handkerchief use, as, when inhaled in even small quantity, it tends to cause irritation of the air tubes of the lungs and intense headache, but it is employed as one material in the manufacture of compound perfumes. It is composed of ordinary ether (C_4H_5O) and butyric acid ($C_8H_7O_3+HO$), and its strict chemical name and symbol is the butyrate of the oxide of ethyl ($C_4H_5O,C_8H_7O_3$). It is remarkable that a substance possessing such a disagreeable odor as butyric acid (that of rancid butter) should be capable of forming, in part at least, a substance with such a pleasant flavor as artificial pine-apple oil.

BUXA'R, a town of Shahabad, in Bahar, presidency of Bengal, situated on the right bank of the Ganges. It is chiefly remarkable as the scene of a victory gained in 1764 by Sir Hector Munro. At the head of 7072 men, of whom only 857 were Europeans, he defeated a native army of 40,000, and captured 133 guns. B. is 62 miles north-east of Benares, and 398 north-west of Calcutta. Pop. (1871) 13,446.

BUXBAU'MIA, a genus of Mosses, of which only one species is known, *B. aphylla*, a very rare British plant, remarkable for its apparent want of leaves; the whole plant above ground seeming to consist of a little conical bulb, with minute scales, which are, however, really its leaves.

BU'XTON, a town in Derbyshire, 33 miles north-west of Derby. It lies 900 feet above the sea, in a deep valley, surrounded by hills and moors, which have been tastefully planted; the only approach being by a narrow ravine, by which the Wye flows into the Derwent. The new part of the town is much under the level of the old. Five miles to the east of B. is Chee Tor, a perpendicular limestone rock, rising to a height of between 300 and 400 feet from the Wye. B. has for 300 years been famous for its calcareous springs, tepid (82° F.), and cold (discharging 120 gallons of water per minute), and its chalybeate springs. It is visited annually, from June to October, by 12,000 to 14,000 persons, the waters being taken for indigestion, gout, rheumatism, and nervous and cutaneous diseases. Nearly 5000 strangers can be accommodated at one time. There is an institution, called the Devonshire hospital, containing 100 beds, supported by subscription, where nearly 1000 patients are annually boarded and lodged free of charge. The baths and public walks are numerous. Much of the splendor of B. is due to the Dukes of Devonshire, one of whom, in the last century, at the cost of £120,000, erected an immense three-storied pile of buildings, of gritstone called the Crescent, a curve of 200 feet, with wings of 58 feet. It includes several hotels, a library, assembly rooms, &c. Near B. is the Diamond Hill, famous for its crystals; and Poole's Hole, a stalactitic cavern, 560 yards long.

The Romans had baths here. Mary Queen of Scots resided for some time at B., when in the custody of the Earl of Shrewsbury. B. is approached by railway both from north and south; and the baths, which were rebuilt some years ago, are considered among the finest in Europe. The town, which in 1871 had 3717 inhabitants, had 6021 in 1881. Four newspapers are published.

BUXTON, SIR THOMAS FOWELL, a man of singular earnestness and force of character, belonging to the class termed 'philanthropists,' was born in 1786 at Earl's Colne, Essex. The eldest son of a wealthy family, and early deprived of paternal guidance, his youth was distinguished chiefly by a strong development of animal energy, natural enough to a young Englishman whose full stature exceeded 6 feet 4 inches. At the university of Dublin, his mind at length asserted its claims, and the new consciousness of needing to raise the family fortunes animated him to extraordinary efforts. His preparatory education had been almost thrown away, but at 21 he left the university its most distinguished graduate. In that year he married a sister of the celebrated Mrs. Fry, and entered business as a brewer, with an energy which in due time was crowned with splendid prosperity. His warm religious and moral impulses soon brought him prominently forward as an advocate of philanthropic interests. Prison discipline formed one of the earliest subjects of his efforts. In 1818, he entered parliament as member for Weymouth, which he continued to represent for about 20 years, taking a prominent part in every debate on such questions as the amelioration of criminal law and of prison discipline, widow-burning and slave emancipation. The latter, in particular, engrossed a large share of his activity for many years, and no man on that side displayed more indomitable zeal and firmness in its advocacy. In 1837, he was rejected by his constituency, and refused ever after to stand for a borough. His philanthropic labors, however, terminated only with his life. In 1840, he received the well-merited distinction of a baronetcy. He

died on 19th February, 1845. See *Memoirs of Sir T. Fowell B.* (1848.)

BUXTORF, JOHANN, a celebrated orientalist, was born 25th December, 1564, at Kamen, in Westphalia; studied at Marburg, Herborn, Basel, and Geneva. After traveling through Germany and Switzerland, he settled at Basel, where he became professor of Hebrew in 1591. He died of the plague, 13th September, 1629. In a knowledge of rabbinical literature, he surpassed all his contemporaries. The two works which prove his extensive acquaintance with this recondite branch of theological study, are his *Biblia Hebraica Rabbinica* (Basel, 1618—1619), and his *Tiberias seu Commentarius Masorethicus* (Basel, 1620). The most useful of his grammatical works is the *Lexicon Hebraicum et Chaldaicum* (Basel, 1607).

BUXTORF, JOHANN, the son of the former, was born at Basel, 13th August 1599, and displayed at an early period a decided predilection for the same studies with his father. At five years of age—according to his rather credulous biographers—he could read German, Latin, and Hebrew. To perfect his knowledge of these tongues, he visited Holland, France, and Germany; and in 1630 was appointed to succeed his father in the chair of Hebrew at Basel, where he died 16th August 1664. Besides his *Lexicon Chaldaicum et Syriacum* (Basel, 1622), and a work of Maimonides, entitled *More Nevochim* (Basel, 1629), which is an exposition of obscure passages of the Old Testament, he published from MSS. of his father a *Lexicon Chaldaicum, Talmudicum, et Rabbinicum* (Basel, 1639), and *Concordantiæ Bibliorum Hebraicorum* (Basel, 1632).

BU'XUS. See BOX.

BUYING OF PLEAS by lawyers is prohibited by an old Scotch act passed in 1594. It is explained under the English term *champarty*, to which it is analogous.

BUYUKDEREH, a beautiful suburb of Constantinople, from which it is a few miles distant, situated on the Bosporus, in the midst of the most charming scenery. It forms the summer residence of many of the Christian ambassadors, some of whom have splendid mansions here.

BU'ZZARD (*Buteo*), a genus of *Accipitres* (q. v.), or birds of prey, of the family *Falconidæ*, having a rather small and weak bill, which bends from the base, and is not notched, as in falcons. The legs are short and strong, the tarsi covered with scales or with feathers, the toes short, and the claws strong. Buzzards may be regarded as an inferior kind of eagles; they do not possess courage equal to that of eagles and falcons, nor equal strength of bill or claws. They are large birds; the COMMON B. (*B. vulgaris*) measuring almost 4 feet from tip to tip of its outstretched wings. It is a bird still pretty common in Britain, although much less so than it formerly was. It is subject to variations of plumage; the prevailing color is brown, with a considerable mixture of black on the upper parts, and of white or grayish-white on the under.

Common Buzzard (*Buteo vulgaris*).

It is sluggish and inactive, in comparison with many other birds of the same family; is usually slow in its flight, and often sits long on a tree, watching for prey, which, when it perceives, it glides silently into the air, and sweeping rapidly down, seizes it in its claws. This B. is plentiful in all the wooded parts of Europe; it is found also in the north of Africa, and is known to exist in the western parts of Asia; but it is doubtful how far it extends over that continent, a distinct although very similar species occurring in the Himalaya Mountains. The Common B. is, however, a North American bird. Tame female buzzards have been known in several instances to exhibit so strong a propensity for incubation, and the rearing of young at the proper season, that they have hatched hens' eggs and brought up the chickens, although if chickens not of their own hatching were brought within their reach, they devoured them. Meat given to the B. nurse was carefully divided among her nurslings, but they found out by their own instincts the use of grain and other vegetable food.—The ROUGH-LEGGED B. (*B. lagopus*) is very similar to the Common B., but is at once distinguished by having the tarsi feathered to the toes, whilst in the Common B. they are covered with scales. It is a rarer British bird, yet not of unfrequent occurrence; it is very widely diffused, being found in the Old World from Lapland to the Cape of Good Hope, and equally common in North America. It is most frequently to be seen in marshy districts, and often skimming over marshes, where it makes prey of frogs.—The RED-TAILED HAWK of North America is a species of B. (*Buteo borealis*). It is in very bad repute among American farmers and housewives for its frequent invasion of poultry-yards, from which it has acquired the name of *Hen-hawk*.—Several other species of B. appear to be limited to particular parts of the world, as *Buteo Jackal*—so called from the resemblance of its voice to that of the jackal—to South Africa, and *B. melanosternon* to Australia. The Australian species has the head, chest, and center of the belly deep back.—The HONEY BUZZARDS (q. v.) belong to a different genus, although nearly allied to the true buzzards, as are also the HARRIERS (q. v.), of which the most common British species the Marsh Harrier, is sometimes called the *Moor Buzzard*.—BALD B. is a name of the OSPREY (q. v.).

BY'BLOS, an ancient city of Phœnicia, now called Jubeïl, situated at the base of the lower range of the Libanus, about halfway between Tripoli and Beyrout. B. was famous as the birthplace of Adonis, or Thammuz, in whose honor a splendid temple was erected, which attracted many worshipers. The name given to the town by the Jews was Giblah, and its inhabitants the Giblites are noticed in the Scriptures as stone-squarers and calkers of ships. A wall belonging, apparantly, to the era of the Crusades, surrounds the town, and the remains of a Roman theater are still visible.—B. was also the name of a town in the Egyptian Delta, celebrated for its manufacture of papyrus from the byblus or papyrus plant.

BY-LAWS are the private regulations which are usually made by corporate bodies for the control and government of the corporation. They are binding, unless contrary to the laws of the land, or to the charter, or act of incorporation, or, as it has been decided in England, unless they are manifestly unreasonable. Blackstone tells us that the right of making B. was allowed by the law of the Twelve Tables at Rome; and Mr. Stephen, in his *Commentaries*, states that in the law of England such a right is so much of course, as regards every corporation, that if the charter by which certain persons are incorporated give to a select body, out of their whole number, a power to make B. as to certain specified matters, the body at large is nevertheless at liberty to make them with regard to all matters not specified. Every corporation, too, can of course alter or repeal the B. which itself has made. By the Municipal Corporation Act, 5 and 6 Will. IV. c. 76, s. 90, borough councils have power to make B. for the government of the borough, and for the prevention and suppression of nuisances; such by-laws, however, not to be of force till the expiration of forty days after the same, or a copy, shall have been sent to one of the secretaries of state, during which period Her Majesty, with the advice of her privy council, may either disallow the B., or a part, or enlarge the time within which they shall not come into force. Railway companies are required to lay before the Board of Trade, for the approbation of that authority, certified copies of the B. and regulations by which the railway is governed, which B. may be disallowed by the Board. See CANAL, CARRIER, RAILWAY (From same root as BYRLAW.)

BYNG, GEORGE, VISCOUNT TORRINGTON, a British admiral, born January 27, 1663, eldest son of John Byng, Esq., of Wrotham, Kent, entered the navy as a volunteer at the age of 15, and rapidly rose to the rank of lieutenant. In 1688, he recommended himself to the Prince of Orange by his activity and zeal in attaching the officers of the fleet to the cause of the Revolution, and was advanced to the rank of captain. In 1702 he took part in the capturing and burning of the Spanish fleet at Vigo, and in the following year was made rear-admiral of the red. The attack on Gibraltar was solely confided to his command, and for his gallant conduct at the battle of Malaga he was knighted by Queen Anne. In 1708 he became admiral of the blue, and commanded a squadron fitted out to oppose an intended invasion of Scotland from France, on the part of the Pretender. He pursued the French fleet to the Firth of Forth, took one ship, and forced the fleet back to Dunkirk, on which occasion he was presented with the freedom of the city of Edinburgh. On the breaking out of the rebellion of 1715, he was appointed to the command of a squadron in the Downs, and for important services against the French, was created a baronet. In 1718, he commanded the English fleet sent

to Sicily for the protection of the neutrality of Italy, and gained a victory over the Spanish fleet off Messina. Soon after, he was appointed treasurer of the navy and rear-admiral of Great Britain. In January 1721, he was sworn one of the privy council, and in September following, created Baron Southhill and Viscount Torrington. On the revival of the Order of the Bath, in 1725, he was installed one of the knights; and, on the accession of George II., was nominated First Lord of the Admirality. He represented Plymouth in parliament from 1706 until 1721. Died January 17, 1733.

BYNG, JOHN, a brave but ill-fated British admiral, fourth son of the preceding, born in 1704, entered the navy early, served under his father, and, in 1727, became captain. In 1748, he had attained the rank of admiral of the red. In 1756, he was appointed to command a squadron of ten ships of the line in the Mediterranean, destined for the relief of Minorca, at that time blockaded by a French fleet under La Galissoniere. On the 20th May, B. made the signal to engage, which was obeyed by Rear-admiral West with such impetuosity that several of the enemy's ships were driven out of the line; but B. not advancing to his support, the French were allowed to escape, and Minorca was lost. The dissatisfaction in England, on the news arriving, was taken advantage of by the ministry to avert the public odium from their own inefficient measures. B. was tried by a court-martial, and condemned to death, for a breach of the 12th article of war, but recommended to mercy.

Sacrificed to the general indignation, he was shot on board the *Monarch*, at Portsmouth, March 14, 1757, meeting his fate with firmness and resignation. In the fleet, he was not popular, being a strict disciplinarian.

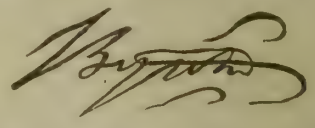
BYNKERSHOEK, CORNELIUS VAN, a Dutch jurisconsult, was born at Middelburg, in Zealand, 29th May 1673. He studied at the university of Franeker, took the degree of doctor in 1694, and immediately after commenced to practise as an advocate at the Hague. In 1703, he was elected by the states-general a member of the supreme court, and in the exercise of his functions, soon had occasion to observe how defective and vague was the common law of the country. In 1710, with a view to remedy this, he published the first part of his *Observationes Juris Romani;* in 1719, his *Opuscula Varii Argumenti;* and in 1724, he was elevated to the dignity of president of the supreme court. In 1733, appeared the rest of his *Observationes Juris Romani*. B. now began to devote himself earnestly to the study of Dutch and international law, acquiring, of the former in particular, a most extensive and solid knowledge. His great work on this subject is his *Quæstiones Juris Privati*, which he did not live to finish, and on the other, his *Quæstiones Juris Publici*. In addition to these, B. collected (from his notes) the decisions and proceedings of the supreme court in his time, under the title *Observationes Tumultuariæ*, and besides (what is perhaps his most valuable work) made a digest under the title of *Corpus Juris Hollandici et Zelandici*, of all the laws of his own country, whether statutory, or existing in the decisons of courts, or in the practice of the bar, or in the customs of particular places. He died 16th April 1743. A complete edition of his works was published by Professor Vicat of Geneva, in 1761.

BY'RGIUS, JUSTUS, or, more properly, JOBST BÜRGI, the inventor of various astronomical instruments, was born 28th February 1552, at Lichtensteig, in the canton of St. Gall, Switzerland. In 1579, he went into the service of the learned Landgraf of Hesse, Wilhelm IV. His first work was a celestial globe, the surface of which was plated with silver, and in which the stars were placed according to his own observations. The landgraf sent it to the Emperor Rudolf II., who thought it so beautiful, that in 1604, he appointed B. his own mechanician. B. subsequently went to Austria, but returned to Cassel in 1622, where he died in 1633. Many of his reputed discoveries and inventions are questioned, such as those of logarithms and the proportional compasses; but he seems to have hit upon something like both, while it is certain that he was the inventor of a method of resolving spherical triangles.

BY'RLAW, BI'RLAW, or BU'RLAW, the name given to a sort of popular jurisprudence formerly in use in Scotland, in villages and among husbandmen. Sir John Skene, writing in 1597, when the system was in full force, defines B. as '*leges rusticorum, de re rustica latæ*—laws made by husbandmen, concerning neighborhood to be kept among themselves.'—*Reg. Majest.* lib. iv. As the B. was enacted by the common consent of the villagers or neighbors, so it was administered by judges chosen by them from their own ranks. These judges were commonly called 'brylaw men,' a name which is still applied in some parts of Scotland to an arbiter, oddsman, or umpire. The courts which they held were called 'brylaw courts,' and took cognizance of disputes between neighbor and neighbor. B. seems to be an interesting survival of the system of the ancient Aryan village community; the word is derived from *burgh*.

BYRON, GEORGE GORDON, LORD, a great English poet, was was born in Holles Street, London, on the 22d of January 1788. He was the only son of Captain John Byron, of the Guards, and Catherine Gordon, of Gight, an heiress in Aberdeenshire. Captain Byron and his wife did not live happily. Domestic peace perished in the conflict of their ungovernable tempers. The husband's habits were profligate in the highest degree, and the wife's fortune was soon squandered in the debauch and at the gambling-table. Separated from her husband, the lady retired to the city of Aberdeen with her little lame boy, whom she passionately loved, her sole income at this time being about £130 per annum. In his 11th year, B. succeeded his grand-uncle, William Lord Byron; and mother and son immedietely left the north for Newstead Abbey, the ancient seat of the family, situated a few miles distant from Nottingham, in the romantic district which Sherwood Forest shadowed, and which was once familiar with the bugle of Robin Hood. On succeeding to the title, B. was placed at a private school at Dulwich, and thereafter sent to Harrow. The most remarkable thing about B.'s early years was his extraordinary attachments. Like almost every member of the poetic tribe, he 'had a passion for the name of Mary.' In his 8th year, in Aberdeenshire, he fell in love with Mary Duff. Margaret Parker, a cousin of his own, and who died early, was his next idol. His strongest passion was, however, for Mary Chaworth. This lady he first met when on a visit to Newstead in 1803, at which date he was in his 15th year. Miss Chaworth's father had been killed in a duel by Lord Byron, the grand-uncle of the poet, and marriage would have healed the family feud, and would have joined rich estates. But it was not to be.

Miss Chaworth was B.'s senior by two years, and evidently felt little flattered by the worship of the lame Harrow boy. Next year came the parting interview described in *The Dream*, with which every Englishman is familiar now as with a personal experience. In 1805, B. removed to Trinity College, Cambridge; and two years thereafter his first volume of verse, entitled *Hours of*



Idleness, was printed at Newark. The poems therein contained were not absolutely without merit, but they might have been written by any well-educated lad, who in addition to ordinary ability, possessed the slightest touch of poetic sensibility. The volume was fiercely assailed by Lord (then Mr.) Brougham in the *Edinburgh Review*, and his sarcasms stung B. into a poet. The satire, *English Bards and Scotch Reviewers*, was written in reply to the article in the *Edinburgh*, and the town was taken by a play of wit and a mastery of versification unequalled since the days of Pope. In the babble of praise that immediately arose, B. withdrew from England, visited the shores of the Mediterranean, and sojourned in Turkey and Greece. On his return in 1812, he published the first two cantos of *Childe Harold*, with immense success, and was at once enrolled among the great poets of his country. During the next two years, he produced *The Giaour*, *The Bride of Abydos*, *The Corsair*, and *Lara*. While these brilliant pieces were flowing from his pen, he was indulging in all the revelries and excesses of the metropolis. What was noblest in the man revolted at this mode of life, and, in an effort to escape from it, he married Miss Milbanke, daughter of Sir Ralph Milbanke, a baronet in the county of Durham. This union proved singularly infelicitous. It lasted only a year, and during that brief period, money embarrassments, recriminations, and all the miseries incident to an ill-assorted marriage were of frequent occurrence. After the birth of her child Ada, Lady Byron retired to her father's house, and refused to return. This event, from the celebrity of one of the parties, caused considerable excitement in the fashionable world. B. became the subject of all uncharitable tongues.

The most popular poet, he was for a space the most unpopular individual in the country. In one of his letters, written from Italy some years later, referring to the slanders current at the time, he thus expresses himself: 'I was accused of every monstrous vice by public rumor and private rancor. My name, which had been a knightly or a noble one since my fathers helped to conquer the kingdom for William the Norman, was tainted. I felt that if what was whispered, and muttered, and murmured was true, I was unfit for England; if false, England was unfit for me. I withdrew.' The separation from his wife, and the departure from England, mark a stage in B.'s genius. A new element of power had entered into his verse; the reader feels it quite distinctly in the magnificent burst of exultation that opens the third canto of the *Childe*—

Once more upon the waters, yet once more!

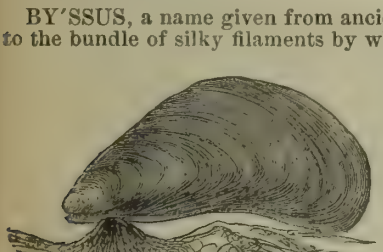
Misery and indignation stimulated him to remarkable activity.

Six months' stay at Geneva produced the third canto of *Childe Harold* and *The Prisoner of Chillon*. *Manfred* and *The Lament of Tasso* were written in 1817. The next year, he was at Venice, and finished *Childe Harold* there; and, in the gay and witty *Beppo*, made an experiment in the new field which he was afterwards to work so successfully. During the next three years, he produced the first five cantos of *Don Juan*, and a number of dramas of various merit, *Cain* and *Werner* being opposite poles. In 1822, he removed to Pisa, and worked there at *Don Juan*, which poem, with the exception of *The Vision of Judgment*, occupied his pen almost up to the close of his life. Morally, his Italian life was unsatisfactory, and his genius was tainted by his indulgences. At the close of his career, he was visited by a new inspiration; the sun, so long obscured, shone out gloriously at its setting. In the summer of 1823, he sailed for Greece, to aid the struggle for independence with his influence and money. He arrived at Missolonghi on the 4th of January 1824. There he found nothing but confusion and contending chiefs; but in three months, he succeeded in evoking some kind of order from the turbulent patriotic chaos. His health, however, began to fail. On the 9th of April, he was overtaken by a shower while on horseback, and fever and rheumatism followed. Medical aid was procured, and copious bleeding recommended; but this, B., with characteristic wilfulness, opposed. After twenty-four hours' insensibility, he expired on the evening of the 19th April 1824. His body was conveyed to England; and, denied a resting-place in Westminster Abbey, it rests in the family vault in the village church of Hucknall, near Newstead. A monument to B. was uncovered at Missilonghi in 1881, amid demonstrations of gratitude to his memory.

Lord B, is a remarkable instance of the fluctuations of literary fashion. Elevated to the highest pinnacle of fame in the heydey of his early popularity, he was unduly depressed after his death, when the false romance which he threw around himself and his writings began to wear away ; and it is only during the last twenty or thirty years that the proper place has been found for him in the public estimation. He is high, but not the highest. The resources of his intellect were amazing. He gained his first reputation as a depicter of the gloomy and stormful passions. After he wrote *Beppo*, he was surprised to find that he was a humorist; when he reached Greece, he discovered an ability for military organization. When all the school-girls of England fancied their handsome idol with a scowling brow and a curled lip, he was laughing in Italy, and declaring himself to be the most unromantic being in the world. And he was right. Take away all his oriental wrappings, and you discover an honest Englishman, who, above all things, hates cant and humbug. In *Don Juan* and his *Letters* there is a wonderful fund of wit, sarcasm, humor and knowledge of man. Few men had a clearer eye for fact and reality. His eloquence, pathos, and despair; his *Manfreds* and *Childe Harolds*, were only phases of his mind. Toward the close of his life, he was working toward his real strength, and that lay in wit and the direct representation of human life. If his years had been extended, he would in all liklihood have deserted poetry for prose, gaudy colored fiction for sober fact; and the assertion may be hazarded, that the English novel would have boasted of another and a greater Fielding. See the *Life, Letters and Journal*, of B., by Thomas Moore (1830); Leigh Hunt's *Lord B.* (1828); the Countess Guiccioli's *Recollections of Lord B.* (1869); and Prof. Nichol's short work on *Byron* (1880).

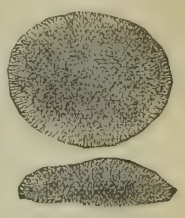
BYRON ISLAND is one of the Gilbert Islands in the Pacific Ocean, near the equator.

BY'SSUS, a name given from ancient Greek and Roman times to the bundle of silky filaments by which many lamellibranchiate mollusks—bivalve shells—attach themselves to rocks or other fixed substances. The B. springs from a cavity at the base of the solitary foot of the mollusk, and its fillaments, which are capable of being reproduced if destroyed, are secreted by a glandular tissue which occupies a furrow running nearly to the extremity of the foot. They are united together at the base in a common mass, and are often considerably divergent. They are guided to their place by the foot, and expand into a sort of disc at the point of attachment, so as to have a firm hold. A few common mussels in an aquarium readily afford an opportunity of observing the B., particularly when the filaments are attached to the glass-sides of the vessel. In the *Pinna* (q. v.) of the Mediterranean, the B. is remarkably long and delicate, has a beautiful silky luster, is very strong, and is capable of being woven into cloth, upon which a very high value is set; but the animal which produces it is now so rare, that it is almost exclusively an article of curiosity. This manufacture was known to the ancients.



Byssus of Common Mussel.

BYSSUS (Gr., a fine flaxen or silken substance), a genus established by Linnæus to include some of the lowest and most obscure forms of vegetation, and defined as having a substance like fine down or velvet, simple or feathered. Botanists sometimes ranked it among *Algæ*, sometimes among *Fungi;* it has been made the type of a group *Byssaceæ*, and placed among Lichens. Some have regarded this group as entitled to the rank of a distinct order, 'comprehending the filamentous fungi found in cellars, and similar plants;' but others reject the genus as altogether spurious. Some of the species once included in it have now been satisfactorily shown to be Lichens, others to be *Confervaceæ*, whilst many appear to be really not distinct vegetable forms but cryptogamic plants prevented by unfavorable circumstances from proper development. The green incrustations formerly regarded as species of B., have been found to be the primary germination of mosses, often species of *Polytrichum* and *Tortula*. It cannot be said, however, that the nature of all the vegetable forms which have been referred to the genus B., has yet been satisfactorily ascertained. Some of them are very phosphorescent, and are generally found where some higher form of vegetation is undergoing decay.



Black-rock Byssus (*Byssus nigra*).

BYSTROM, Joh. Nikolaus, a celebrated sculptor, was born 18th December 1783, at Philippstadt, in the province of Wermeland, Sweden, and educated under Sergell of Stockholm. In 1809, he obtained the highest prize in the Swedish Academy of Arts, and in the following year went to Rome, where he executed his first independent work, a 'Drunken Bacchante,' and sent it home. It was received with great approbation, and B. had to repeat it thrice. In 1815, he returned to Stockholm, and surprised the newly-elected crown prince by exhibiting a colossal statue of himself, which he had finished all but the head in Rome, and had found means to complete quietly in Stockholm. The crown-prince was highly gratified, and commissioned B. to execute colossal statues of Charles X., XI., and XII. After 1838, he resided in Stockholm; but returned to Rome in 1844, and died there March 13, 1848. His chief works are: 'A Nymph going into the Bath,' 'A reclining Juno suckling the Young Hercules,' 'Hygieia,' 'A Pandora combing her Hair,' 'A Dancing-girl,' a statue of Linnæus, and colossal statues of Charles XIII., Gustavus Adolphus, and Charles XIV. B. excels in the delineation of females and children, but his male figures want strength of character; his conceptions are always true to nature, his grouping skilful and pleasant, and his execution is clear and distinct.

BYTTNERIACEÆ, a natural order of oxogenous plants, sometimes united with the order *Sterculiaceæ* (q. v.), and also closely allied to *Malvaceæ* (q. v.), from which it differs, especially in the stamens not being columnar—although more or less united, generally into a cup or tube—also in the anthers being turned inwards, and 2-celled. The species of this order are trees, shrubs, or half-shrubby plants, abounding chiefly in tropical climates, although some are natives of the temperate zones. About 400 have been described. The flowers of many are beautiful. The most important product of the order is Cocoa (q. v.). The fruit of *Guazuma ulmifolia*, a native of Brazil, is eaten, being filled with a sweet and pleasant mucilage. The young bark of this tree yields, when macerated, a copious mucilage, and is therefore used in Martinique for clarifying sugar, as is that of *Kydia calycina* in the northern provinces of India. *Guazuma ulmifolia* was introduced into India, and at one time largely cultivated in the Madras presidency, under the name of Bastard Cedar, that its foliage and young shoots might be employed as fodder for cattle.

Its straight luxuriant young branches yield a strong fibre. The bark of other species of this order also affords a tough fibre, which is employed for making cordage, particularly that of *Microlæna* (or *Schillera*) *spectabilis* in the regions on the southern base of the Himalaya, *Abroma Augustum* in various parts of India, *Dombeya spectabilis* in Madagascar, and *D. umbellata* in the Isle of Bourbon. *Abroma augustum* has been especially recommended to attention and cultivation on account of its fibre, which is beautiful, white, fine and strong and is produced in great abundance. The plant grows to be a handsome small tree, having hairy lobed leaves and beautiful drooping purple flowers; but may be treated much as willows grown for basket-making, and in this way yields two, three, or four crops of cutting annually, which are peeled and the bark macerated in order to the separation of the fibre.

BY-TOWN, a town of Upper Canada, on the Ottawa, which took its name from Colonel By of the Royal Engineers. It is now *Ottawa* (q. v.), the capital of the Royal Dominion of Canada.

BYZA'NTINE ART. From the time of Constantine the Great, the emperors of the East arrogated to their imperial city the pre-eminence which, for so long a period, ancient Rome had actually possessed; and, as a necessary consequence of this assumption, Constantinople, or Byzantium, as it still continued sometimes to be called, became the rival of the mother-city in the richness and variety of its artistic monuments. In Rome, and, indeed, in the whole of Western Europe, the first effect produced by the influx of the mighty stream of barbarian life, and the consequent dissolution of existing society, was the almost total suppression of artistic effort. It was then that the artists of the West, willing and eager to avail themselves of the invitation held out to them, poured into Constantinople, carrying with them what yet remained of the artistic life of the ancient world. Byzantium was the hearth on which, during the dark period of the middle ages, those feeble sparks of ancient art were kept alive, which served to kindle the new and independent artistic life of the modern world. Not only were the painters and sculptors of Italy indebted to the art of Byzantium for the tradition of that ideal mode of conception to which the term classical is peculiarly applied, but artists in every department derived thence the elements of that technical knowledge without which the embodiment of such conceptions is impossible.

This practical acquaintance with the technical rudiments of their respective arts, which could scarcely have been derived from a mere examination of ancient works, was communicated to the fathers of Italian art by living Byzantines, some of them probably the descendants of those whom barbarian conquests had driven into the East, and whom the conquests of a still more barbarous race now restored to Western Europe. It is impossible to doubt that modern art was largely indebted to this circumstance for the marvelous stride which it took immediately after the taking of Constantinople by the Turks. But though its chief value may consist in its having thus transmitted to us the succession of antiquity, B. A. was by no means devoid of original and individual character; and it is only in so far as it possesses this, and not when regarded as a mere conservation of antique types and processes, that it takes rank as a school of art. The characteristic element in B. A. may be described as the earliest artistic recognition and representation to the senses of what was new and peculiar in Christian as opposed to heathen life. To the fullest extent to which it could claim a separate and individual existence, B. A. was Christian art; and consequently in Germany, where the subject has received more attention than in this country, two terms are frequently used as synonymous. The appearance of B. A., in this its only peculiar sense, dates from the age of Justinian, i. e., from the earlier half of the 6th c., and its productive period may be said to terminate with the conquest of the Eastern Empire by the Crusaders in 1204. But though its declension dates from this event, B. A. continued to exist in considerable vigor down to the final destruction of the Empire of the East in 1453; and even now may be seen as the inseparable handmaid of the Greek Church, both in Europe and in Asia. It is in this point of view, and more particularly as forming the basis of artistic life in Russia, that B. A. possesses its chief living interest in our day. What Rome was to the Western, Byzantium was to the Eastern European; and the relation of the latter to his mother-city, if it commenced at a somewhat later date, continued during the whole period of the middle ages.

Though the inhabitants of Eastern Europe thus derived their traditions of antiquity from a meaner source than the Romanic nations, they received them more unbroken; and, from first to last, were subjected to their influences during a much longer period. To them the living voice and hand continued to communicate what for nearly a thousand years Italians, Spaniards, and Franks had had to seek in the dead image and letter alone; and if anything still remains unrecorded of ancient thought, it doubtless dwells on Greek, and not on Roman or German tongues. Indolent, luxurious, and dissolute as their ancestors had been in classical times, the citizens of Constantinople were distinguished by an intellectual character, which, unfruitful and enfeebled though it was, was systematic, subtle, mystical, and pedantic. They were eminently an instructed people; but, like individuals whose glory is in the past, they were more conservative than original; and, however justly we may despise the chaff which they engendered, it is impossible to overestimate the value of the corns of gold which clung to their memories.

BYZANTINE ARCHITECTURE. The typical form of B. Architecture, at least as applied to ecclesiastical purposes, was fixed by the church of St. Sophia, which still exists as the great mosque of Constantinople. It was built, or rather rebuilt, by the orders of Justinian, the architects being Anthemius of Tralles, and Isodorus, the Elder, of Miletus, and completed 537 A.D. Though the largest and most magnificent, the church of St. Sophia was but one of twenty-five churches which were erected in the capital, and of a vastly greater number of ecclesiastical structures with which the provinces were adorned by the pious emperor. The style thus introduced largely influenced the architecture even of Western Europe; and in St. Mark's at Venice, the churches at Ravenna and elsewhere on the Adriatic, and even in the cathedral

Church of St. Sophia at Constantinople: Specimen of Byzantine Architecture.

of Aix-la-Chapelle, we have examples of churches almost purely Byzantine. The fundamental principle in the construction of Byzantine churches was an endlessly varied application of the Roman arch, whilst its exhibition in the form of the cupola was their most characteristic feature. In the St. Sophia, as was generally the case, the cupola covered the principal central portion of the church, and was supported by strong and lofty pillars, bound together by bold arches. To this central space were usually joined others of smaller size, which were covered by half-cupolas or arches of more ordinary construction. Though frequently in the form of a Greek cross, with the great cupola rising in the center, and smaller or semi-cupolas surmounting the four arms, neither this nor any other plan was consistently adhered to in Byzantine churches. The windows were always semicircular, similar to those in the Romanic churches of Germany, and in our own Saxon or early Norman churches; but the doors were frequently square-headed, after the classical model. Many of the details, such as the square capitals tapering downwards, and the bold projecting mouldings ornamented with foliage, seem to have owed their origin entirely to the ingenuity of Byzantine architects.

Byzantine Column.

The earlier Byzantine churches were profusely ornamented with mosaics, which, after the admixture of the Gothic element, and the adoption of the pointed arch, gave place to fresco-paintings. The constant use of the Apse (q. v.) is, after the cupola, perhaps their most marked feature. The following division into periods, though, like most divisions of the kind, somewhat arbitrary, has the authority of M. Couchaud, an eminent French architect, in its favor, and is, apparently, adopted by Parker: 1. From the time of Constantine to the middle of the 6th c.; 2. From the beginning of Justinian's reign down to the 11th c., which comprises the greater part of the existing buildings of the pure Byzantine type; 3. From the 11th c. to the conquest of Greece by the Turks, when the influence of the Venetian conquests is apparent in the intermixture of Italian and Gothic details and characteristics.

BYZANTINE SCULPTURE. When contrasted with the ignoble, tasteless, and meaningless productions of the later plastic art of Rome, that of Constantinople claims both admiration and respect. The figures are not deficient in dignity either in form or in attitude, and a deeply Christian spirit is traceable both in their general conception, and in their rich and significant symbolical accompaniments. In sculpture, as in architecture, the peculiar Byzantine type first exhibits itself towards the beginning of the 6th century. Alongside of unmistakable reminiscences of the antique, it exhibits characteristics which are as unquestionably oriental. The figures are positively laden, not with drapery alone, but with costume, which obscures the nobler and freer lines in which the ancients delighted. The execution is careful, even painful. All this becomes more and more the case as we advance in the order of time, the earliest Christian works, and those immediately suggested by the antique, exhibiting such faults only to a limited extent. Down to the 12th c., the defects which we have described were the worst which could be laid to the charge of B. sculpture, and it is scarcely earlier than the 13th c. that it assumes that mummy-like aspect by which it is too generally known. The art of carving in ivory was practised with great success at Constantinople, and in the examples of it which remain, the gradual decline—the *benumbing process*, as it has been aptly called—may be traced with great distinctness.

Of this species of work, in its earlier and better time, a fine specimen in alto-rilievo of the 'forty saints' may be seen in the museum at Berlin. The decorations of the churches, and of the sacred vessels used in the service of the altar, formed no insignificant objects of art in the better Byzantine period. Cups, plates, lamps, candlesticks, crosses, and the like, were either of gold or silver, and frequently adorned with jewels; whilst the altar itself, the chancel, and sometimes the whole interior of the church, were covered with precious metals, the panels being adorned with mosaics or frescoes.

BYZANTINE PAINTING. The same characteristics which we have ascribed to the sculpture belonged to the pictorial efforts of the artists of Byzantium, and of the neighboring countries who were mostly their imitators. The execution was careful and anxious rather than skilful, and such skill as still remained was exhibited in the mechanical perfection with which the guilding of the backgrounds and other details were managed. Of B. pictures, the best existing specimens are to be found in Italy, and belong especially to the school of Sienna. The picture of the Virgin in the church of St. Domenico at Sienna by Guido, bearing date 1221, deserves special mention. Much labor was expended on the illumination of MSS. of the Scriptures, and of these many beautiful examples, as fresh as when they were painted, may be seen in some of the larger public libraries of Europe. The chief interest attaching to B. painting consists in the parental relation in which it stood to the art of Italy. Cimabue may be regarded as its immediate heir; and in the works of Giotto, Leonardo da Vinci, Pietro Perugino, and even of Raphael in his earlier time, the traces of the inheritance are quite unmistakable. See PAINTING.

BYZA'NTINE EMPIRE, also styled the EAST ROMAN, EASTERN, or GREEK EMPIRE, was founded in 395 A.D., when Theodosius the Great, at his death, divided the Roman empire between his two sons, Arcadius and Honorius. The former, a weak and luxurious character, was made emperor of the eastern division, formerly included under the prefectures of the East and of Illyricum—namely, Syria, Asia Minor, and Pontus, stretching along the shores of the Black Sea in Asia; Egypt in Africa; and Thrace, Mœsia (now Bulgaria), Macedonia, Greece, and Crete in Europe. Arcadius left the government of the empire in the hands of his minister, Rufinus, from whom it passed to the eunuch Eutropius, and afterwards to Gainas, the murderer of Rufinus.

Gainas fell by his ambition in 401, and the shameless and avaricious Empress Eudoxia, ruled until the time of her death, 404. See ARCADIUS. After Theodosius II., a minor, under the guidance of the prefect Prætorio Anthemius, had held the reins during six years, he resigned the government in favor of his sister Pulcheria (Augusta), who ruled powerfully while her brother was kept apart from all state affairs. Western Illyria (comprehending Pannonia, Dalmatia, and Noricum) was ceded to the Eastern empire by the Roman emperor, Valentinian III.; and after several victories achieved by the Byzantine general, Ardaburius, over the Persians, a part of Armenia was also annexed. But, nevertheless, Thrace and Macedonia could only be secured from the destructive conquests of Attila by the payment of tribute. After the death of Theodosius II., Pulcheria married the senator Marcianus (450—457), whose firmness repelled the invasions of Attila. Marcianus was followed by Leo I., surnamed Macella (the Butcher), a Thracian of low birth, but elevated to the throne by the commander-in-chief, Aspar, who, being himself an Arian, would not venture to encounter the perils that sovereignty might have entailed on one of his religious views. Leo II., grandson of the former, succeeded, but died after a few months, in consequence of which the crown came into the possession of his father, Zeno (474—491), who was banished by Basiliscus (475), but who re-ascended the throne in 477. Though a weak and unpopular ruler, he contrived to retain his power in spite of several serious revolts. The internal distraction of the empire, to which, as at other times, religious strifes added considerably, increased greatly during the reign of Zeno, and the invasions of the Goths were prevented only by gifts and stratagems. Ariadne, widow of Zeno, by her second marriage, raised the courtier Silentiarius to the throne under the title Anastasius I. (491—518). By the help of the Goths, this monarch overthrew, after a six years' contest, the robber tribes of Mount Taurus. A new enemy, however, now appeared on the Danube in the Bulgarians, against whose desolating raids Anastasius built the Long Wall, to protect the peninsula on which Constantinople lies. The war with the Persians also broke out anew during his reign, and religious tumults often purpled the streets of Constantinople itself. After his death, the army raised Justinus I. to the throne. He maintained his position mainly through the favor of the clergy, whom he had conciliated by his severe persecution of heretics.

His nephew, Justinian (q. v.), succeeded (527—565), and became celebrated by his code of laws, and by the victories of his great generals, Belisarius (q. v.) and Narses (q. v.). But the rapid decline of the empire after his death showed that he had not been able to give it any internal consolidation or vitality. It was during the reign of Justinian that those pestilent contests of the Blues and Whites against the Greens and Reds (political factions so named from the colors respectively worn) first attained any consequence; and though the first disturbance was terribly chastised by Belisarius in 532, they continued to distract the capital periodically down to the 7th century. Justin II. (565—578), a weak man, governed by his wife, Sophia, yielded a part of Italy to the Longobards, was unsuccessful against the Persians, allowed the Avari to plunder the Danubian provinces, and ultimately became insane through vexation and anxiety. Tiberius, the captain of the guard, was then made regent, and after the death of Justin II., received the imperial dignity. He ruled with mildness and prudence (578—582), purchased a peace with the Avari, concluded the war with Persia, and left as his successor the commander-in-chief, Mauricius, who reigned from 582 to 602. Having replaced on the throne the Persian king, Kosroes II., who had been banished by his subjects, he thus secured the peace of his eastern frontiers; but, on the other hand, the war against the Avari did not prosper. His niggardly treatment of the army caused a military insurrection, in which he was slain along with his son; and Phocas, one of his generals, was elevated to the throne. Phocas proved a bad ruler. Through his monstrous vices, tyranny, and incapacity for government, the empire lapsed into still deeper anarchy. Suddenly, however, a deliverer appeared in the person of Heraclius (q. v.), son of the exarch or governor-general of Africa, who headed a conspiracy, marched to Constantinople, overthrew the tyrant, and ascended the throne, 610. But great as was the genius of Heraclius, he had to submit to twelve years of defeat before he could organize and discipline a victorious army. In 622, he opened those magnificent campaigns in which the power of Persia was crushed, and which, in the opinion of Gibbon, were equal to those of Scipio or Hannibal. He lived, however, to see more formidable foes in the Arabs, who, inspired by fanatic zeal, and led by the Calif Omar, captured, during 635—641, the countries on the Euphrates, with Syria, Judæa, and Egypt.

The power of the Greeks, which was demanded to resist the Arabian invasions, was miserably divided and weakened by their unending religious quarrels, especially the controversy of the Orthodox against the Monothelites (q. v.). The empire was breaking asunder, and Heraclius, now worn out with the fatigues of war, had abandoned his enfeebled senses to pleasure, and his enfeebled intellect to theological discussions. He died in 641. Constantine III., who succeeded his father, Heraclius, also died soon after, and was followed by Heracleonas, who lost the crown, and was mutilated in an insurrection. The next Ruler was Constans, son of Constantine III., who ruled from 642 to 668, made himself odious by cruelty, and perished in an insurrection. His son, Constantine IV., Pogonatus (668—685), enforced a treaty of peace on the invading Arabs (675) by his successful use of the Greek fire in warfare. On the other side, he was compelled to pay tribute in 680 to the Bulgarians, who had established themselves in ancient Mœsia. Justinian II. (685—711), son and successor of Pogonatus, was victorious in war against the Monothelite Maronite); but was defeated by the Bulgarians (688), and by the Arabs (692). His cruelty caused an insurrection, at the head of which was Leontius, who, in 695, deposed him, cut off his nose (hence his surname *Rhinotmetus*), and banished him to the Taurio Chersonese; in 705, he was restored to the throne, but adversity had taught him no wisdom. A part of his subjects revolted, and the king, abandoned by his army and by the Bulgarians, was assassinated in 711. With him the dynasty of Heraclius expired.

Philippicus Bardanes (the leader of the last insurrection against Justinian II.), was next raised to the throne (711); but having made himself odious by favoring the metaphysical tenets of the Monothelites, he was deposed, and brutally deprived of eyesight (713). His successor, Anastasius II., prudently screened himself from a mutinous army by retiring into a monastery (716), and left the crown to Theodosius III., who abdicated in 717, when Leo, the Isaurian, and general of the army of the East, did not recognize him, and marched with hostile intent to Constantinople. Leo (q. v.) himself ascended the throne in 717, and drove back the Arabs from Constantinople, but unhappily gave occasion, in 726, for that contest concerning the worship of images, which rent the empire for more than a century. In 728, the exarchate of Ravenna was lost, and the eastern provinces became the prey of the Arabs, over whom, however, he won a great victory in Phrygia. He died in 741. Constantine V. (741—775), son of Leo III., on account of his zeal as an iconoclast, was hated by the monks, who gave him the surname 'Copronymos,' because (according to their malicious and uncleanly statement) he had polluted the font at his baptism. He was a brave ruler, recovered from the Arabs parts of Syria and Armenia, and ultimately defeated the Bulgarians, against whom he had long been unsuccessful.

His son, Leo IV. (775—780), was a mild ruler; but by the ability of his generals, he made the boundaries of his empire

secure against the Arabs. After him, Constantine VI. ascended the throne under the guardianship of his ambitious mother, Irene (q. v.), who raised a powerful party in favor of image-worship. Constantine having made an attempt to liberate himself from the influence of his mother and her paramour, Stauratius, Irene barbarously caused her own son to be blinded (797). He died soon after this atrocity; and Irene, who had boldly conceived the design of marrying the Emperor Charlemagne, and thus uniting the east and west of Europe in one vast realm, excited the opposition, which, in 802, placed her treasurer, Nicephorus, on the throne. Irene was banished to Lesbos, where she died in 803. Nicephorus, who fell in battle against the Bulgarians (811), was succeeded by his son, Stauratius, who soon yielded the throne to his brother-in-law, Michael I., from whom it was taken by the Armenian general, Leo V., a powerful ruler, who conquered the Bulgarians, but fell (820) in a conspiracy excited by his zeal against image worship. Michael II., the Stammerer, was raised from a dungeon to the throne, and ruled until 829. In his reign, Crete and Sicily passed into the hands of the Arabs. Under the rule of his son, Theophilus, who is praised by the Byzantine historians for his love of justice (829—842), the general Manuel, gained some indecisive victories over the Arabs. Theodora, widow of Theophilus, and guardian of Michael III. (842—867), brought the controversy about images to a close at the council of Nicæa (842), when the worship of these was fully sanctioned and re-introduced. During this reign, the government busied itself in the persecution of the Paulicians (q. v.), while the Arabs devastated the Asiatic provinces. Theodora, having been banished to a convent by her son, the government was for some time held by Bardas, uncle of Michael III., and after his assassination, by Basilius I., the Macedonian, who caused Michael to be put to death, and afterwards ruled ably from 867 to 886. But though on the whole successful against the Arabs, the latter contrived to make themselves masters of Syracuse. His dynasty (the Macedonian) maintained itself on the Byzantine throne, with some few interruptions, until 1056. The reign of his son, Leo VI., the Philosopher, (886—912), was not prosperous.

The inroads of the Bulgarians and of the Arabs, who, in 904, plundered Thessalonica, continued to increase during the government of his son, Constantine VII., Porphyrogenitus, who ruled mildly but feebly (912—959). Under his son, the dissolute Romanus II. (959—963), Crete was retaken from the Arabs by the vigor of his general, Nicephorus Phocas, who, on the death of the emperor, married his widow, Theophania. She, however, caused him to be murdered in 969, as she wished to marry John Tzimiskes, who ruled till 976, and, like his predecessor, was victorious against the Arabs and Bulgarians, as also the Russians, who about this time began to emerge from obscurity as an enemy of the Byzantine power. His successor, Basilius II. (976—1025), the son of Romanus, conquered the Bulgarian kingdom, and attached it as a province to the empire, which it remained till 1186, when it again became independent. His brother, Constantine VIII. (1025—1028), did not resemble him. Romanus III. next ascended the throne, but was assassinated by his wife, Zoe, a profligate but crafty princess, who raised successively to the imperial dignity Michael IV. (1034), Michael V. (1041), and Constantine IX. (1042). Meanwhile, Russians and Arabs devastated the realm. In Asia, the Seljuk Turks proved dangerous enemies; while in Lower Italy, the Normans narrowed the Byzantine power to the possession of Otranto. After Constantine's death in 1054, Theodora, sister of Zoe, was elected empress; and on her death in 1056, Michael VI., who was deposed by Isaac I., Comnenus.

With Isaac I., Comnenus, who came to the throne in 1057, the dynasty of the Comnenian emperors began. He retired to a monastery (1059), and was succeeded by Constantine X., whose widow, Eudocia, married Romanus IV., and raised him to the throne. Romanus was deposed in 1071 by Michael VII. (son of Constantine X.), who, in his turn, was dethroned by Nicephorus III. (1078), who reigned until 1081, when he was deposed by Alexius I., Comnenus (q. v.), (1081—1118). This last reign was marked by the commencement of the Crusades. The successors of Alexius—his son, Kalo-Joannes (1118—1143), and Manuel I. (1143—1180)—were able rulers, and victorious in their engagements with the Turks. Manuel's son, Alexius II., was murdered by his guardian, Andronicus (grandson of Alexius I.), who raised himself to the throne. He was the last prince of the Comnenian dynasty, and fell in an insurrection excited by his own cruelty, 1185.

After the first turbulent reign of Isaac II., who was blinded and deposed by his brother, Alexius III, who took the surname of Comnenus in 1195, the Crusaders restored Isaac to the throne (1203), and also crowned his son Alexius IV.; but the restless citizens of Constantinople elected Nicholas Kanabus, who took the title of Alexius V., and pursuing the usual bloody course, put his predecessor to death.

In 1204, the French and the Venetians (collectively named *Latins*) advanced on Constantinople, and captured the city, April 12, having made themselves masters of the European provinces. The whole was divided into four parts, of which the first, including the metropolis, fell to the lot of Baldwin, Count of Flanders, who was made emperor, and to whom the other participants in the expedition did fealty for their respective shares. The Venetians obtained the coasts of the Adriatic and Ægean seas, a part of the Morea, and several islands; Bonifacius, Count of Montferrat, Macedonia and part of Greece; several dukedoms, countships, &c., were also established at Athens, Philippopolis, and other places for French knights; while a number of Greek princes, both on the mainland and in the islands, maintained their independence. In the west of Asia Minor, Theodorus Lascaris, who had been elected emperor at Constantinople, formally transferred the seat of government to Nicæa; and finally, in the north-east of Asia Minor, the governor of the province of Colchis, Alexius Comnenus, ruled at Trebizond with absolute authority; while one of his successors, John Comnenus, even assumed the title of emperor. At Constantinople, neither Baldwin nor his successors could strengthen the sinking empire. Baldwin himself died (1206) a prisoner in the hands of the Bulgarians. After him came his brother, Henry, who ruled bravely and wisely till 1216. For the next four years, the empire was actually without a ruler, and a prey to utter anarchy. In 1221, Robert, son of Peter, Count of Auxerre and Courtenay, came to the throne; and was succeeded by John of Brienne, titular king of Jerusalem (1228—1237); and the latter by Baldwin II. (1237—1261).

During these reigns, a great part of the empire was seized by John Vatazes, successor of Theodorus Lascaris of Nicæa (1222—1255). This ruler was followed in Nicæa by Theodorus II. (1255—1259), whose son, Johannes, during his minority, was superseded by Michael VIII., Palæologus, who, by the help of the Genoese, captured Constantinople (July 25, 1261), and thus put an end to the Latin dynasty; though some few Latin principalities maintained themselves till the fall of the Byzantine empire.

Michael, the first of the Palæologi, a powerful prince, really endeavored to strengthen the realm; but by his unhappy attempt to unite the Greek Church with the Latin, from which it had decisively separated (1054), he gave great offence to the clergy and the people. His son, Andronicus II., who came to the throne, 1282, re-established the Greek ritual. After the death of his son and co-regent, Michael IX. (1320), Andronicus II. was compelled to divide the throne with his grandson, Andronicus III., who became sole emperor, 1328. This monarch unsuccessfully opposed the Turks, who took Nicæa and Nicomedia in 1339, and wasted the European coasts. He died in 1341. Under his son, Johannes V., the Turks first gained a firm footing in the European provinces, and spreading themselves from Gallipoli (which they captured in 1357) over other districts. Sultan Murad took Adrianople, 1361, and make it the seat of government. He and his follower, Bajazet, conquered all the Byzantine territories as far as Constantinople. Manuel II., son and successor of Johannes, was besieged in Canstantinople by Bajazet, who defeated an army under Sigismund of Hungary, at Nicopolis, in 1396, and compelled the Byzantine monarch to cede to the Turks one of the main streets of the city, which was saved from capture only by Timur's incursions into the Turkish territories, 1402. By this diversion Manuel recovered some portion of the Byzantine provinces; but made so little use of the occasion, that, in 1422, the metropolis was again besieged by Murad II., who, after he had overthrown the force sent to aid the emperor by Ladislaus, king of Hungary, at the battle of Varna, made Constantinople, in 1444, the limit of the domains of Johannes VI., son of Manuel, and compelled him to pay tribute. Constantine XI., brother of Johannes, bravely but fruitlessly contended against the overwhelming Turkish forces, and fell heroically in the defence of Constantinople, which was captured by Mohammed II., May 29, 1453, when the B. E. was brought to a close. The petty Latin princes who existed here and there in Greece, and the despots, Demetrius and Thomas, who ruled in the Morea, were subdued by Mohammed in 1460; while David, a member of the Comnenian dynasty, the last emperor of Trebizond, submitted in 1461.

It has hitherto been usual for authors dealing with the bloody record of dynastic crimes in the B. E. to affirm that the history of the world never witnessed so degraded a caricature of imperial government. Against all such summary statements Mr. Freeman and others energetically protest; declaring that careful study brings the fairer side into relief, and that, on the whole, the history of the fall of the B. E. is the record of a noble struggle against overwhelming odds.

The constitution of the B. E. was founded on the institutions of of Diocletian and Constantine the Great, and was purely despotic. The emperors who were consecrated by the Patriarchs of Constantinople, claimed, as the true descendants of the Cæsars, a sovereignty over the West as well as the East, and styled themselves 'rulers of the Romans,' even after Charlemagne had founded a new dynasty. Though great influence was at various times exercised by the clergy as well as by women, courtiers, and ministers,

the emperors were pure autocrats, having supreme power in all departments of government, and being themselves superior to all laws. By pompous titles, by great splendor of costume, and by a strict observance of an elaborately minute court ceremonial, as well as by the cruel penalties inflicted for any insult offered to the imperial dignity, or to the dignity of the emperor's relatives, they kept themselves sacredly apart from the people. Gradually everything disappeared that might have been a check upon the utter despotism of the supreme power. As early as the 6th c., the consulate was absorbed into the mass of imperial honors, while the traces of the senate which Constantine had established at Byzantium, and which was composed of those on whom the emperor had bestowed the dignity of patriciate, as well as the chartered privileges of the towns, had entirely vanished in the 10th century. The privy council, to whom the conduct of the state was intrusted, was arbitrarily chosen by the emperor. The state-officials were very numerous, and their respective ranks carefully distinguished. They were raised far above the populace by titles and privileges, but were utterly dependent on the throne. Among these, the *Domestici* (including many eunuchs), clamed the highest rank as immediate attendants on the emperor. The rank of the *Curopalates*, who had charge of the four chief imperial palaces, became in course of time, subordinate to that of the *Protovestiarius*, who was invested with the highest dignity of all.

The Domestici were made commanders-in-chief of the army. Among them, the *Domesticus* of the East (styled, *par excellence*, *Megadomesticus*) held the highest rank, and finally, under the Palæologi, was considered the first civil and military officer of the realm. The provinces were ruled by governors bound to contribute certain sums to the royal revenue, which gave rise to oppressive exactions. No distinction was made between the state-revenue and the privy-purse. For military service, the land was divided into districts (*Themata*); and the army, down to the later times, consisted almost entirely of foreign mercenary troops, the imperial body-guard, or *Spatharii*, who were mainly Germans, holding the highest rank. The admiral of the fleet was styled *Megas Dux*. In the midst of constant internal and external disturbances, the administration of justice was grossly neglected and abused, though Justinian and other emperors earnestly endeavored to establish just laws.

BYZA'NTINE HISTORIANS are those Greek writers who have handled the history of the Byzantine empire. They are divided into three classes—1. Those whose works refer exclusively to Byzantine history; 2. Those who professedly occupy themselves with universal history, but at the same time treat Byzantine history at disproportionate length; 3. Those who write on Byzantine customs, antiquities, architecture, &c. The B. H. are far from faultless, yet, as they are the only sources of information regarding the vast empire of the East, they are invaluable to us. The most interesting and instructive among them, however, are those who confine their attention to a limited number of years, and to the events which transpired under their own observation, or in which they took part. The principal B. H. were collected and published at Paris in 36 vols., with Latin translations under the editorship of P. Philippe Labbé, a Jesuit and his successors (1648—1711). This magnificent collection was reprinted, with additions, at Venice, 1727—1733. In 1828, Niebuhr, assisted by Bekker, the Dindorfs, and others, began a *Corpus Scriptorum Historiæ Byzantinæ*, carried on till 1855, and continued in 1872 by the *Bibliotheca Græca Medii Ævi*.

BYZA'NTINES, in Numismatics, is the term applied to coins of the Byzantine empire. Byzantine coins are of gold, silver, and bronze; bear impressions distinct from those of the earlier Roman coins; and were copied in several countries where the Byzantine standard was adopted. The commercial relations of the Eastern empire served to distribute its coinage over almost all the then known world. It was current in India, as well as in the north of Europe. Recently, an increased attention has been paid to the study of Byzantine coins as aids to history.—Saulcy, *Essai de Classification de Suites Monétaires Byzantines* (Metz, 1836).

BYZA'NTIUM, a city which stood on the Thracian Bosporus, was first founded by emigrants from Megara in 667 B.C., and rapidly rose to importance as a seat of commerce. Its position was at once secure and enchanting; it commanded the shores of Europe and Asia, had magnificent facilities for trade, and was also encircled with rich, picturesque, and varied scenery. After a time of subjugation under Darius Hystaspes, B. was liberated from the Persian yoke by Pausanias. Along with other Grecian seaports, B. revolted from Athens in 440 B.C., but was captured by Alcibiades (408). Lysander recovered it for the Lacedæmonians in 405. Shortly afterwards, it renewed its alliance with Athens, and in 390, Thrasybulus altered its form of government from an oligarchy into a democracy. When Athens again acquired a dangerous importance as a naval power, B., in 356, leagued itself with Chios, Rhodes, and King Mausolus II. of Caria, and crippled the trade of the former city; with which, however, it again formed an alliance, through the influence of Demosthenes, in opposition to Philip of Macedon, who, in 341—340 B.C., vainly besieged Byzantium. Under Alexander the Great, B. retained a certain degree of independence. For some time, B. was tributary to the Gauls, who settled in Thrace, after the death of Brennus (280 B.C.). After the second Punic war, when the Romans began to interfere in the affairs of Grecian and Asiatic cities, B. attached itself to Rome, and, retaining almost entire its former liberties, maintained also its commercial importance. In the civil war between Septimius Severus and Pescennius Niger, B. sided with the latter. It was therefore besieged by Severus, and, after a brave defence of three years' duration, was captured in 196 A.D., and reduced to ruin. Severus, repenting of the desolation which he had made, rebuilt a part of the city under the name of *Augusta Antonina*, and ornamented it with baths, porticos, &c. Caracalla restored to the inhabitants their ancient privileges; and, in 330 A.D., under the name of New Rome or Constantinople, it was made the metropolis of the Roman empire. See CONSTANTINOPLE.

THE third letter in all the alphabets derived from the Roman. It corresponds in place to the Greek gamma (Γ), and had originally the same sound—viz., that of *g* in *gun;* as is expressly recorded, and as is proved by very old inscriptions, on which we read *leciones, lece*, for what were afterwards written *legiones, lege*. This medial or flat guttural sound of *c* was at an early period of Roman history lost in the sharp guttural or *k*-sound (see ALPHABET), and this continued to be the pronunciation of the letter *c* in Latin down at least to the 8th c. of the Christian era, not only in such words as *comes, clamo*, but also before the vowels *e* and *i*. Such Latin words as *Cicero, fecit*, are uniformly represented in Greek by *Kikero, phekit;* and in the times of the Empire, the Germans borrowed *Kaiser, keller*, from *Cæsar, cellarium*.

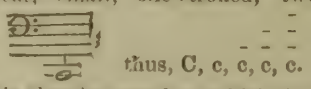
It seems difficult, at first sight, to account for the same letter having sounds so different as those heard in *call* and in *civil*. The beginning of the transition is to be found in the effect produced upon certain consonants by their standing before *i* followed by a vowel. Thus, in *nation, ti* has the effect of *sh;* and out of *diurnal* has sprung *journal*. In such combinations, *i* is originally a semivowel having the force of *y*, and it is easy to see that *tyon, dyur*, pronounced in one syllable, cannot but slide into the sibilant or hissing sounds of *shon, jur*. A precisely similar effect is produced on the *k*-sound before *ia, iu, io;* in Lucius, Porcia, or rather Lukyus, Porkya, *ky* tends to slide into a hissing sound similar to that of *ty* and *dy*. This tendency showed itself early in the Latin tongue; and in the vulgar Latin of later ages, and in the Romanic tongues that sprang out of it, it fully developed itself, so that the Italian came to pronounce *Lucia* as if written *Lutshia*. Combinations like *ceo, cea*, are little different from *cio* and *cia*, and would naturally follow the same course; and the *s* sound being once associated with the letter *c* in these positions, was gradually extended to it in cases where the *e* or *i* was not followed by a vowel.

The Anglo-Saxon alphabet resembled the Roman, from which it sprang, in having no *k*, and in always using *c* with the sound of *k; king* and *keen* were spelled *cyning* and *cene*. It was so also without *q*, for which *cw* was used—*quick* being spelled *cwic*. By a process analogous to that described above, such Anglo-Saxon words as *ceorl, ceosan* (pro. *kyorl, kyosan*), became transformed into the English *churl, choose*. And this suggests a natural explanation of the multitude of cases where the *c* of the Latin has been transformed into *ch* in French, and has passed in this form into English—e. g., Lat. *caput*, Fr. *chef*, Eng. *chief;* Lat. *caminus*, Eng. *chimney;* Lat. *carmen*, Eng. *charm*. For as the Anglo-Saxons turned the *karl* or *korl* of the other Gothic nations into *kyorl*, so doubtless the Romanized Gauls corrupted the pronunciation of the Latin *camera*, for example, into *kyamera* (compare Eng. *cart*, pro. by some *kyart*), which would then readily slide into *chambre*.

In the other Germanic alphabets, which were derived partly from the Roman and partly from the Greek, the Greek *kappa* or *k* is used almost to the exclusion of *c*, which, in German, Swedish, &c., appears only in words borrowed from the Romanic languages. See letter K.

In modern English, *c* is pronounced like *k* before the vowels *a, o, u*, and like *s* before *e, i*, and *y;* and where the sharp gutteral sound has to be represented before *e, i*, and *y*, the Germanic *k* has superseded the Anglo-Saxon *c*, as in *king, keen*. In so far as mere sound is concerned, *c* is a superfluous letter in English; in every case its power could be represented either by *k* or by *s*. In the corresponding words of the several Aryan languages, we find various substitutions for *c*, thus: Lat. *calamus*, Eng. *halm* (stalk), Rus. *soloma;* Lat. *cord-*, Eng. *heart*, Rus. *serdtse;* Lat. *collum*, Ger. *hals* (neck); Lat. *acer* (sharp), Fr. *aigre*, Eng. *eager;* Lat. *duc-* (lead or draw), Ger. *zoq*, Eng. *tug;* Gr. *pepo*, Lat. *coquo*, Eng. *cook;* Lat. *dictus*, Ital. *ditto*. C sometimes disappears before *l* and *r;* thus: Gr. *kleo* (to sound one's fame, allied to *kaleo*, to call or shout), Lat. *laudo*, to praise, Ger. *laut*, voice, Eng. *loud*, Old Ger. *hlud*, fame (hence Hludwig or Clodowig, Clovis, Louis).

C, in music, is the name of one of the notes of the gamut. The scale of C major has neither flats nor sharps, and therefore is called the natural scale. The different octaves of the gamut, beginning with C, are called by the Germans the great, small, one-stroked, two-stroked, &c., beginning with



thus, C, c, c, c, c.

C is also the sound on which the system of music is founded, and from which the mathematical proportions of intervals are taken; that is, a string of a given length sounding C, when divided into certain proportions, is made to produce harmonically the intervals of the different fundamental chords.

C MAJOR, the first of the twelve major keys in modern music; being the natural scale, it has no signature.

C MINOR, the tonic minor of C major, has three flats for its signature—viz., B flat, E flat, and A flat.

CAABA. See KAABA.

CAA'ING WHALE (*Globicephalus deductor*), an interesting cataceous animal which has been very generally included by naturalists in the genus *Delphinus* with dolphins (q. v.) and porpoises (q. v.), being named by some *Delphinus melas* (Gr. black), by others *D. globiceps*, from the round form of its head, but which has recently been separated from the true dolphins, either as a species of porpoise (*Phocæna*), or as the type of a distinct genus, *Globicephalus*, principally characterized by the rounded muzzle, and the convex and rounded top of the head. The general form of the animal is not unlike that of the common porpoise, but it is much larger, being from 16 to 24 feet in length. The body is thick, its circumference at the origin of the dorsal fin, where it is greatest being rather more than 10 feet, tapering towards the tail, which is deeply forked. The pectoral fins are remarkably long and narrow, fully 5 feet in length, differing very much in this respect from those of every other known cetaceous animal. The whole number of vertebræ is 55. The color is black, with a white

streak from the throat to the vent; and the skin is beautifully smooth, shining like oiled silk.

The C. W. feeds on cod, ling, and other large fishes, but also to a great extent on cephalopodous mollusca, the cuttle-fish indeed, seeming to be its principal food. It is the most gregarious of all the Cetacea, great shoals or herds being usually seen together in the northern seas which it inhabits. These herds exhibit the same propensity with flocks of sheep, when pressed by any danger, to follow their leaders, so that when they are hemmed in by boats, if one break through to the open sea, all escape; but if

Caaing Whale.

one is driven ashore, the rest rush forward with such blind impetuosity as to strand themselves upon the beach, where they become an easy prey and rich prize to their pursuers. The appearance of a herd of caaing whales in a northern bay produces a scene of great excitement, and every boat is in requisition. From 50 to 100 whales are often captured, and it is recorded that 1110 were killed, in the winter of 1809—1810, at Hvalfiord, in Iceland. The word *caaing* is not the Scottish form of *calling*, as has been supposed, but is a totally different Scotch word, which signifies *driving*. C. W. appears to be originally an Orkney or Zetland name. The same animal is known to sailors as the Black Whale, the Howling Whale, the Social Whale, and the Pilot-fish.—Another species of the same genus, *G. Rissoanus*, 9 or 10 feet long, the male of a bluish-white color, the female brown, both sexes marked with irregular white lines and brown spots, is found in the Mediterranean.

CABAGA'N, a thriving town, situated at the northern extremity of the island of Luzon, one of the Philippines. Pop. upwards of 11,000.

CABA'L, a term employed to denote a small, intriguing, factious party in the state, and also a union of several such, which, for political or personal ends, agree to modify or sacrifice their principles. The word wes used to describe an English ministry in the reign of Charles II., the initials of whose names composed CABAL.—viz., Clifford, Ashley, Buckingham, Arlington, and Lauderdale. This was not the origin of the word, however, as some have supposed; but merely the ingenious application of a word previously in use, and which appears to have been derived from the French *cabale*, possessing a similar signification.

CABANIS, PIERRE JEAN GEORGES, a French physician, philosophical writer, and partisan of Mirabeau in the Revolution, was born at Cosnac, in the department of the Charente-Inférieure, 1757. When he had completed his studies in Paris (1773), he went to Warsaw, in the capacity of secretary to a Polish magnate. On his return to Paris, he was for some time engaged in literary pursuits, from which he turned his attention to an earnest study of medicine. At the outbreak of the Revolution, he attached himself to the liberal side, but detested the cruelties which followed. For Mirabeau, whose opinions he received, he wrote a work on national education, which was published after the death of that great orator (1791). C. was one of the Council of Five Hundred, afterwards a member of the senate, and administrator of the hospitals of Paris. He died May 5, 1808. His chief work, *Rapports du Physique et du Moral de l'Homme*, completed in 1802, gained its author a considerable reputation as a writer and a philosopher. The work displays no mean power of observation and analysis, but is characterized by a sensationalism so absolute, that it seems at first sight as if the author were burlesquing with grave irony the doctrines of his brother-materialists. He denies that the soul is an entity; it is only a faculty; and declares the brain to be merely a particular organ specially fitted to produce thought, as the stomach and the intestines perform the function of digestion. C. traces this grotesque analogy through all its niceties, and at last triumphantly concludes, 'that the brain digests impressions and organically secretes thought!'

CABATUAN, a city of the province of Iloilo, on the Island of Panay, one of the Philippines. It is situated on the banks of the river Tiguin, which so abounds with crocodiles that fishing is unsafe. Navigation is very uncertain, the river being sometimes nearly dry, while at others it overflows its banks, and deluges the surrounding country. The city was founded in 1732, and possesses a populaton of 23,000, who are chiefly engaged in the production of rice, and of cocoa-nut oil.

CABAZERA, capital of the province of Cagayan, island of Luzon, Philippines. Pop. 15,000. Tobacco is grown very extensively in the province, and its manufacture affords employment to large numbers of people.

CA'BBAGE (*Brassica oleracea;* see BRASSICA), a plant in most general cultivation for culinary purposes in Europe and other countries, cultivated also to a considerable extent for feeding cattle. It is a native of the Rocky shores of Britain and other parts of Europe, more plentiful on the shores of the Mediterranean than in more northern latitudes, and in its wild state is generally from a foot to two feet high. This plant has been cultivated in Europe from time immemorial; it has likewise been cultivated from an early period in gardens and about villages in India. Few plants show so great a tendency to vary in their form through cultivation; and among the varieties of this one species are reckoned several of our most esteemed culinary vegetables, such as Kale (q. v.) or Greens, Borecole, Colewort (q. v.) Savoy (q. v.), Kohl Rabi (q. v.) Cauliflower (q. v.), and Broccoli (q. v.).—plants which differ much in their appearance and in the particular qualities for which they are valuable, both from each other and from the original wild plant.

The wild C. has smooth sea-green leaves, waved and variously indented; the boiling of the leaves, or their forming close heads at a certain stage of the growth of the plant, so that the inner leaves are blanched, is peculiar to those cultivated varieties which commonly receive the name of cabbage.

The ordinary varieties of C. are often called by the general name of *White C.*, to distinguish them from the *Red C.*, which is of a deep brownish-red or purplish color, and is chiefly used for pickling, for which purpose it is much esteemed. The *Tree C.*, or *Cow C.*, is a variety cultivated for cattle, especially in the Channel Islands and the north of France, of which the leaves do not close together into compact heads, but which is remarkable for its great height—reaching, when it is in flower, ten feet on rich soils—and for its branching stem. The stems of this kind are sometimes used as stakes for pease, and even as cross-spars for thatched roofs.

The *Portugal* or *Tranxuda C.*, also known as *Couve Troncluda*, is a variety remarkable for its delicacy, and for the large midribs of its leaves, which are often used like sea-kale. It is an article of luxury like cauliflower, and requires a somewhat similar cultivation.—C. seed is sown either in spring or autumn, and the seedlings transplanted in rows at distances of two feet or upwards, according to the size of the variety. They are often planted closer, and the alternate plants cut young for open greens, for which the sprouts that arise from the stem of some varieties after the head has been cut off are also used. Cabbages require a rich, well-manured soil, and the earth about the roots ought to be often stirred. By sowing and planting at different dates and of different varieties, a succession is secured in the garden; and when winter approaches, part of the principal crop may be taken up and laid in a sloping position, so that only the heads are above the earth, in which way they are generally preserved without injury. In some places, cabbages, are completely buried in the earth, the plants not being allowed to touch each other; and this method succeeds well in peaty or sandy soils.

The C., considered as food, contains more than 90 per cent. of water, and therefore cannot be very nutritious: 100 parts of the ordinary C. consist of

Extractive	2·34
Gummy matters	2 89
Resin	0·05
Vegetable albumen	0·29
Green fecula	0·63
Water and salts	93·80

The digestibility of C. varies according as it is partaken of raw or boiled: thus, raw C. alone is digested in 2½ hours; raw C. with vinegar, in 2 hours; and boiled C. takes 4½ hours. Immense quantities of cabbages are used in Germany as *Sauer Kraut* (q. v.).

CABBAGE BARK. See ANDIRA.

CA'BBAGE BUTTERFLY, a name common to several species of butterfly, the larvæ of which devour the leaves of cruciferous plants, especially of the cabbage tribe, and are popularly known as cabbage-worms or kale-worms. The LARGE C. B., or Large White Garden Butterfly (*Pontia Brassicæ*, or *Pieris Brassicæ*), is one of the most common of British butterflies. It is white; the

wings tipped and spotted with black. The wings, when expanded, measure from 2½ to 3 inches across. The antennæ terminate in an ovoid club. The female lays her eggs, which are conical and bright yellow, in clusters of 20 or 30, on the leaves of the plants which are the destined food of the caterpillars.

The caterpillars, when fully grown, are about 1 inch or 1½ inch long, and are excessively voracious, eating twice their own weight of cabbage-leaf in 24 hours. When full grown, they suspend themselves by their tails, often under ledges of garden-walls, or similar projections, and are metamorphosed into shining pale-green chrysalids, spotted with black, from which the perfect insect emerges, either in the same season or after the lapse of a winter—no longer to devour cabbage-leaves, but to subsist delicately upon honey, which it sucks from flowers. See INSECTS.—The SMALL C. B., or Small Garden White Butterfly, sometimes called the TURNIP BUTTERFLY (*Pontia* or *Pieris Rapæ*), very much resembles the Large C. B., but the expanse of the wings is only about 2 inches. The eggs are laid singly on the under side of the leaves of cabbages, turnips, &c., and the caterpillars, which are of a velvety appearance, pale green, with a yellow line along the back, and a yellow dotted line on each side, sometimes appear in great numbers, and prove very destructive. They bore into the hearts of cabbages, instead of merely stripping the leaves, like those of the last species, and thus are a greater pest, even when comparatively few. The chrysalis is of a pale reddish-brown, color freckled with black.—A third species, also common in Britain, the GREEN-VEINED WHITE BUTTERFLY (*Pontia* or *Pieris Napi*), very nearly resembles the small cabbage butterfly.—The excessive multiplication of these insects is generally prevented by small birds, which devour them and their caterpillars, and by insects of the *Ichneumon* (q. v.) tribe, which lay their eggs in the caterpillars, that their own larvæ may feed on them.

CABBAGE FLY (*Anthomyia Brassicæ*), a fly of the same family with the house-fly, flesh-fly, &c., and of which the larvæ or maggots often do great injury to the roots of the cabbages, and sometimes to those of turnips. It is of the same genus with the fly generally known as the Turnip Fly (q. v.), and also with the Potato Fly (q. v.), Beet Fly (q. v.), &c. It is about one-fourth of an inch in length, and half an inch in expanse of wings; of an ash-gray color; the male having a silvery gray face, and a long black streak on the forehead; the female, a silvery white face, without any black streak; the abdomen of the male is linear, that of the female terminates conically; the eyes of the male nearly meet on the crown, those of the female are distant, with a broad black stripe between them. The larva is very similar to that of the flesh-fly—yellowish white, tapering to the head, which has two black hooks. The pupa is rust-colored and horny.

CABBAGE MOTH (*Mamestra* or *Noctua Brassicæ*), a species of moth, the caterpillar of which feeds on cabbage and turnip leaves, and is sometimes very destructive. The caterpillar is greenish-black, and changes to a brown pupa in autumn. The perfect insect is of a rich mottled-brown color, the upper wings clouded and waved with darker brown, and having pale and white spots, a yellowish line near the fringe, the fringe dotted with black and ochre, the underwings brownish and white.

CABBAGE PALM, or CABBAGE TREE, a name given in different countries to different species of Palm, the great terminal bud of which—the Palm Cabbage—is eaten like cabbage. The C. P. of the West Indies is *Areca oleracea*. The Southern States of America have also their C. P. or Cabbage Tree, otherwise called the Palmetto (*Chamærops Palmetto*). See ARECA, EUTERPE, PALM, and PALMETTO.

CA'BBALA (from Heb. *kibbel*, to receive), the received doctrine, by which is not to be understood the popularly accepted doctrine, but that inner or mystical interpretation of the Law which the Cabbalists allege that Moses received from God in the mount, and subsequently taught to Joshua, who in his turn communicated it to the seventy elders, and which has ever since been the treasure of the select Jews. Since the 12th c., the study of this secret lore has gradually resulted in a distinct school and literature, the elements of which, however, are already visible in the Macedonian epoch, and the real or historical source of which is to be found in the eastern doctrine of emanation. In Philo, in the Talmud, &c., we certainly find theologico-philosophical conceptions, which were at a later period taken up and modified; but the first book on cosmogony is *Jezirah*, a production of the 7th c., attributed to Akiba. After the second half of the 12th c., the Cabbalistic doctrines, which had at first been confined to such high themes as God and creation, began to include exegesis, ethics, and philosophy, and so became a kind of mystical religious philosophy. The numerous cabbalistic writings composed during the three subsequent centuries, professed to teach the secret or mystical sense of Holy Writ, and the principles on which it is grounded, the higher meaning of the Law, as well as the method of performing miracles, by the use of divine names and sacred incantations. The cabbalists, moreover, prepared books, which they attributed to the oldest authorities—for instance, *Sohar*, a work written in Aramaic, during the 13th c., and fathered upon Simeon-ben-Joachai, a scholar of Akiba. This became the Bible of the Cabbalistic neophytes. The chief opponents of the Cabbalists were the philosophers, and in part the Talmudists. Towards the close of the 16th c., the Cabbalistic wisdom, which by that time had degenerated into magic and word-juggling, received a new impulse from its teachers in Palestine and Italy. Since the time of Reuchlin, many Christian scholars have investigated the subject.

CABEIRI, divinities anciently worshiped in Egypt, Phœnicia, Asia Minor, and Greece. The ancients have left us very obscure notices of the C., and learned men have been unable to reach any satisfactory conclusions with regard to them and their worship. It is certain that the worship had both its mysteries and its orgies, and it appears also that the C. were amongst the inferior divinities, and regarded as dwelling upon the earth, like the Curetes, Corybantes, and Dactyles, and were probably representatives of the powers of nature.

CA'BÉS, or KHABS, GULF OF (ancient *Syrtis Minor*), an inlet of the Mediterranean Sea, lying between the islands of Kerkenna and Jerba, on the north-east coast of Africa, in lat. about 34° N., and long. from 10° to 11° E. The town of Cabes (ancient *Tacapæ*) stands at the head of the gulf.

CABET, ÉTIENNE, a notable French communist, was born at Dijon, January 2, 1788, and educated for the bar, but turned his attention to literature and politics. Under the Restoration, he was one of the leaders of the Carbonari (q. v.), and in 1831 was elected deputy for the department of Côte d'Or. Soon afterwards, he published a *History of the July Revolution* (1832), started a Radical Sunday paper, *Le Populaire* (1833), and, on account of an article in this paper, was sentenced to two years imprisonment, but escaped to London. Here he wrote brochures against the July government, and began his communistic studies. After the amnesty, 1839, he returned to Paris, and published a *History of the French Revolution* (4 vols., 1840), bestowing great praise on the old Jacobines. He attracted far more notice by his *Voyage en Icarie* (1840), a 'philosophical and social romance,' describing a communistic Utopia. The work obtained great popularity among the working-classes of Paris. C. next proceeded to turn his 'philosophical romance' into a reality, and published (1847) in his journal, *Le Populaire*, the statutes for the formation of an 'Icarian colony' on the Red River in Texas; inviting his followers to emigrate. The first division sailed on the 2d February 1848, but a short experience convinced them that Texas was anything but a Utopia. Their complaints reached Europe, but did not deter C. from embarking at the head of a second band of colonists. On his arrival, he learned that the Mormons had just been expelled from Nauvoo, in Illinois, and that their city was left deserted. The Icariens established themselves there in May 1850. C. now returned to France, to repel the accusations against his probity which had been circulated during his absence, and to obtain a reversal of the judgment which had been formerly pronounced against him, 30th September 1849. Having succeeded in this, he went back to Nauvoo, where he governed, as a sort of dictator, his petty colony, until 1856, when he was deprived of his office, and obliged to flee to St. Louis, where he died 9th December of the same year. C. was a shallow thinker, a weak ruler, and a poor writer; but his success, such as it was, is a proof of what can be accomplished by what has been termed, with more vigor than elegance, 'pig-headed perseverance.'

CABE'ZA DEL BUEY, a small town of Spain, in the province of Badajos, 86 miles east-south-east of the town of Badajos, on the north slope of the Sierra el Pedrose. The town is tolerably well built, and has a number of churches and other public buildings. Pop. 5395, engaged chiefly in the manufacture of woollen and linen cloths.

CABEZO'N DE LA SAL, a town of Spain, in the province of Valladolid, about 7 miles north-north-east of the city of that name. It is situated on the Pisuerga, and is celebrated as the scene of one of the first battles of the Peninsular campaign in which the Spaniards were signally defeated by the French. Pop. 2000.

CA'BIN is the general name for a room or apartment on shipboard. In ships of war, the living-rooms of the admirals and captains are called 'state' cabins, and are fitted up with much elegance, with a gallery or balcony projecting at the stern. The chief officers below the captain have their cabins on either side of the main-deck; while those of the subordinate commissioned officers are, in large ships, on either side of the lower or orlop deck. All the cabins of a ship of war are enclosed by light panelling, which is quickly removable when preparing for action.

CA'BINET (Ital. *gabinetto*), a small chamber set apart for some special purpose, such as the conservation of works of art, antiquities, specimens of natural objects, models, and the like. From signifying the chamber in which such collections are contained, the term C. has recently come to be employed by us, in imitation

of the French, to signify the collections themselves, and this even when they fill many rooms or galleries. It often means simply a small room appended to a larger one, when it is also called an anteroom, a retiring-room, and the like. See CLOSET.—CABINET PICTURE, a picture suited for a cabinet or small room. C. pictures are generally small in size, highly finished, and thus suited for close inspection.

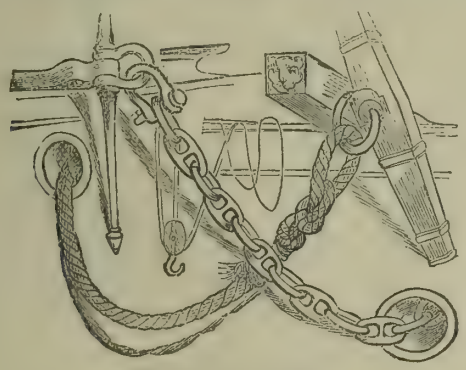
CABINET. See MINISTRY.

CA'BLE is either a large rope, or a chain of iron links, chiefly employed on shipboard to suspend and retain the anchors. Rope cables are made of the best hemp, twisted into a mass of great compactness and strength. The circumference varies from about 3 inches to 26. A certain number of yarns are twisted to form a *lissum;* three lissums are twisted in an opposite direction to form a *strand;* and three strands are twisted (in the same direction as the yarns in a lissum) to form a *cable.* The number of yarns in a C. of given size is not always alike, because the yarns slightly vary in thickness; but the following is one among many tables which have been prepared relating to cables of 120 fathoms, and of the usual degrees of thickness :

Inches. Circumference.		Yarns.		Lbs.
3	=	48	=	192
6	=	174	=	696
9	=	393	=	1572
12	=	699	=	2796
15	=	1093	=	4372
18	=	1574	=	6296
20	=	1943	=	7772

Some cables are made with four strands, but three is the common number. If a C. be twisted too much, it is stiff; if too little, it is weak. The strength of a C. of 18 inches' circumference is found to be about 60 tons; and for other dimensions, the strength varies according to the cube of the diameter. On shipboard, cables receive the names of *chief* cables, *bower* cables, &c., according to the anchor to which they are attached. During the great war ending in 1815, the largest ships in the British navy carried ten cables, most of which were about two feet, or a little more, in circumference. Although ships seldom anchor at a greater depth than 40 fathoms, it is not deemed safe to trust the anchor to one C. of the usual length; two are spliced together at the ends. The hempen cables now made are generally 101 fathoms; but 100 fathoms in practical seamanship denotes 'a cable's length,' and is really the length of a chain cable.

CHAIN CABLES are made of links, the length of each of which is generally about six diameters of the iron of which it is made, and the breadth about three and a half diameters. In government contracts, chain cables are required to be made in 12½ fathoms



Chain and Hemp Cables.

lengths, with one swivel in the middle of every alternate length, and one joining-shackle in each length. The stay-pins, to strengthen the links, are of cast iron. The bar or rod from which each link is made, has the two ends cut diagonally; it is bent into the form of a nearly complete oval ring; and then the two ends are joined and welded, the stay-pin being at the same time introduced at the proper place. Besides the ordinary links, there are end-links, joining-shackles, splicing-tails, mooring-swivels, and bending-swivels.

The sizes of chain cables are denoted by the thickness of the rod-iron selected for the links. The following table gives certain ascertained quantities concerning the cables in ordinary use:

Thickness of Iron.	Weight of Stay-pin	Weight per Fathom.	Breaking Strain.
½ inch.	½ oz.	13½ lbs.	6 tons.
1 "	3½ "	54 "	24 "
1½ "	12 "	121 "	60 "
2 "	23 "	215 "	99 "
2½ "	40 "	272 "	126 "

By the Chain Cables Act of 1871, certain bodies are licensed to erect machines for testing all chain cables and anchors ; and it is forbidden to sell or purchase, under a penalty of £50, any chain cable or any anchor weighing more than 168 lbs., which has not been duly tested. Minor alterations were introduced by a later Act (1874), leaving the main rules intact.

CABLE-MOULDING, in Architecture is a moulding cut in the form of a rope, the twisting being prominently shown. It was much used in the later Norman style.

CABLING, the moulding by which the hollow parts in the flutes of columns and pilasters in classical architecture are often partially filled. The C. seldom extends beyond a third part of the shaft from the ground.

CABO'CHED, or CABO'SSED an heraldic term, from the old French word *caboche*, the head. When the head of an animal is borne, without any part of the neck, and exhibited full in face, it is said to be caboched.

Stag's Head Caboched.

CABOO'SE, or CAMBOOSE (Danish, *kabyse*, a cook's room in a ship ; Ger. *kabuse*, a little room), is the name of the kitchen or cook-room in a merchant-ship. In coasting-vessels, the term is applied to a portable cast-iron stove on the deck, where food is cooked.

CABOT, the name of two Venetians, father and son, both celebrated as navigators and discoverers.—GIOVANNI CABOT, or CABOTTO, the father, whose business compelled him to reside much in Bristol, was appointed by Henry VII., March 5, 1496, to the command of a squadron of five vessels on a voyage of discovery in the Atlantic Ocean. In this expedition he was accompanied by his sons Ludovico, Sebastiano (born at Bristol, 1477), and Sanzio. On the 24th of June, 1497, the coast of Labrador, North America, was sighted. The merit of this discovery has been generally ascribed to the navigator's second son, Sebastian C., the most scientific of the family ; but an extract from a chart preserved by Hakluyt mentions the father before the son. The expedition returned in August 1497. In 1498, a second was made, with what results we do not know; and in 1499, a third to the Gulf of Mexico. About this time, Giovanni, the father, appears to have died, and we hear no more of *Sebastian* till 1512, when he entered the service of Ferdinand, king of Spain.

During the year 1515, he was engaged in revising maps and charts in connection with his profession, and in planning an exploration of the North-west Passage to Asia, which, however, was laid aside on account of the death of Ferdinand in 1516. C., who seems to have been no favorite with the Spanish courtiers, was now subjected to a series of contemptible insults. This usage induced him to return to England, and in 1517, he was appointed by Henry VIII. to the command of an expedition to Labrador. He reached lat. 67½° N., and entered Hudson's Bay, where he gave names to several places; but the expedition proved on the whole a failure, on account of the cowardice or malice of his vice-commandant, Sir Thomas Perte. C. now entered again into the Spanish service, was made pilot-major of the kingdom by Charles V., and commanded an expedition which examined the coast of Brazil and La Plata, which he attempted to colonize. In 1531, he returned to Spain, and resumed his old situation; but in 1548, he once more betook himself to England, where he was well received by King Edward VI., who made him Inspector of the Navy, and gave him a pension. To this monarch he seems to have explained the variation of the magnetic needle in several places, which he was among the first, if not the very first, to notice particularly. In 1553, C. was the prime mover and director of the expedition of Merchant Adventurers which opened to England an important commerce with Russia. It is not known exactly when C. died.—Memoir of Sebastian Cabot (Lond. 1831).

CABOTZ. See CUSSO.

CA'BRA (ancient *Ægabrum*), a town of Spain, in the province of Cordova, 30 miles south-east of the city of that name. C. is irregularly built between two hills, and surrounded with gardens; vineyards in the neighborhood produce excellent wine. It is chiefly agricultural; but it has manufactures of woollen, linen, hats, soap, earthenware, &c. Pop. 14,000.

CABRAL, or CABRERA, PEDRO ALVAREZ, the discoverer of Brazil, was descended from an old and patrician Portuguese family. Nothing is known of his early life, save the fact, that he must have recommended himself by talent and enterprise to King Emanuel of Portugal, who, after the first voyage of Vasco de Gama, appointed C. to the command of a fleet of 13 vessels, carrying 1200 men, and bound for the East Indies. On the 9th March 1500, he sailed from Lisbon. To avoid the inconvenience of being becalmed on the coast of Africa, he took a course too far westerly, fell into the South American current of the Atlantic, and was carried to the unknown coast of Brazil, of which he claimed possession for the king of Portugal, April 24, 1500, naming the new country 'Terra da Santa Cruz.'

After sending home one vessel to bear news of this great accidental discovery, C. sailed for India; but on the 29th of May, four of his vessels foundered, and all on board perished, including Diaz the great navigator; and soon afterwards three more vessels were lost. C. therefore landed at Mozambique, on the east coast of Africa, of which he first gave clear information, and also discovered (August 23) the Antschedives Islands, of which he described correctly the position. Hence he sailed to *Calicut*, where, having made the terror of his arms felt, he was permitted to found a factory; entered into successful negotiations with native rulers, and thus established the first commercial treaty between Portugal and India. He returned from India, bringing with him a considerable booty, and arrived in the port of Lisbon, July 31, 1501. It appears probable that the king was dissatisfied with the results of the expedition (although it had annexed Brazil to the crown of Portugal), for subsequently we find no mention made of C. among other discoverers. At the request of C., Sancho de Toar wrote a description of the coast of Sofola. C.'s voyages are described in Ramusio's *Navigatione e Viaggi*, 3 vols. (Venice, 1563; new ed., Venice, 1835).

CABRE'RA, a small island in the Mediterranean, lying off the southern point of Majorca. It is about three miles in length and breadth, with an irregular coast, and is little else than a barren calcareous rock. The only interest attached to C. is, that during the war in the Peninsula it formed a Spanish depôt for French prisoners, who were crowded in thousands into the desolate spot, and treated with great barbarity; of which an account is given in a popular work, entitled the *Adventures of a French Sergeant*.

CABRE'RA, Don Ramon, the boldest leader of the Carlist party in Spain, was born at Tortosa, in Catalonia, 31st August 1810. The death of Ferdinand, in 1833, gave the signal for a civil war, and first brought C. into notice. Placing himself at the head of some guerilla troops, he joined the Absolutists, or partisans of Don Carlos, and by his vigilance, energy, and daring soon rose to be second in command in the Maestrazgo district. Throughout Aragon and Valencia his name became a by-word for cruelty. After penetrating as far south as Andalusia, his forces were completely routed by the royal troops, on the borders of Aragon, and he himself, severely wounded, escaped with difficulty into the woods. It was now rumored that C. was dead, when all at once he reappeared at the head of 10,000 foot and 1600 horse. Invading the province of Valencia, he overthrew the royal army at Buñol, 18th February 1837, and again on the 19th March at Burjasot; but was in his turn vanquished at Torre-Blanca, and once more compelled to seek a hiding-place. Shortly after, he reopened the war with fiery energy. Madrid itself was threatened by C., who, about this time, received the title of Count of Morella for his vigorous defence of the fortress of that name, and was also appointed governor-general of Aragon, Valencia, and Murcia. The Carlists now believed that the triumph of absolutism was approaching, when the treachery of the Carlist general, Marotto, changed the whole aspect of affairs, and Don Carlos fled from Spain.

C. held out until Espartero forced him to quit the country in the summer of 1840. He then entered France, where he was taken prisoner, and confined for a short time in the fortress of Ham. In 1845, he strongly opposed Don Carlos's abdication of his rights. On the outbreak of the French revolution in 1848, he renewed the struggle on behalf of absolutism in Spain; but the adventure proved a miserable failure, and on the 17th January 1849, he recrossed the Pyrenees, to live in retirement. He afterwards married a wealthy English lady, Miss Marianne Catherine Richards. When Alphonso was proclaimed king of Spain in 1875, C. advised the Carlists to submit to him, chiefly because he was 'a good son of the church.' He died 24th May 1877.

CABU'L, a river in Afghanistan, rises in lat. 34° 21′ N., and long. 68° 20′ E., on the southern declivities of the Hindu Kush or Indian Caucasus. Its source is 8400 feet above the level of the sea; and an eastward run of 320 miles, with a fall of about 7500 feet, along North Afghanistan, through the Khyber Mountains, and across Peshawur, carries it into the Indus, opposite to Attock, in the Punjab. The point of confluence marks the head of navigation on the main stream, while the tributary itself is practicable about 50 miles upwards for craft of 40 or 50 tons. By means, therefore, of the two taken as one line, there exists an available communication of about 1000 m. between the Khyber Mountains and the Indian Ocean. The C. washes the cities of Cabul, Jelalabad, and Dobundee.

CABU'L is the name given to that part of Afghanistan (q. v.) which lies south of the Hindu Kush, and is drained by the Cabul river. It extends from the south of Ghiznee to the Hindu Kush, and from Bamian (q. v.) to the Khyber Pass. This region has long occupied a prominent position in the world. Through it, as the passage from Persia to India, Alexander the Great marched to complete his eastern conquests; from it issued Mahmoud of Ghiznee, the first Mohammedan invader of Hindustan.

The city of Cabul, from which the surrounding territory takes its name, has 60,000 inhabitants, and stands in lat. 34° 30′ N., and long. 69° 6′ E., near the point where the river, here crossed by three bridges, ceases to be fordable. Elevated about 6400 feet, and overtopped, within a short distance to the north, by pinnacles of the Hindu Kush, about 14,000 feet higher than itself, C. has a severe winter, and a temperate summer, ranging from 75° to 85° F.

The city was formerly surrounded with an earthen wall, which no longer exists. It is separated into different quarters, for defence, by stone walls—The Bala Hissar, or citadel proper, being on the E., and the Kuzzilbashes or Persians having a strongly fortified quarter on the S.W. In the days of Sultan Baber, C. was the capital of the Mogul empire. In more recent times, it has witnessed some of the most momentous events in Anglo-Indian history. In 1839, it was taken by the British: in 1841, it was lost through a treacherous outbreak, which led (6th January 1842) to the massacre of about 4000 soldiers and 12,000 followers; and, finally, after being recovered by General Pollock in the same year, it was abandoned, its bazaars and public buildings having previously been burned to the ground.

After the death of Dost Mohammed, Ameer of Afghanistan, in 1863, Shere Ali, the son whom he had selected as his heir, had to fight for the possession of C. with Afzul Khan, his elder brother, and the son of the latter, Abdulrahman. In 1866, Afzul entered C. in triumph, and was proclaimed Ameer of Afghanistan. He applied to the Indian viceroy for recognition, but the request was declined. At the death of Afzul, his brother Azim took the title of Ameer, not of Afghanistan, but of C. and Candahar. In the end of 1868, Shere Ali, aided by his son Yakoob, obtained possession of C., which became again the capital of Afghanistan. War was declared against Shere Ali by England in 1878. In the treaty concluded in 1879 by Yakoob, now by the death of his father Ameer, it was agreed that an English resident should be admitted to C.; and in July 1879, Sir Louis Cavagnari was established in the capital. But in September he, his suite, and escort were assassinated; war re-commenced; and a month later C. was occupied by English troops, who remained there till August 1880. Meanwhile Yakoob, a fugitive under English protection, had abdicated his sovereignity; and Abdulrahman (or Abdurrahman), son of Afzul, was recognized as Ameer.

CACA'O. See Cocoa.

CACCA'MO, a town in the province of Palermo, Sicily, about 6 miles south-west of Termini, with a population of 7200.

CA'CERES, the capital of the Spanish province of Caceres, lies 18 miles south of the Tagus. It is famous for its bacon; has some manufactures of linen, woollens, leather, and a large trade in the produce of the district. It is the *Castra Cecilia* of the Romans, and many relics of its antiquity have been found. Pop. 14,000.

CA'CERES, Nueva, a town of the Philippines in the province of South Camarines, on the south-east coast of the island of Luzon. Pop. 12,000.

CACHA'O, capital of the province of Tonquin, and the largest city of the kingdom of Anam (q. v.), having an estimated population of 100,000. It stands about 100 miles from the sea, on the Tonquin River, which is thus far navigable for small-craft. It has a considerable trade, sufficient to have at one time attracted English and Dutch factories. The exports are bullion, silks, and lackered ware; and the imports are pepper, arms, long cloths, chintzes, and manufactured goods generally. The port is open to all nations.

CACHA'R, or HAIRU'MBO, a district of British India, since 1874 included in the chief-commissionership of Assam, between 24°—26° N. lat., and 92°—93° 30′ E. long. With an area of 1285 sq. m., it contained, in 1871, 205,027 inhabitants. It is mostly mountainous and uncultivated. Its principal river is the Barak, which, after a singularly tortuous course of 350 miles, enters the Brahmaputra about 40 miles above Dacca. The territory produces rice, cotton, tea, sugar, timber, bamboo, iron-ore, wax, and ivory; and imports salt, cloths, tobacco, and ghee or half-liquid butter.

CACHE (Fr. a lurking-hole), the name given by parties of travelers in the great western prairies of the United States to places for concealing provisions and other articles. Designing to return on their tracks after crossing the Rocky Mountains, they disburden themselves of what articles can be spared, and to conceal them from the Indians, construct places of deposit in the wilderness. The making of a C., is a matter of much labor and ingenuity. A hole is dug to a depth of perhaps six or eight feet and several feet broad, and then the articles being interred, the surface is replaced with the utmost possible care. The excavated earth is also carefully removed, so as to leave no trace whatever of the excavation.

The situation of the C., however, is known to the party by some landmark, and returning months afterwards, they probably find its contents undisturbed.

CACHET, LETTRES DE. See LETTRES DE CACHET.

CACHE'XIA, a name applied by physicians sometimes to a group of diseases, and sometimes to the constitutional state accompanying a particular disease—e. g., Cancerous C., Gouty C., Mercurial Cachexia. The word is derived from the Greek *kakos*, bad, and *hexis*, a habit, and signifies simply *a bad habit of body*, without reference to the cause of illness. From Cullen's having in modern times given extensive circulation to the word, as indicating a large group of chronic diseases, in most of which there are complicated changes in the blood and in the solid textures, C. has come to be chiefly employed with reference to diseases in which the general nutrition of the body is at fault, and in which the local disorders are supposed to be the result of a constitutional cause. Thus, Cancerous C. indicates the peculiar impoverished state of the blood and general debility which are associated with the deposits of cancer in various parts of the body; Gouty C., the state of the general system in gout, as opposed to the mere local attack of gout in the foot, &c. The cachexiæ differ from the fevers in being much slower in development, and, for the most part, in having no natural termination at a fixed period. See CRISIS.

CA'CHOLONG, a beautiful mineral, regarded as a variety of Opal (q. v.). It is sometimes called Pearl Opal, or Mother-of-pearl Opal. It is generally of a milk-white color, rarely with a yellowish or reddish tinge, opaque and dull or pearly and shining, and has a flat conchoidal fracture. Among the localities in which C. is found are the Giants' Causeway and the Faröe Islands.

CA'CHOLOT, CACHALOT, SPERMACETI WHALE, or SPERM WHALE (*Physeter macrocephalus* or *Catodon macrocephalus*), one of the largest of the *Cetacea* (q. v.), very peculiar in form and appearance, much sought after not only on account of the oil, but still more on account of the Spermaceti (q. v.) which it yields. Ambergris (q. v.) is also obtained from it. The C. belongs to the family of *Cetacea* called *Physeteridæ*, or *Catodontidæ*, of which some naturalists still think that there is only one well-ascertained species. There appears, however, to be pretty good reason for thinking that at least two species exist, both of which are occasional visitants of the British shores—the Common C. having no dorsal fin, and the High-finned C. (*Physeter Tursio*), having a very high dorsal fin. The Common C. has a very wide geographical range. It may almost be said to inhabit all seas, although it is most abundant in those of the southern hemisphere. It is not of frequent occurrence on the European shores, although it sometime enters the Mediterranean, and is occasionally stranded on the coasts of Britain. An individual, fifty-four feet long and thirty in circumference, ran ashore on Cramond Island in the Firth of Forth in 1769, and was very particularly described in the Philosophical Transactions by Mr. Robertson of Edinburgh. Twelve were caught at Walderwich, on the Suffolk coast, in 1788. The C. sometimes reaches the length of seventy or eighty feet. The head is enormously large, forming about one-half of the entire bulk of the animal, and occupying more than one-third of the entire length. From the head, the body tapers to the tail, and at last rather rapidly. The general color is very dark gray, nearly black on the upper parts, lighter beneath. Old males, or, in the language of the South Sea whalers, old bull-whales, usually have a large gray spot on the front of the head.

The muzzle is very obtuse, almost as if suddenly cut off in front, the breadth of it almost equalling the thickness of the body. In a protuberance on the upper part of it, is the blow-hole, which is single, situated a little on the left side, and in form not unlike

Cacholot, or Sperm Whale.

the letter S. elongated. The mouth is very large and wide; and the throat, unlike that of the Greenland whale, is very wide, sufficiently so to admit the body of a man. The upper jaw projects some feet beyond the lower, but is destitute both of teeth and whalebone; the lower jaw has from 20 to 25 teeth on each side, according to the age of the animal. The teeth are conical and slightly recurved, projecting about two inches from the gum. The lower jaw is extremely narrow, the two branches being in contact throughout the greater part of its length: it fits into a groove in the upper, in which are cavities for the teeth. The eyes are small, and placed far back in the head, above the angles of the mouth; the left eye is said to be smaller than the right. Just above the eyes, the dorsal line rises considerably; the dorsal fin is also represented by a protuberance about half-way between the neck and the tail; and these parts are seen above water in the ordinary swimming of the animal, which is at the rate of from 3 to 7 miles an hour, and just under the surface of the water, although when alarmed it swims with greater velocity, striking the water upward and downward with its tail with great force. The pectoral fins are small, and seem scarcely if at all to aid in progression, which is accomplished by the large and powerful tail-fin. The tail-fin is very broad, and is divided into two lobes, called by South Sea whalers *the flukes*.

The enormous head of the C. is in great part occupied by a cavity in front of and above the skull, called by whalers *the case*, which is a receptacle for spermaceti (q. v.). This substance being light, it is not wonderful that the animal in swimming raises its head above the surface of the water, which it also often does even when at rest, 'like a black rock in the ocean.' The *case* frequently holds as much as ten large barrels of spermaceti. It is not formed of bone, but of a strong tendinous integument, and is divided into compartments communicating with each other. The substance which it contains is in a semi-fluid state, but hardens on cooling; it consists of spermaceti and oil; the oil is separated by draining and squeezing, and the spermaceti further purified, till, instead of being a yellow unctuous mass, in which state it is brought home by the whalers, it assumes a beautiful pearly white, flaky, almost crystalline appearance. When the spermaceti whale is killed, and towed alongside the whaling-ship, the *case* is emptied of its valuable contents through a hole made in front of the muzzle, and by means of a bucket attached to a pole. The spermaceti was at one time imagined to be the brain of the whale; what purpose it serves in the animal economy, is not well known, except that already alluded to of giving buoyancy to the forepart of the huge body; and perhaps this is its chief use, respiration even more than progression depending on it; but it is distinct enough from the brain, which is comparatively very small, and is indeed, as well as the skull which contains it, small in proportion to the whole bulk of the creature. Cavities filled with spermaceti are distributed over the body, and even ramify through the external fat or blubber, although the principal mass is in the head. The blubber of the C. is not nearly equal in thickness to that of the Greenland whale, being only about fourteen inches thick on the breast of a large whale, and from eight to eleven inches on other parts of the body. It is called by whalers the *blanket*, is removed from the body of the captured whale in great strips, and is heated in large pots, the skin of the whale serving for fuel, when the oil known as SPERM OIL (q. v.) flows from it. The *junk*, a thick elastic mass, which occupies the forepart of the head, immediately under the *case*, yields also a considerable quantity of sperm oil.

The C. feeds upon fishes and cephalopodous mollusks. Squids and cuttle-fishes appear to be its chief food. It is gregarious in its habits and the herds are called *schools* by whalers. Five hundred or more have been seen in a single herd. Large herds generally consist of females, with only a few males; herds of young males also occur; when solitary individuals are met with, they are almost always old males. Terrible conflicts often take place among the males, and it is not unusual to find the lower jaw deformed in consequence of having been dislocated or broken in them. See WHALE-FISHERY.

CACI'QUE, or CAZI'QUE, the designation given to the chiefs of Indian tribes in works relating to the central and southern parts of America. The word was derived by the Spaniards from the language of the former inhabitants of St. Domingo.

CACODÆ'MON. See DEMON.

CA'CODYLE, or KA'KODYLE, is an organic substance containing carbon, hydrogen, and arsenic (C_4H_6As). It has been proposed to employ the oxide of C. (C_4H_6AsO) as a deadly agent in war. This compound, otherwise known as *Cadet's fuming liquor* or *alkarsine*, has the remarkable property of taking fire spontaneously when exposed to the air, and evolving abundant fumes of arsenic. Thus, a shell filled with it would, on bursting, saturate a space of ground, or the rigging or deck of a man-of-war, with a liquid which would quickly take fire of its own accord, and besides causing destruction by burning, would likewise spread death by its fumes.

CACO'NGO, or MALLE'MBA, an independent state of South Guinea, Africa, extending along the South Atlantic Ocean, in lat. 5° S., and stretching south-east as far as the river Bell. Its limits interiorly are not well defined. The country is generally flat,

and the soil fertile. The principal towns are Kinguele, and Cacongo and Mallemba on the coast, the last once a great mart for slaves.

CA'CTEÆ, or CACTA'CEÆ, a natural order of exogenous plants, consisting of succulent shrubs of very singular appearance. Linnæus included all the C. in the single genus *Cactus*, which is now divided into a number of genera; the name *Cactus*, however, still continuing in popular use, common to the whole order. Nearly 500 species are known, but the real number is probably much greater. The C. are, without exception, natives of America, and their extraordinary forms constitute a remarkable feature in the vegetation of its warmer regions. All of them have fleshy stems, either simple or branched, often very soft and juicy; but in many, at least when old, having an easily distinguished woody axis, composed of annual rings, and covered with a layer of inner bark so that the thick fleshy part may be regarded only as a layer of bark.

Most of them are leafless; the *Pereskiæ* alone have true leaves, which are fleshy; and the *Opuntiæ* have rudimentary leaves, which soon fall off; but, instead of leaves, most of the order have clusters of hairs or prickles, where buds are formed in their stems, and these are very numerous, even in the species which in ordinary circumstances most rarely develop branches. The multiplicity of curious forms exceeds imagination; in many species (*Melocactidæ*, or Melon Thistles), the stem swells out into a globe; in others (*Torch Thistles*), it rises up as a column with many angles; in others (*Opuntiæ*, Indian Figs, or Prickly Pears), it divides in leaf-like articulations; in some (*Pereskiæ*) it assumes a tree-like form, in which the thick stem bears a head of branches, and reaches a considerable height, sometimes even 30 or 40 feet. Those which have angular, ribbed, and channelled, or flat and two-edged stems, show a tendency to the cylindrical form as the stem advances in age. Some species have long creeping or trailing stems. The whole organization of the C. adapts them for the endurance of long droughts; they vegetate vigorously during a part of the year, and then rest; the very absence of leaves concurring with the absence of pores or *stomata* in their tough skin to enable them to resist the action of a dry atmosphere and powerful sunshine, and to occupy arid soils and bare rocks, on which they are very generally found, often covering large tracts. Some of them grow rapidly on old lavas, and disintegrate them by their penetrating roots, thus preparing a soil for other plants; and the Prickly Pear is often planted in Sicily by the mere insertion of a branch or joint of it in a fissure of lava. Many species occur as *epiphytes* (q. v.) on the trees of American forests.

Some also grow on high mountains, a few even reaching almost to the border of the snow. The plants of this order are a great boon to the regions in which they chiefly abound, which are, at least during great part of the year, very destitute of water; their stems containing a store of insipid and wholesome juice, of which both men and cattle avail themselves.—Some species, as the Prickly Pear (q. v.), produce a pleasant fruit.—The fruit of *Opuntia Tuna* affords a valuable pigment of the richest carmine color.

Melon Cactus, or Thistle (*Melocactus*).

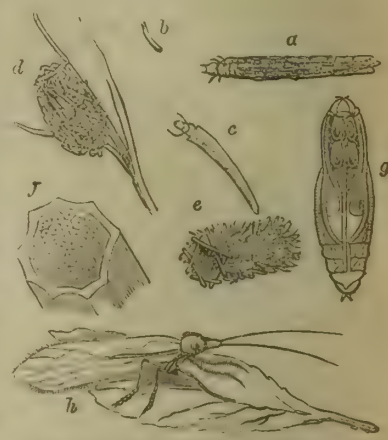
Cochineal or Nopal Cactus (*Opuntia Cochinilifera*), with Cochineal Insects.

The flowers of the C. are in general very short-lived; those of some night-flowering species, as of *Cereus grandiflorus*, well known in our hothouses, endure only for part of a single night. In the greater number, they are large and splendidly colored, in some they are very fragrant. The order is regarded as botanically allied to *Mesembryaceæ* (q. v.) and to *Grossulariaceæ* (q. v., Gooseberry, Currant, &c.).

The cultivation of C. in green-houses and hothouses has been much in fashion for more than 30 years. The gardener must imitate the natural conditions of their growth, by giving water freely during a few months, and withholding it almost entirely during the rest of the year. Most of them are easily propagated by branches, taken off, and allowed to dry a little before being planted. The *Melocactidæ*, which do not readily produce branches, are made to do so by cutting off or burning out the central bud, that the means of propagating them may be obtained.

CADA'MBA, or KUDUMBA, the wood of several species of *Nauclea*, a genus of trees of the natural order *Cinchonaceæ*, natives of the East Indies, having flowers with a funnel-shaped corolla. *N. cadamba* is a noble tree with orange-colored fragrant flowers, collected in heads about the size of a small apple. The leaves are from six to ten inches long. The wood is yellow, soft, and fine-grained. The tree is highly prized for the shade which it affords; the wood is used for various purposes. *N. cordifolia* is a large tree, plentiful in mountainous districts of Hindustan; the wood yellow, close-grained, and used for flooring-planks, packing-boxes, and many other purposes, as is also that of *N. parviflora*. All kinds of C. wood are, however, liable to be injured by moisture, and can only be used where they are to be kept dry.

CA'DDICE, or CA'DDICE-FLY (*Phryganea*), a Linnæan genus of insects of the order *Neuroptera*, a family in subsequent entomological systems, and constituted by Mr. Kirby into a distinct order, *Trichoptera* (Gr. hairy-winged). The caddice-flies certainly differ in important particulars from the other neuropterous insects, and exhibit points of resemblance to the *Lepidoptera*. They have no mandibles, and the maxillæ and lower lip are membranous and united; the head is small with prominent eyes, and two additional small simple eyes, situated on the forehead; the antennæ are long and bristle-like, composed of very numerous indistinct joints. Both wings and body are generally very hairy, and the wings, when at rest, are raised, and meet above the back like those of butterflies, from which, however, they differ very much in form, being much more elongate: the legs are long. Caddice-flies are extremely active, particularly in the evening and at night, when the smaller species often fly in great numbers above streams and ponds.



Various shapes of Caddice Cases, and perfect Insect:
a, case of bark; *b*, case of sand; *c*, case of sand, magnified; *d*, case of grass stems; *e*, case of grass; *f*, orifice of case, showing the silk grating, magnified; *g*, pupa; *h*, stone, or caddice-fly.

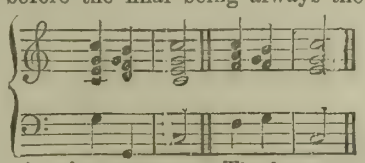
These insects are most interesting, however, on account of their larvæ, of which the larger kinds are the well-known *Caddice-worms*, or *Cad-bait* of anglers. They are of a long, almost cylindrical form, the head and first three segments hard, the remainder—the abdominal segments—soft. To the thoracic segments are attached the feet, six in number, as in the perfect insect. The larva lives always in the water, feeding on aquatic vegetables. It spins by its mouth silken threads, by means of which, together with a viscid substance, it attaches together—and often in a very symmetrical manner, and with interesting peculiarities which differ in the different species—small hard substances, such as small stones, bits of stick, or small shells, even although they happen to contain living inmates, and thus constructs a case for itself, in which its soft body is protected, and from which only the head and hard thoracic segments are voluntarily protruded. When it changes into the pupa state, in which it differs little from the perfect insect, except in the imperfectly developed wings, it fixes its case to some solid substance beneath the water, and closes the two extremities with a kind of grating, which admits the free passage of water, necessary for respiration. Before assuming the perfect form, the pupa of the larger species breaks out of its case by means of a pair of hooks on the forepart of the head, and swims actively by means of the hind legs, or crawls by the other two pair. Many of the smaller species bring their pupa case to the surface of the water, and there take wing from it as from a boat. The species of caddice-fly are very numerous, and they are said to be more so in the north than in the south of Europe. About 200 British species have been described.—The angler looks for cad-bait about the edges of streams and under stones, or on the stalks of water-

cresses, and other aquatic plants. As a bait for angling, the caddice is almost as deadly as the May-fly, and more so, in clear running steams, than the ordinary worm; the usual-sized bait-hook is used, upon which two of the baits are fixed, the angler proceeding exactly as in ordinary worm-fishing.

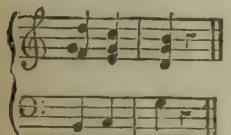
CADE, JACK, a historical character, leader of an insurrection which broke out in Kent, June 1450. Little is known of his personal history, further than that he was an Irishman and an illegitimate relation of the Duke of York, and hence called himself Mortimer. With 15,000 or 20,000 armed men of Kent, C. marched on London, and encamped at Blackheath, whence he kept up a correspondence with the citizens, many of whom were favorable to his enterprise. The court sent to inquire why the good men of Kent had left their homes; C., in a paper entitled 'The Complaint of the Commons of Kent,' replied that the people were robbed of their goods for the king's use; that mean and corrupt persons, who plundered and oppressed the commons, fill the high offices at court; that it was 'noised that the king's lands in France had been aliened;' that misgovernment had banished justice and prosperity from the land; and that the men of Kent were especially ill-treated and over-taxed, and that the free election of knights of their shire had been hindered. In another paper, called 'The Requests by the Captain of the Great Assembly in Kent,' C. demanded that the king should resume the grants of the crown, which he complained the creatures about the royal person fattened on, the king thus being compelled to live on taxation; that the false progeny of the Duke of Suffolk should be dismissed; and that the Duke of York and others should be restored to favor, and a number of persons punished. The court sent its answer in the form of an army, before which C. retreated to Sevenoaks, where he awaited the attack of a detachment, which he defeated. The royal army now objected to fight against their countrymen; the court made some concessions, and C. entered London on the 3d July. For two days, he maintained the strictest order; but he forced the mayor and judges to pass judgment upon Lord Say, one of the king's hated favorites, whose head C.'s men immediately cut off in Cheapside. On the third day, some houses were plundered, the leader himself, it is said, setting the example. C., who at night lodged his army in the Borough, got news that the citizens intended to prevent his entrance into the city on the morrow, and in the night he made an attack on the bridge, but was defeated. A promise of pardon now sowed dissension among his followers, who dispersed, and a price was set upon C.'s head. He attempted to reach the Sussex coast, but was followed by an esquire, named Alexander Iden, who fought and killed him, July 11. His head was stuck upon London Bridge, as a terror to traitors.

CADE'LLE (*Trogosita Mauritanica* or *caraboides*), an insect sometimes found in granaries in Britain, but seemingly imported from more southerly countries, where, as in France, its larvæ often commit great ravages among stored corn. They also live on bread, almonds, and even rotten wood. When full grown, they are about three-quarters of an inch long, flattened, fleshy, rough with scattered hairs, whitish, tapering towards the head; which is black, horny, and furnished with two curved jaws. The perfect insect is a glossy beetle of a deep chestnut color, marked with dotted lines. It belongs to the family of *Xylophagi*, of the order *Coleoptera* (q. v.), section *Tetramera*. The name C. is French.

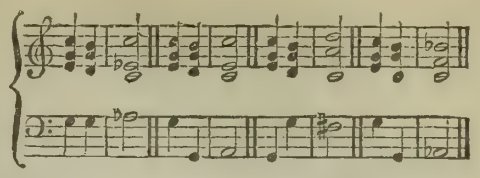
CA'DENCE, in Music, is the finish of a phrase (in German, *Schluszfall*), of which there are three principal species—viz., the whole, the half, and the interrupted cadence. The whole C., which finishes on the harmony of the tonic, is also called the perfect C., and is always used at the end of a composition, and frequently called the final cadence. In its most perfect use, it consists of three chords—the one before the final being always the dominant, as for example:



The half C., also called the imperfect C., is used to mark the termination of an idea or phrase, like the colon and semicolon; showing a considerable division, but at the same time that a continuation is necessary. The harmony of the half C. is the reverse of the whole C., as it falls from the tonic to the dominant, and sometimes to the subdominant, as follows:



In the interrupted C., (Ger. *Trugschulsz*; Ital. *Cadenza d'inganno*), the preparation for the ordinary perfect C. is made; but instead of the harmony of the tonic following the dominant, another harmony quite strange is introduced, so that the ear is deceived. The more particular the preparation for the usual C. is made, the more strange and unexpected is the interruption, which can be made in so many ways that Reicha, in his *Traité de Haute composition Musicale*, gives 129 interrupted cadences. The following are those generally in use:



CA'DENCY (from Lat. *cado*, to fall or decline). The marks by which the shields of the younger members of families are distinguished from those of the elder, and from each other, is an extensive, and, in so far as that term can be applied to heraldry at all, an important branch of the science. No distinction is usually made by writers on heraldry, and probably the practice of heralds in general scarcely admits of any being made, between *marks of C.*, *differences*, *distinctions*, or even *brisures*, though the last term is pretty constantly, and quite appropriately used to include not only differences in general, but also abatements (q. v.), or bearings by which the arms of the family are broken or diminished. See BASTARD BAR. But there is a manifest convenience in the practice which is usually followed in Scotland, of appropriating the label, the crescent, the mullet, and the rest of the series of marks, commonly known as marks of C., to the purpose of distinguishing the sons from the father, and from each other, during the father's lifetime; and of adopting other distinctions—such as the bordeur of various kinds, the chief engrailed, embattled, and the like, as differences between the coats of brothers, after the death of their father, and of the houses descended from them. Another very common mode of differencing the shields of brothers in early times, was by changing the tinctures; but this is now regarded as too extensive a change for such a purpose. The method of differencing by means of the ordinary marks of C. will be understood from the accompanying illustration. Fanciful reasons have been imagined by heralds for assigning these different marks to the different sons.

Distinction of Houses:

In the First House, the first, second, &c., sons are denoted by 1, the label; 2, the crescent; 3, the mullet; 4, the martlet; 5, the annulet; 6, the fleur-de-lis; 7, the rose (not figured in the cut); 8, the cross moline; 9, the double quatrefoil. In the Second House, or family of the second son, the first son is denoted by (1) the crescent, with the label upon it; the second, by (2) the crescent, with the crescent upon it; and so on. In the Third House, or family of the third son, the first son is denoted by the mullet, with the label upon it; the second, by the mullet, with the crescent upon it; and so on.

The differences at present used by the royal family will be found in most of the peerages. The rule with regard to them seems to be that, unlike subjects, they all bear the label of three points argent; but the label of the Prince of Wales is plain, whilst those of the other princes and princesses are charged with crosses, fleurs-de-lis, hearts, or other figures, for the sake of distinction. One of the most frequent reasons for matriculating the arms of the younger branches of families of distinction in the Lord Lyon's Register, is that they may be properly distinguished from those borne by the head of the house.

CADE'NZA, in Music, an ornamental succession of notes introduced at pleasure by the performer at the finishing of a phrase.

CA'DER I'DRIS (Chair of Idris, a reputed giant), a picturesque mountain in Merionethshire, Wales, 5 miles south-south-west of Dolgelly. It consists of an immense ridge of broken precipices, 10 miles long, and 1 to 3 miles broad; the highest peak reaching an elevation of 2914 feet. It is composed of basalt, porphyry, and other trap rocks, with beds of slag and pumice. The view from the summit, which is very extensive, includes the Wrekin in Shropshire, and St. George's Channel almost to the Irish coast.

CADE'T, MILITARY (Fr. *cadet*, younger, junior in service—allied in derivation and meaning to cadency (q. v.) in heraldry), is a term applied in a general sense to a junior member of a noble family as distinguished from the eldest; and in France, any officer junior to another is a C. in respect to him. In a strict military sense, however, a C. is a youth studying for the public service.

In England, military cadetship has presented two aspects, according as it is related to the East India Company's or to the royal service. When the Company possessed political and military authority in India, there were about 5000 English officers in their pay. Those who commanded the Company's own regiments had been professionally educated by the Company. A youth, nominated by the directors, was examined as to his proficiency in an ordinary English education, and admitted between the ages of 14 and 18 to Addiscombe School or College, near Croydon. If a probation of six months resulted satisfactorily, he entered upon a two years' course of study. If he passed through this ordeal well he became a *C.* in the Company's service, receiving pay or salary, and being available for service in India, as opportunity might offer.

The system of Indian cadetship underwent various modifications by the introduction of competition in the appointments, and by the transference of the Company's powers to the Crown; and ceased in 1861, when the accession of fresh officers to the local Indian armies was stopped.

The second aspect of military cadetship in England, adverted to above, is that of the Royal or Queen's cadets. The arrangements in operation until recently will be found noticed under SANDHURST COLLEGE; and the present arrangements are given under STAFF COLLEGE, and MILITARY ACADEMY ROYAL.

CADE'T, NAVAL, is the lowest grade of officer in the royal navy. The cadets enter the royal service at 12 to 13½ years of age. Every captain, on being appointed to a ship in commission, is allowed to nominate one C.; every flag-officer (admiral, &c.), two, on hoisting his flag; each member of the Board of Admiralty, four; the two secretaries, two each; and all the rest are nominated by the First Lord of the Admiralty. The candidates are examined at the Royal Naval College at Greenwich; if they pass, they are sent for two years to the *Britannia* training-ship at Dartmouth, which is virtually a public school, for tuition in which the C.'s parent or guardian pays £70 a year. If they do not progress sufficiently in the training-ship, they are rejected; but if the report is favorable, they are put into sea-going ships. While on board, the C. is expected to watch and learn as much as possible of what is going on—saluting officers, tying knots, splicing ropes, arranging rigging, learning technical terms, going aloft, keeping the log, keeping watch, &c. If he pass from the *Britannia* with a first-class certificate, he becomes a midshipman at once; otherwise, according to the progress he makes. Cadets mess with the midshipmen on shipboard. There were 191 cadets on the navy estimates for 1878—1879, receiving each a shilling a day as pay or pocket-money.

CADETS' COLLEGE A college with this designation was established in 1858 by a remodelling of the Junior Department of the Royal Military College at Sandhurst. Its objects were, to give a sound military education to youths intended for the army, and to facilitate the obtaining of commissions when the education was finished. The age of admission was between 16 and 19. The friends of a youth, able to pay the sums of money presently to be named, applied to the commander-in-chief for permission to place the youth on the list of candidates; this permission was usually granted on production of satisfactory certificates and references. The youth might go up for examination on any half-year. The list of subjects included English composition, continental languages, mathematics, history, geography, natural sciences, experimental sciences, and drawing. After the examination, the candidates were reported to the commander-in-chief in their order of merit. Those who had the most marks were admitted as cadets as soon as vacancies occurred in the college. When entered, they studied for two years on a great variety of subjects connected with military science and practice. The friends supplied clothing, books, and instruments. The annual payment for education, board, and lodging varied from £100 per annum down to £20; the highest sum being demanded for 'the sons of private gentlemen,' while the lowest was deemed sufficient for 'the sons of officers of the army or navy who had died in the service, and whose families were proved to be left in pecuniary distress.' Twenty of the youths were 'Queen's cadets,' sons of officers 'who had fallen in action, or had died from the effects of active service, and had left their families in reduced circumstances.' Those 20 cadets were admitted and educated gratuitously. This system was abolished in 1870. Sub-lieutenants of cavalry and infantry, styled 'student officers,' who have done duty with a regiment for about 12 months, are now required to attend the college at Sandhurst, and go through a course of study for a year. At the end of it, on passing a satisfactory examination, they are promoted to the rank of lieutenant, and rejoin their regiments. See also MILITARY ACADEMY, ROYAL.

CADET'S FUMING LIQUOR. See CACODYLE.

CA'DI, an Arabic word signifying a judge or person learned in the law, the title of an inferior judge amongst the Mohammedan nations, who like the Mollah (q. v.), or superior judge, must be chosen from the higher ranks of the priesthood, as all law is founded upon the Koran.

CA'DIZ (ancient *Gades*), an important commercial city of Spain, capital of the modern province of the same name, which forms a part of the great division of Andalusia; is situated at the extremity of the long narrow isthmus of the Isle of Leon, in lat. 36° 32′ N., and long. 6° 17′ W. The Atlantic Ocean washes its western and part of its southern side, and on the north and north-east it is enclosed by the Bay of Cadiz, a deep inlet of the Atlantic, forming an outer and an inner bay. Connected by only a narrow strip of ground (in some places not above 200 yards across) with the mainland, C. is admirably situated for defence; but though it has several sea and land fortifications, these are by no means considered impregnable. The town, which is surrounded by walls, forms nearly a square, each side being about a mile and a half in length.

The houses being built of white stone, the city presents a remarkably bright and clean appearance from the sea. The streets are well paved and lighted, regular, but narrow, and there are some pleasant public walks, the most frequented of which is the Alameda. It has few public buildings of note; its two cathedrals are, on the whole, but poor specimens of ecclesiastical architecture, and its pictures, with the exception of one or two excellent pieces by Murillo, are of little value. C. declined greatly as a commercial city after the emancipation of the Spanish colonies in South America; but owing partly to the recent extension of the railway system in Spain, and partly to the establishment of some new lines of steamers, the trade has, within the last thirty years, revived considerably. Quite lately again there has been serious depression. In 1873, the total imports of C. were valued at £2,100,729; in 1876, at £1,908,166: in 1873, the exports were worth £3,941,095; and in 1876, only £1,908,166. The number of Spanish ships which entered C. in 1874 was 2677, with a tonnage of 315,333; of foreign ships, 962—tonnage, 300,730. The exports consist of wine, olive-oil, fruits, salt, and metals. The manufactures are glass, woolen cloth, soap, hats, leather, &c. Pop. (1879) 68,000.

C. is one of the most ancient towns in Europe, having been built by the Phœnicians, under the name of Gaddir, 347 years before the foundation of Rome, or about 1100 B.C. It afterwards passed into the hands of the Carthaginians, from whom it was captured by the Romans, who named it Gades, and under them it soon became a city of vast wealth and importance. Occupied afterwards by the Goths and Moors, it was taken by the Spaniards in 1262. In 1587, Drake destroyed the Spanish fleet in the bay; nine years later, it was pillaged and burned by Lord Essex; and in 1625 and 1702, it was unsuccessfully attacked by other English forces. After the revolution of 1808, C. became the headquarters of the insurrectionary junta, by whose orders it was separated from the mainland. The French, in February 1810, commenced a blockade, which they vigorously persevered in, capturing several of the forts, until August 25, 1812, when the victories of the Duke of Wellington forced them to abandon it. The city was besieged and taken by the French in 1823, and held by them until 1828. In the Spanish revolution of 1868, C. played a distinguished part.

CA'DMIA is the term applied to the crust formed in zinc furnaces, and which contains from 10 to 20 per cent. of cadmium.

CA'DMIUM is a metal which occurs in zinc ores, and, being more volatile than zinc, rises in vapor, and distils over with the first portions of the metal. See ZINC. C. is represented by the symbol Cd, has the atomic weight 56—new system, 112—and the specific gravity 8·6. It is a white metal, somewhat resembling tin; is malleable and ductile; fuses at 442° F., and rises in vapor a little above 600°. It is rarely prepared pure, and is not employed in the arts as a metal, though one or more of its salts have been serviceable in medicine. The sulphide of C., CdS, occurs naturally as the mineral *Greenockite*, and when prepared artificially, is of a bright yellow color. It is known as CADMIUM YELLOW, and is of great value to the artist.

A great variety of tints are produced by mixing it with white-lead. Much of what is sold as Naples Yellow (q. v.) is thus prepared; but the genuine Naples Yellow has a greenish tint, which renders it easily distinguishable from the imitation. Cadmium Yellow, however, has many valuable qualities, which are causing it rapidly to supersede Naples Yellow.

CA'DMUS (according to Apollodorus and others) was the son of Agenor and Telephassa, and the brother of Europa. When the latter was carried off by Zeus, he and his brothers, as also their mother, were sent in quest of her, with injunctions from Agenor not to return without her. Their search was vain, and the oracle at Delphi told C. to relinquish it, and to follow a cow of a certain kind which he should meet, and build a city where it should lie down. He found the cow in Phocis, followed her to Bœtia, and built there the city of Thebes, about 1550 B.C. The myth of C., however, like other early Greek myths, abounds in contradictions, and it is wholly impossible to disentangle the historical facts from the meshes of fable in which they are imprisoned. To him is ascribed the introduction into Greece of an al-

phabet of 16 letters, derived from Egypt or Phœnicia, and the discovery of brass, or introduction of its use.

CADOUDAL, GEORGE, a distinguished leader in the Chouan or Royalist war in Brittany, was born near Auray, in Lower Brittany, where his father was a miller, in 1771. He was among the first to take up arms against the Republic, and soon acquired great influence over the peasants. Captured in 1794, he was sent as a prisoner to Brest, from which he soon made his escape, imprisonment having only increased his loyal ardor. Annoyed at the dissensions between the Vendean generals and the emigrant officers, and the disasters consequent thereon, C. organized an army in which no noble was permitted to command, and which Hoche, with all his great military talents, was unable to subdue or disperse. In 1799, C. was the soul of the conspiracy to overthrow the First Consul, and place a Bourbon on the throne; but the events of the 18th Brumaire disarranged the plans of the conspirators. Bonaparte recognized C.'s energy and force of character, and offered to make him a lieutenant-general in his army, which offer C. refused, as well as another of a pension of a hundred thousand francs, if he would only consent to remain quiet. Bonaparte attempted to arrest him, but he fled to England, where, in 1802, he conspired with Pichegru for the overthrow of the First Consul. With this design he went to Paris, but was arrested, condemned, and executed June 25, 1804. C. was a man of stern honesty and indomitable resolution. 'His mind was cast in the true mould; in my hands he would have done great things,' was Napoleon's estimate of him.

CADU'CEUS, the winged staff of Mercury, or Hermes, as he was called by the Greeks, which was supposed to give the god power to fly. The C. in the actual world was the staff or mace carried by heralds and ambassadors, from which circumstance, no doubt, it came to form one of the attributes of the messenger of the gods. Originally, it was simply an olive-branch, the stems of which were afterwards formed into snakes, in accordance with several poetical tales invented by the mythologists. One of these was to the effect that Mercury, having found two snakes fighting, divided them with his rod, and that thus they came to be used as an emblem of peace. Many miraculous virtues were ascribed to the caduceus. On the coinage of antiquity, the C. is often given to Mars, who holds it in the left hand, a spear being in his right, to show how peace and war alternate. It is also seen in the hands of Hercules, Bacchus, Ceres, Venus, &c. Amongst the moderns, the C. is used as an emblem of commerce, over which Mercury was the presiding divinity.

Caduceus.

CÆCI'LIA (Lat. *cæcus*, blind), a genus of reptiles, formerly placed among serpents, on account of their form, although, in their anatomical structure, peculiarities were observed allying them to Batrachians, with which they are now ranked, the important fact having been ascertained of their breathing by gills when young, and undergoing a metamorphosis. The body is almost cylindrical or worm-like, the head small, the eyes very small, and nearly hidden by the skin; in some species, indeed, imperfect or wanting, upon which account the name C. was given to them. and an attempt has been made to transfer to them the English name Blindworm, commonly given to the *Anguis fragilis*. The skin is smooth, viscous, and annularly wrinkled, appearing naked, although upon dissection, minute scales are found disposed between its wrinkles, at least in some species. The vertebræ are articulated as in fishes and in some of the other lower Batrachians, not as in serpents, and the skull is united to the first vertebra by two tubercles. The ribs are imperfectly developed, and much too short to encircle the trunk.—The original genus C. has been subdivided, now forming a family, *Cæciliadæ*. The species are inhabitant of warm climates, and of marshy or moist places.

Two-banded Cæcilia.

CÆ'CUM (Lat. *cæcus*, blind), a blind sac; that is, a sac or bag having only one opening, connected with the intestine of an animal. In man, there is only one C., very small, and apparently not performing any important function, situated at the extremity of the small intestine, where it terminates in the large intestine or colon. In many of the mammalia, however, and particularly in most of those which are herbivorous, it is comparatively large, and is found to secrete an acid fluid resembling the gastric juice. It therefore appears that, where the nature of the assimilatory process is such as to require the detention of the food for a considerable time, this provision is made for it, in order that digestion may be more completely accomplished. The C. is entirely wanting in some quadrupeds, as in bats, and the bear and weasel families. Birds have two cæca, which are generally long and capacious in those that are omnivorous or granivorous, and the position of which is the only circumstance that marks the division of the intestine into two parts, the small and the large intestine, or the *ileum* and the *colon*. In reptiles, a C. is of very rare occurrence. Fishes have none in the position occupied by those of quadrupeds and birds, but many of them have cæca attached to the intestine at its uppermost part, and very generally regarded as appendages of the stomach. The number of these cæca is, however, extremely various; sometimes there are only 2, and sometimes more than 100. The number is different even in very nearly allied species of the same family; thus, there are only 6 in the smelt, but 70 in the salmon; 24 in the herring, and 80 in the shad. In some fishes, as the cod, the cæca consist of large trunks ramified into smaller ones.—The intestinal canal of some of the *Infusoria* is furnished throughout its whole length with numerous cæca, no other organ corresponding to a stomach appearing to exist.

CÆDMON, the first Anglo-Saxon writer of note who composed in his own language, and of whom there are any remains. The date of his birth is unknown, but his death occurred about 680 A.D. He was originally a cow-herd, attached to the monastery of Whitby, and, according to Bede, 'even more ignorant than the majority of his fellows, so that in the evenings, when the domestics assembled in the hall to recreate themselves with music after the labors of the day, Cædmon was frequently obliged to retire, in order to hide his shame when the harp was moved towards him.' One night, however, as he was sleeping in the stable-loft, a stranger appeared to him, and commanded him to sing. C. declared his ignorance, but the stranger would take no refusal, and imposed on the poor cow-herd the sublime task of hymning the glories of creation.

Suddenly a poetic inspiration seized him, and he began to pour forth verses. When he awoke from his dream, the words remained fast-rooted in his memory, and were recited by him to others with new confidence. The Abbess Hilda, and the learned men who were with her in the monastery, immediately declared that he had received the gift of song from Heaven. He was now educated, became a monk, and spent the rest of his life in composing poems on the Bible histories and on miscellaneous religious subjects, many of which have been preserved, and are altogether in bulk nearly equal to the half of *Paradise Lost*, to parts of which some of them bear a striking resemblance. Satan's Speech in Hell is characterized by a simple yet solemn greatness of imagination, which may possibly have influenced at some period of his life the more magnificent genius of Milton.

CÆLATU'RA. See CHASING.

CAEN, the chief town in the department of Calvados, France—formerly the capital of Lower Normandy—is situated on the left bank of the Orne, about 9 miles from its mouth, 122 miles west-north-west of Paris. C. is built in the middle of a fertile plain; its streets are wide and clean, it has several fine squares, and many noble specimens of ancient Norman architecture. Among the best examples are the churches of St. Etienne, founded by William the Conqueror, and which contained his monument, erected by William Rufus, and destroyed by the Huguenots in 1562; La Trinité, called also *Abbaye aux Dames*, founded by Matilda, wife of the Conqueror; St. Nicholas, now a cavalry fodder-store; St. Pierre, and St. Jean. The castle, founded by the Conqueror, and finished by Henry I. of England, was partially destroyed in 1793. There are several beautiful promenades in the city, which has manufactures of lace, blonde, crape, cutlery, cotton-yarn; breweries, dye-works, wax-bleaching, and ship-building yards. Its Angora gloves, made from the unwashed, undyed fur of Angora rabbits, which are reared in the district, are celebrated. Quarries in the neighborhood produce an excellent stone, called Caen Stone (q. v.). Trade is facilitated by a maritime canal connecting the port with the sea, and also by the railway connecting it with the Paris and Rouen line; those to Cherbourg, Tours, and Honfleur, and that to Flers, opened in 1867, which affords C. communication with Granville. Nothing is known of C. before the 9th century. It was a place of importance in 912, when it came into the possession of the Normans, under whom it increased rapidly. William the Conqueror and his queen made it their residence, and greatly improved it. In 1346, it was taken and pillaged by the English, who again captured it in 1417. It was held by them until 1450, when the French compelled them to surrender. During the revolution of 1793, several of the Girondist chiefs, proscribed by the Jacobins, went to C., and organized a revolt against the Mountain, which proved unsuccessful. Pop. (1876) 33,072.

CAEN STONE. The neighborhood of the town of Caen, in Normandy, has been celebrated for its stone-quarries from a very early period. The excellence of the stone, and the facility of transport by sea, led to C. S. being very extensively used in England in the 15th and 16th centuries. In 1460, the Abbot of Westminster obtained a license to import C. S. for the repairs of the monastery. Later, it became a regular article of importation, and in 1582 it is rated at the custom-house at 6*s.* 8*d.* the ton. Winchester and Canterbury cathedrals, Henry VII.'s Chapel at Westminster, and many country churches, are built of C. S., which is still frequently used in England. The stone is an oolite, resembling Stonesfield slate, but without its slaty structure. The quarries are subterraneous, and the stone is brought up through vertical shafts in blocks 8 or 9 feet long, and about 2 thick.

CAERLE'ON (Castle of the Legion), a small but ancient town in Monmouthshire, on the right bank of the Usk, 2 miles north-east of Newport. It is the Isca Silurum of the Romans, and is supposed to have been the capital of the Roman province Britannia Secunda, now Wales, and the residence of the famous King Arthur. It was the seat of an ancient archbishopric, which was removed to St. Davids about 519 A.D. An abbey of Cistercian monks existed here before the Reformation. C. was an important place in the 12th c., but it was afterwards ruined by the frequent wars between the Welsh and Anglo-Saxons. Many Roman relics have been found here, as aqueducts, baths, pavements, altars, tiles, coins, inscriptions, and statues; many of the smaller antiquities are deposited in a museum in the town; besides half-melted ore and cinders, and the remains of a fortress, with walls 12 feet thick and 1800 yards long, and of an amphitheater, called King Arthur's Round Table, 222 by 192 feet in size. Pop. (1871) 1306. The chief occupation is the manufacture of tin-plates.

CAERMA'RTHEN (Welsh, *Caer Fyrddyn*, the *Maridunum* of Ptolemy), a seaport town, capital of Caermarthenshire, South Wales, on the right bank of the Towy, 9 miles from Caermarthen Bay. It lies in a picturesque situation, but the streets are irregular, steep, and often narrow. The Towy is navigable for vessels of 200 tons up to the town, and salmon and sewin are caught in the river. There are tin and iron works near the town. C. exports tin-plates, cast iron, timber, marble, bark, slates, lead ore, bricks, grain, butter, and eggs. The Welsh language is used in most of the churches. C. is a county borough, having a separate jurisdiction from the shire. It unites with Llanelly in returning one member to parliament. Pop. (1881) 10,512. There is a college for Welsh teachers. Near C. are the remains of two Roman camps. In the 5th c., Merlin, the Welsh prophet, is said to have been born here. It was long the residence of the native princes of South Wales. Caermarthen Castle often changed hands in the contests of the Welsh chiefs with each other, and in the subsequent wars with the Saxons and Normans.

CAERMA'RTHENSHIRE, a maritime county in South Wales, on the Bristol Channel; bounded N. by Cardigan, from which it is separated by the Teify; E. by Brecknock; S. by Glamorgan and Caermarthen Bay; and W. by Pembroke. It is the largest of the Welsh counties; length, 53 miles; greatest breadth, 33 miles; area, 974 square miles, nearly a third of which is waste. The county is mountainous in the north and east, and is characterized by productive though narrow valleys and deep wooded glens. Caermarthen Van or Beacon rises to the height of 2596 feet, being the greatest elevation in the county. The coast of C. is marshy, and is all situated on Caermarthen Bay, which washes also some portions of the coasts of Glamorgan and Pembroke, is 17 miles across, 10 miles deep, 35 in circuit, and receives the rivers Taff or Tave, Towy, and Lhoughor. The chief rivers of C. are the Towy, Cothy, Taff, and Teify. The Towy has a course of 60 miles, of which 50 are in Caermathenshire. It yields plenty of salmon, sewin, trout, eels, and lamprey, and is navigable for the last 9 miles of its course. On this river is the celebrated vale of the Towy, 30 miles long, with an average breadth of 2 miles. C., north and west of the Towy, comprising three-fourths of the county, consists of lower Silurian clay-slate and grauwacke. In the south-east corner of the county is a band of carboniferous limestone and grit, to which succeeds a small part of the South Welsh coal-field of Glamorgan and Monmouth, chiefly composed of stone-coal and culm. The mineral productions of the county are iron, coal, copper, lead, slates, lime, dark-blue marble. These, with tinned iron, grain, cattle, horses, sheep, and butter, are exported. The climate of C. is mild but moist; the soil is stiff and poor in the uplands, affording pasturage for small cattle; but the rest of the county is well wooded, and in the south part along the rivers very fertile. Oats and barley are the chief crops. The chief towns are Caermarthen (the county town), Llanelly, Llandeilo-vawr, Llandovery, Newcastle-in-Emlyn. The chief manufactures are woollens and hides. Pop. (1871) 115,710; (1881)124,861. C. sends two members to parliament. The county contains so-called Druidical remains, and Roman roads, besides many baronial and ecclesiastical ruins. In this county originated the 'Rebecca' riots, which in South Wales, in 1843—1844, were directed against the turnpike gates.

CAERNA'RVON (*Caer-yn-ar-Fon*, Fort opposite Mon or Anglesea), a parliamentary and municipal borough and seaport in North Wales, the capital of Caernarvonshire, situated near the south end of the Menai Strait, on the right bank of the Seiont, 245 miles north-west of London. C. has a castle situated at the west end of the town, the building of which was commenced by Edward I. in 1284. It is one of the noblest ruins in the kingdom, the walls being still entire, and enclosing and oblong of three acres. The walls are 7 to 9 feet thick, and are pierced by a covered gallery, with loopholes to discharge arrows. There are thirteen embattled towers, with five, six, or eight sides, and surmounted by turrets. The gateway under the great square tower has four portcullises. The town itself was once surrounded by walls and round towers. These walls, with several of the gates, still exist, but are within the town. The streets are narrow, but regular, and at right angles with each other. In the churches and chapels, the services are in Welsh and English. C. unites with Pwllheli, Nevin, Criccieth, Conway, and Bangor in returning one member to parliament. In 1880, 2256 vessels, with a burden of 149,706 tons, entered, and 2389 vessels, with a burden of 172,021 tons, cleared the port, chiefly small-craft and steamers to and from Liverpool. The harbor admits of ships of 400 tons. The chief exports are copper, ore, coal, and slates. There is also a great iron and brass foundry. C. is a bathing-place, and is much frequented by tourists, on account of its vicinity to the grandest scenery in North Wales. Many families of the upper ranks reside in and around the town. Pop. (1881) 10,237. Half a mile from C. are the remains, covering seven acres, of Segontium, or Caer Seiont, a Roman station or city. Gold, silver, and copper coins and ornaments, and other Roman relics, have been found here. There is a Roman fort on the left bank of the Seiont, still almost complete, with walls 11 feet high, and 6 feet thick, and with parallel rows of holes 3 inches in diameter. C. was the seat of the native princes of North Wales down to 873. In 1284 was born here the first Anglo-Norman Prince of Wales, afterwards the unhappy Edward II. In 1294, the town and castle were burned, and the English inhabitants massacred by the Welsh under Madoc, the illegitimate son of Llewelyn, a native prince of Wales. From a rocky height near Uxbridge Hotel, there is a fine view of Snowden and the island of Anglesea.

CAERNA'RVONSHIRE, a maritime county in North Wales, bounded N. by the Irish Sea; E. by Denbigh, with the Conway between; S. by Merioneth and Cardigan Bay; and W. by Caernarvon Bay and the Menai Strait, the latter separating it from Anglesea. It is 51 miles long; greatest breadth, 22 miles; average, 9; area, 544 square miles, of which ½ is in pasture, and only $\frac{1}{40}$ in tillage. The surface is mountainous, and is traversed by the grandest and highest ranges in South Britain, and it is the highest and most mountainous county in North Wales. The Snowdonian or chief range runs through the middle of the greatest length of the county, from south-west to north-east, and is very bold and rocky. It attains its greatest elevation in Snowdon (q. v.), 3571 feet, in the center of the county, and the highest mountain in South Britain. Caernarvon Bay is 30 miles across, 15 long, with 2 to 30 fathoms water, and communicates with the Irish Sea through the Menai Strait, which is 17 miles long, and ½ to 4 miles broad. The rivers of C. are numerous, but small, from the nearness of all parts of the county to the sea. The Conway, navigable for 10 miles, which runs along the east border, is the chief. Almost all the streams flow through small lakes or tarns—of which there are 50 or 60 in the county—around the central or Snowdonian group of mountains. There are many fine cataracts on these streams. The mineral products of C. are copper, lead, zinc, coal, roofing and writing slates, slabs, chimney-piers, honestone. The slate-quarries employ many thousands of workmen. The climate is mild in the peninsular part of C., but severe among the hills. Large numbers of black-cattle are reared; the sheep are numerous but small. Wheat, oats, barley, and potatoes are raised in the valleys. Pop. (1871) 106,121; (1881) 119,195. The chief towns are Caernarvon (the county town), Bangor, Pwllheli, Conway, Nevin, and Criccieth. In addition to the above boroughs, several flourishing towns have recently sprung into existence in the county—Llandudno, Tremadoc, and Bethesda being the principal. It returns two members to parliament—one for the county, and one for the six chief towns. Connected with C. is the Chester and Holyhead Railway, on the great route from London to Dublin, which crosses into Anglesea by the Britannia Tubular Bridge over the Menai Strait. C. contains the remains of British or Celtic camps and hill-forts, especially around Snowdon, several dolmens and stone circles, and some ancient castles. The Snowdonian mountains were long the stronghold of the Welsh against the Romans, Saxons, and Normans in their efforts to subjugate Wales, and here the Welsh were at last defeated in 1283 by Edward I.

CÆSALPI'NIA, a genus of trees of the natural order *Leguminosæ* (q. v.), the type of the sub order *Cæsalpinieæ*. This sub-order is characterized by irregular flowers, which are not papilionaceous (q. v.) and contains upwards of 700 known species, among which many are notable for their purgative properties, as Senna (q. v.); some produce eatable fruits, as the Tamarind (q. v.), the Carob (q. v.), and the West Indian Locust Tree (q. v.); some yield resinous and balsamic products, as Copaiva (q. v.), Aloes-wood (q. v.), &c.; some produce important dye-woods, as Log-wood (q. v.), Brazil Wood (q. v.), Camwood (q. v.), &c.; and some are trees of great size, and very valuable for their timber, as the Purple-heart (q. v.) and the Wallaba (q. v.), trees of Guiana. No species of the sub-order is British, and it generally belongs to warm climates.—The genus C. contains a number of species, trees with pinnate or bipinnate leaves, natives of the warm parts of Asia and America, which yield the Brazil wood, Pernambuco wood (see BRAZIL WOOD), and Sappan Wood (q. v.) of commerce also the astringent pods called Dividivi (q. v.) used in tanning.

CÆ'SAR, the name of a patrician family of the *Julia Gens*, one of the oldest in the Roman state, claiming to be descended from Iulus, the son of Æneas. When or from what cause the surname of C. was first acquired, is in the highest degree uncertain. Spartianus, in his *Life of Ælius Verus*, mentions four different opinions respecting its origin: 1. That the word signified an elephant in the language of the Moors, and was given as a surname to one of the Julii because he had killed an elephant; 2. That it was given to him because he had been cut (*cæsus*) out of his mother's womb after her death; 3. Because he had been born with a great quantity of hair (*cæsaries*); or, 4. Because he had azure-colored eyes (*cæsii*). The opinion to which we most incline is the third of these, but who was the original 'shock-head' of the gens we cannot say; the first, however, mentioned in history is Sex. Julius Cæsar, prætor in 208 B.C. The greatest individual of the family, and one of the greatest men the world has ever seen, was

CÆSAR, CAIUS (or rather GAIUS) JULIUS, son of a Roman prætor of the same name, was born 12th July, 100 B.C. Two circumstances conspired to determine his sympathies in favor of democracy, and against a republican oligarchy: the first was the marriage of his aunt Julia with Caius Marius; the second, the marriage of C. himself, in 83 B.C., with Cornelia, daughter of L. Cinna, one of the principal enemies of Sulla. The anger of the dictator at this cost C. his rank, property, and almost his life itself.

Feeling that he would be safer abroad for a time, he went to Asia, 81 B.C.; but on learning the death of Sulla (78 B.C.), he hurried back to Rome, where he found the popular party in a state of great ferment, and anxious to regain what it had lost under the vigorous despotism of the aristocratic dictator. C., however, took no part in the attempts of Lepidus to overthrow the oligarchy; but he showed his political leanings by prosecuting (77 B.C.) Cn. Dolabella—a great partisan of Sulla—for extortion in his province of Macedonia. To improve his eloquence, he went to Rhodes to study under the rhetor Apollonius Molo. In 74 B.C., he returned to Rome, where he had been elected pontifex, and now for the first time threw himself earnestly into public life. In the year 70 B.C., he attached himself to Pompey, whose political actions at this time were of a decidedly democratic character. In 68 B.C., C. obtained a quæstorship in Spain. On his return to Rome (67 B.C.), he married Pompeia, a relative of Pompey, with whom he was daily becoming more intimate. In 66 B.C. he was elected to the curule ædileship, and lavished vast sums of money on games and public buildings, by which he increased his already great popularity. For the next few years, C. is found steadily skirmishing on the popular side. In 63 B.C. he was elected pontifex maximus, and shortly after, prætor. During the same year occurred the famous debate on the Catiline conspiracy, in which the aristocratic party vainly endeavored to persuade the consul, Cicero, to include C. in the list of conspirators. In 62 B.C., Pompey returned from the East, and disbanded his army. Next year, C. obtained the province of *Hispania Ulterior*. His career in Spain was brilliant and decisive. On his return, he was elected consul, along with M. Calpurnius Bibulus. Shortly before the passing of the agrarian law (59 B.C.), C. with rare tact and sagacity, had reconciled the two most powerful men in Rome, who were then at variance, Pompey and Crassus, and had formed an alliance with them, known in history as the *First Triumvirate*. Both of these distinguished men aided C. in carrying his agrarian law; and to strengthen still further the union which had been formed, C. gave Pompey his daughter, Julia, in marriage, though she had been promised to M. Brutus; while he himself also married Calpurnia, daughter of L. Piso, his successor in the consulship.

On the expiry of his term of office, he obtained for himself, by the popular vote, the province of *Gallia Cisalpina* and *Illyricum* for five years, to which the senate added—to prevent the popular assembly from doing so—the province of *Gallia Transalpina*. Nothing could have been more favorable for C.'s aims. He had now an opportunity of developing his extraordinary military genius, and of gathering round him an army of veterans, whom perpetual victory should inspire with thorough soldierly fidelity and devotion to his person. This was the very thing he wanted to give him a reputation equal to that of his coadjutors, Pompey and Crassus, whom, in genius, he far surpassed. Leaving, therefore, the political factions at Rome to exhaust themselves in petty strifes, C., in 58 B.C., after the banishment of Cicero, repaired to his provinces, and during the next nine years, conducted those splendid campaigns in Gaul, by which, had he done nothing else, he would have 'built himself an everlasting name.' C.'s first campaign was against the Helvetii, whom he totally defeated near Bibracte (Autun). Out of 368,000 only 110,000 remained. These were commanded by C. to return home, and cultivate their lands. The eyes of the Gauls were now turned upon the new conqueror. His help was solicited, among others, by Divitiacus, an Æduan chief. This involved C. in a second war with a German prince, named Ariovistus, who was utterly overthrown; and now C., having in the course of one campaign successfully concluded two important wars, led his troops into winter-quarters.

Next year (57 B.C.) occurred the Belgic war, in which C. successively routed the Suessiones, Bellovaci, Ambiami, and Nervii, who, alarmed at the progress of the Roman arms, had entered into an alliance with each other against the invaders. When the senate received C.'s official dispatches, it decreed a thanksgiving of 15 days—an honor never previously granted to any other general. During the winter and the spring following, C. stayed at Lucca; and after spending large sums of money in hospitality, and in other less praiseworthy purposes, he departed for Gaul, where the flames of war had burst out in the north-west.

The Veneti, a maritime people of Brittany, were the chief instigators of the insurrection. C.'s plans were laid with consummate skill, and were crowned with the most splendid success. The Veneti were totally defeated, and most of the other Gallic tribes were either checked or subdued. C. wintered in the country of the Aulerci and Lexovii (Normandy), having, in the course of three campaigns, conquered Gaul. Next year (55 B.C.), Crassus went to Syria, and Pompey to Spain, while C.'s provincial government was prolonged for five years. He now undertook a fourth campaign against two German tribes who were about to enter Gaul. He was again successful; and pursuing the fleeing enemy across the Rhine, spent eighteen days in plundering the district inhabited by the Sigambri. He next invaded Britain, about the autumn; but after a brief stay in the island, returned to Gaul. The Roman senate, astonished at his hardihood and his successes in regions where no Roman army had ever been before, accorded him a public thanksgiving of 20 days. In 54 B.C., C. opened his fifth campaign by a second invasion of Britain. On his return to Gaul, C. was compelled—on account of the scarcity of corn, arising from drought—to winter his army in divisions. This naturally aroused the hopes of the Gauls, who thought the time had come for recovering their independence. An insurrection broke out in the north-east of Gaul, which was at first partially successful, but was ultimately crushed. C. resolved to winter at Samarobriva (Amiens), in the vicinity of the malcontents. In 53 B.C., C. commenced his sixth campaign. It was chiefly occupied in crushing a second insurrection of the Gauls. C. now returned to Northern Italy, that he might be able to communicate more easily and securely with his friends at Rome. That city was gradually becoming more anarchic, the evils of weak government more apparent; the hour for decisive action seemed to be approaching, and doubtless C.'s heart beat with expectation of the mighty future, when all at once the plot that Fate was weaving in his favor, appeared to be completely marred by a tremendous rebellion over the whole of Gaul, headed by a young warrior named Vercingetorix. It was in the dead of winter when the news came to C., who instantly saw that, at all hazards, he must preserve his fame and his army. Leaving, therefore, Pompey to succeed at Rome, he hurried to meet the insurgent hordes. His great difficulty was to collect his scattered legions. First crossing, with some Cisalpine and provincial troops, the mountains of Auvergne, though they lay six feet deep in snow, he suddenly appeared among the Arverni, who, terrified at his unexpected approach, sent for their chief, Vercingetorix, to come to their assistance.

This was what C. wished. After some wonderful exhibitions of military skill, and numerous successes, Vercingetorix was shut up in Alesia (Alise in Burgundy) with all his infantry. C. besieged him, and though harassed by nearly 300,000 Gauls without, who attempted, but in vain, to break through the well-defended Roman lines, forced Vercingetorix to capitulate. Many of the

tribes now hastened to submit to C., who prudently determined to winter among the vanquished. The senate, of course, voted him another public thanksgiving. Next year (51 B.C.), C. proceeded to quell the tribes who still held out. This he successfully accomplished, and having in addition reduced the whole of Aquitania, passed the winter of his eighth campaign at Nemetocenna, in Belgium, where he spent the time both in a magnanimous and politic manner. The Gallic princes were courteously and generously treated; the common people were spared the imposition of further taxes, and everything was done to render it possible for him to visit Italy with safety in the spring. This he did, and took up his residence at Ravenna, where he was informed of everything that was going on by the tribune C. Curio. There can be no doubt that at this moment he was the most popular man in the state, while his soldiery were devoted to him with a loyalty as enthusiastic as that which Bonaparte inspired when fresh from his Italian victories.

Meanwhile, Pompey, whose vanity could not endure the greatness of C., had been gradually veering round again to the aristocracy, whose dread of the new conqueror was hourly increasing. After much futile diplomatic finessing on all sides, the senate carried a motion 'that C. should disband his army by a certain day; and that if he did not do so, he should be regarded as an enemy of the state.' The tribunes, Mark Antony and Q. Cassius put their veto on this motion; but they were violently driven out of the senate-chamber, and fearing for their lives, they fled to C.'s camp. The senate, in the madness of their terror, now declared war, and intrusted the conduct of it to Pompey, whose pride in the invincibility of his military prowess hindered him from taking the necessary measures for the defence of the state. He fancied that his name would bring thousands to his standard, and he was even led to believe that C.'s troops were willing to desert their general: the result of which delusion was, that when hostilities formally commenced, he had hardly any soldiers except two legions which had recently been in the service of his rival. C., on the other hand, perceiving that the time for decisive action had at length come, harangued his victorious troops, who were willing to follow him anywhere; crossed the Rubicon (a small stream which separated his province from Italy Proper), and moved swiftly, amid the acclamations of the people, towards Rome.

Pompey fled to Brundusium, pursued by C., but contrived to reach Greece in safety, 17th March, 49 B.C. The Italian cities had everywhere gladly opened their gates to the conqueror as a deliverer. In three months, C. was master of all Italy.

C. next subdued Pompey's legates in Spain, who were at the head of considerable forces. On his return, he took Massilia, where he learned that he had been appointed dictator of the republic—a function which at this time he retained only for 11 days, but these were honorably distinguished by the passing of several humane enactments. Pompey, now thoroughly alive to the magnitude of his danger, had gathered in Egypt, Greece, and the East, a powerful army, while his fleet swept the sea. C., however, crossing the Adriatic at an unexpected season, made a rush for Dyrrhachium, where Pompey's stores were; but was nevertheless outstripped by his opponent. Pompey intrenched his army on some high ground near the city, where he was besieged by C. The first encounter was favorable to Pompey, who drove back C.'s legions with much loss. The latter now retreated to Thessaly, followed by his exulting enemies. A second battle ensued on the plains of Pharsalia, 9th August, 48 B.C. Pompey's army was utterly routed; Pompey himself fled to Egypt, where he was murdered. See POMPEY.

No sooner had the news reached Rome, than C. was again appointed dictator for a year, and consul for five years. He was invested with tribunicial power for life, and with the right of holding all the magistricial comitia except those for the election of the plebeian tribunes. He did not, however, return to Rome after the battle of Pharsalia, but went to Egypt, then in a distracted condition on account of the disputes regarding the succession. Out of love for Cleopatra (who subsequently bore him a son), he entered upon the 'Alexandrine War,' in which he was successful, and which he brought to a close in March 47 B.C. He next overthrew a son of Mithridates, near Zela, in Pontus, August 2 of the same year, and arrived in Rome in September.

He was once more appointed dictator, and the property of Pompey was confiscated and sold. Before the close of the year, he had set out for Africa, where his campaign against the Pompeian generals, Scipio and Cato, was crowned with victory at the battle of Thaspus, 6th April, 46 B.C. Cato committed suicide at Utica, and with such irresistible celerity was the work of subjugation carried on, that by the end of the summer, C. was again in Rome. Now occurred that display of noble and wise generosity which proves C. to have been possessed of a great magnanimous nature. He was not a man that could stoop to the vulgar atrocities of Marius or Sulla, and so he majestically declared that henceforth he had no enemies, and that he would make no difference between Pompeians and Cæsarians. His victories in Gaul, Egypt, Pontus, and Africa, were celebrated by four great triumphs, during which the whole Roman populace was feasted and fêted by the magnificent liberality of the dictator.

He now proceeded to check, by wholesome enactments, as far as in him lay, the social evils which had long flourished in the city. During the year 46 B.C., also, he conferred a benefit on Rome and on the world by the reformation of the calendar, which had been greatly abused by the pontifical college for political purposes. After quelling an insurrection which now broke out in Spain, where Pompey's sons, Cneius and Sextus, had collected an army, he received the title of 'Father of his Country,' and also of *imperator*, was made dictator and *præfectus morum* for life, consul for 10 years; his person was declared sacred, and even divine; he obtained a body-guard of knights and senators; his statue was placed in the temples; his portrait was struck on coins; the month Quintilis was called Julius in his honor; and on all public occasions he was permitted to wear the triumphal robe. He now proposed to make a digest of the whole Roman law for public use, to found libraries for the same purpose, to drain the Pontine Marshes, to enlarge the harbor of Ostia, to dig a canal through the Isthmus of Corinth, and to quell the inroads of the barbarians on the eastern frontiers; but in the midst of these vast designs he was cut off by assassination on the Ides (15th) of March, 44 B.C. The details of this crime—the greatest disaster that could have befallen the Roman world, as subsequent events showed—are too familiar to require narration. It is sufficient to say that, of the sixty aristocrats who were in the conspiracy, many had partaken of C.'s generosity, and all of his clemency. A few, like Brutus, out of a weak and formal conscientiousness, based on theory rather than insight, were probably offended by C.'s desire to change the form of government into a hereditary monarchy; but the most, like Cassius, were inspired by a spleenful hatred of the dictator, and the base ambition of regaining power at all hazards.

C., who was 56 years of age when he was murdered, was of a noble and kingly presence, tall of stature, and possessing a countenance, which, though pale and thin with thought, was always animated by the light of his black eyes. He was bald-headed (at least in the latter part of his life), wore no beard, and though of a rather delicate constitution naturally, he ultimately attained to the most vigorous health. His besetting sin was sensuality; but without meaning to detract from the criminality of his conduct in this respect, it may be said that it was as much the sin of the times in which he lived as his own, and that the superlative grandeur of his position gave a prominence to his licentiousness which a more humble lot would have escaped. His intellect was marvelously versatile. In everything he excelled. He was not only the first general and statesman of his age, but he was—excepting Cicero—its greatest orator. As a historian, he has never been surpassed and rarely equalled in simplicity and vigor of style, and in the truthfulness with which he narrates events of which he was an eye-witness. He was, in addition, a mathematician, philologist, jurist, and architect, and always took great pleasure in literary society. Most of his writings have been lost, though their titles are preserved; but we still possess his invaluable *Commentarii* (generally known as 'Cæsar's Commentaries on the Gallic and Civil Wars'). The *editio princeps* was printed at Rome 1449. C.'s life was formally written in ancient times by Suetonius and Plutarch. There are modern lives by Delorme, Napoleon III. (1865), and J. A. Froude (1879).

CÆSARE'A (*Turris Stratonis*), called by the natives 'Kaisari'yeh.' This once proud and splendid seaport, perhaps one of Herod's most magnificent works—a Grecian town with its temples, amphitheater, baths, &c., imported into Syria—was situated on the coast of Syria, 95 miles south of Beyrout, and 37 miles north of Jaffa.

In 65 A.D., Gessius Florus, the worst of all the petty tyrants that had afflicted Judæa, was appointed governor of Cæsarea. About that time, a terrible revolution, which commenced at C., broke out all over Judæa. It arose from a dispute between the Syrian and Jewish citizens of C. as to which of them the city really belonged to; and some idea may be formed of the extent of the insurrection from the fact, that above 20,000 Jews were massacred in C. in the space of one hour; 13,000 in one night at Scythopolis; 50,000 at Alexandria; 8000 at Joppa; and 10,000 a. Damascus.

C. was occupied by the Crusaders; after them, it seems to have gradually decayed into nothingness. It is now a heap of half-buried ruins, with a few miserable stone houses inhabited by fishermen.

CÆSARE'A PHILI'PPI (*Panium*). This town, mentioned in Matt. xvi. 13, was situated about 20 miles north of the Sea of Galilee. It was distinguished from the Cæsarea on the coast of Syria by the appendage of 'Philippi,' given to it in honor of Philip the Tetrarch, who repaired the city. It is now a heap of ruins, overgrown with bushes and grass.

CÆSA'REAN OPERATION (*cædo—cæsus*) has, from very ancient times, been the popular name for *Hysterotomy* (*hystera*, uterus; *tome*, section). Pliny distinctly alludes to it in his *Natural History* (lib. vii. cap. ix.), saying that Cæsar was so called from being taken by excision out of the womb of his mother, and that such persons were called *Cæsones* (Cæsar a cæso matris utero dictus; quâ de causâ *Cæsones* appellati). In his case, the mother must have survived the operation, as Aurelia was alive when her son invaded Britain.

The pages of a popular work scarcely allow of the details of such a proceeding, but we may state that the first incision is made exactly in the middle line of the body, to a length of 6 or 7 inches. When the uterus is exposed, it must be carefully opened, the child lifted out, and then the after-birth. The uterus now contracts, and sinks down into the pelvis, the wound is closed, and opium is given to the patient to allay pain and nervous irritability.

In Great Britain, the C. O. has been rarely performed, most likely from the skill of the accoucheurs rendering such a proceeding unnecessary; but still several cases are on record where not only the child but the mother are saved. Some women, indeed, seem to have accepted it as their usual method of delivery, having several children, each requiring to be removed through an abdominal incision; one woman submitted to it seven times. It has also been successfully performed in most unfavorable circumstances. In the year 1500, a sow-gelder operated successfully on his own wife; an illiterate Irish midwife, Mary Donally, operated with a razor on a poor farmer's wife in January 1738, and removed a dead child; her patient completely recovered, so as to be able to walk a mile on foot on the 27th day after the operation. Nay, a negro woman in Jamaica cut herself open with a butcher's knife, removed her infant and recovered. Practitioners are not quite decided as to the circumstances which justify the performance of this severe operation on the living female, but all agree on the propriety of at once removing by it the child of a recently dead woman.

Numa Pompilius decreed that every pregnant woman who died should be opened; and the senate of Venice, in 1608, decreed that practitioners should perform under heavy penalties, the C. O. on pregnant women supposed to be dead. In 1749, the king of Sicily decreed the punishment of death to medical men who omitted to perform it on women dying when advanced in pregnancy. Of course, to be of any use, it must be performed immediately.

CÆSIUM. See RUBIDIUM.

CAFFA. See KAFFA.

CA'FFEINE, or THEINE ($C_{16}H_{10}O_4N_4,2HO$), is the alkaloid or active principal of Coffee (q. v.) and Tea (q. v.). When isolated, it forms beautiful white crystals, with silky lustre, which are soluble in water, alcohol, and ether. It is present in coffee to the extent of about 1 per cent., and in ordinary or Chinese tea, from 2½ to 6 per cent., and it is also found in Paraguy and Guiana teas. It may be extracted from coffee or tea by making a decoction in hot water, and adding acetate of lead, which causes a precipitate of caffeotannate of lead. When the latter is acted on by sulphuretted hydrogen, the lead is separated, and the C. left in solution. On evaporation of the liquid, and recrystallization from alcohol, the C. separates in crystals.

CA'FFER BREAD, a name given to several species of *Encephalartos*, trees of the natural order, *Cycadaceæ* (q. v.), which like many others of that order, have much starch in their stems, and afford food to the natives of South Africa. They are also called Bread-trees.

CAFFERS. See KAFIRS.

CAFFRA'RIA. See KAFFRARIA.

CAFFRISTA'N. See KAFIRISTAN.

CAGAYA'N SOOLOO', an island of the Asiatic Archipelago, in lat. 6° 58′ N., and long. 118° 28′ E. It is about 20 miles in circumference well-wooded and elevated. Cagayan is also the name of a province, river, and lake on the island of Luzon, one of the Philippines.

CA'GLIARI, the capital of the island of Sardinia, situated on the side of a hill, on the north-east shore of a spacious bay, and on the south coast of the island, in lat. 39° 13′ N., long. 9° 8′ E. It has a spacious and safe harbor, defended by several forts, and is the emporium of all the trade of the island. The town contains many public buildings and churches, and has a university with 100 students; but its streets, for the most part, are very narrow, steep, and dirty. C. has a pop. of (1872) 32,834. It has also a dockyard, and a good road was some years ago constructed from C. to Sassari, the second city in the island, and to some of the more considerable places. Steamers ply very frequently between C. and Genoa; and it is now united to the continent of Europe by a line of Electric telegraph.

CAGLIARI, PAOLO, best known as *Paolo Veronese*, an Italian painter of great eminence, was born at Verona in 1532. He first studied under his uncle, Antonio Badile, a respectable artist, and afterwards settled in Venice, where he rapidly acquired both wealth and reputation. He had for contemporaries both Titian and Tintoretto, and was held in equal admiration with these famous painters. The church of San Sebastiano, in Venice, contains many of his productions, which are reckoned the most important of his earlier period—i. e., the period before he visited Rome, when he first became acquainted with the master-pieces of Raphael and Michael Angelo. The influence of the Roman school on his style was so happy, that, on his return, he received the honor of knighthood from the Doge. He died 19th April 1588. C. is remarkable for the fertility of his imagination. His design is generally noble, his composition rich, and his execution truthful. In the invention of details, especially, he is inexhaustible, and often overloads his pictures with ornament. One peculiarity of his works is the frequent introduction of splendid architectural backgrounds, which, however, were generally painted by his brother Benedetto. The most celebrated of his productions is the 'Marriage Feast at Cana of Galilee,' now in the Louvre at Paris. It is 20 feet high, and 30 feet in length, and contains 130 figures. Besides these may be mentioned 'The Calling of St. Andrew to the Apostleship,' 'The Feast of Simon,' and the 'Presentation of the Family of Darius to Alexander.'

CAGLIOSTRO, COUNT ALESSANDRO DI, a notorious impostor, who, in the latter part of the 18th c., traveled through Europe, and whose adventures afford considerable sight into the social characteristics of his times. He was born at Palermo, of poor parentage, June 2, 1743, and his true name was GIUSEPPE BALSAMO. Carlyle's picture of him when a boy—'brass-faced, vociferous, voracious'—is probably accurate, and already prophesies the bold and boisterous quack. When 13 years old, he ran away from the seminary of St. Roch, and was afterwards sent to a monastery at Cartagiore.

Here he became assistant to the apothecary of the monastery, and picked up that scanty knowledge of chemistry and medicine, which was afterwards found quite sufficient to impose upon so many respectable individuals. His conduct in the monastery was in keeping with his character, but finding it too contracted a sphere for the development of his ambitious genius, he left it, or was ejected, and for a time led 'the loosest life' in Palermo. When 26 years old, he found it highly advisable to leave his native place. In company with a certain sage named Althotas, C. is vaguely represented as traveling first in some parts of Greece, Egypt, and Asia. At Rome, 'his swart, squat figure first becomes authentically visible in the Corso and Campo Vaccino. He lodges at the sign of the Sun in the Rotunda, and sells etchings there,' very hard up at this time. In Venice, 'the bull-necked forger' contrived to marry a very pretty woman named Lorenza Feliziana, who became a skilful accomplice in his schemes, and captivated many admirers, while C. picked their pockets. C. now made the tour of Italy with great success as a physician, philosopher, alchemist, free-mason, and necromancer! Next, he extended his victorious career through some parts of Germany, and especially carried on a lively business in his 'elixir of immortal youth,' which became very popular among the ladies. By virtue of this fine medicine, the count assured his patients that he had already attained his 150th year, while his young and charming wife often talked affectionately of her son as 'a commander in the Dutch navy.' Through Courland, the count and his accomplice advanced triumphantly to the court of St. Petersburg, where he seems to have first made a failure; for the Empress Catharine, aided by her Scotch physician, Rogerson, a keen-witted native of Annandale, who sceptically examined his famous 'Spagiric food,' and pronounced it 'unfit for a dog,' penetrated his real character, and made him the subject of a comedy. C. soon found it convenient to vanish. We next find him at Warsaw, discoursing on his pet Egyptian masonry, medical philosophy, and the ignorance of doctors, but he has the misfortune to be unmasked by a certain Count M. This, however, had little effect on the stupid credulity of C.'s dupes—belonging, it must be remembered, to the upper classes, who in that age, according to Carlyle, were at once sensual, infidel, and superstitious—so that they persisted for a time in 'distending his pockets with ducats and diamonds,' which, however, his lavish dissipation soon scattered to the winds—for this prophet of a new physical and moral regeneration, and inventor of an 'invaluable pentagon for abolishing original sin,' was a desperate gambler.

In 1780, he went to Strasburg; and soon afterwards we find him in Paris, still founding lodges of 'Egyptian freemasons,' holding nocturnal meetings for calling 'spirits from the vasty deep,' &c., and scandalously simulating the character and deeds of a philanthropist. From Paris he came over to England, where he was cordially received by the followers of Swedenborg. On his return to Paris (1785), he became distinguished at court, was intimate

with the weak and credulous Cardinal Rohan, and played a prominent part in the affair of the Diamond Necklace (q. v.). This lodged him in the Bastile; but he cleared himself by a statement which gained credit, and, after being liberated, carried on his adventures once more in England, but feebly, the sunshine of success now obviously growing dim: in short, the count, in gloom and foreboding, disappeared from the island. But the market in Germany, too, was closed, a general distrust having been excited by the revelations of one of the count's dupes. Elsewhere, also, these began to fail him. 'At Aix, in Savoy, there are baths, but no gudgeons in them;' at Turin, he is ordered off by the king; a similar fate befalls him at Roveredo; at Trent, we catch a glimpse of him, 'painting a new hieroglyphic screen,' which, however, attracts no more the gaping crowd; lower still, 'he pawns diamond buckles;' finally, his wayworn wife—in whom, perhaps, because of her womanhood, the enormous lie and quackery first breaks up—'longs to be in Rome by her mother's hearth, by her mother's grave, where so much as the shadow of refuge awaits her.' In May 1789, he entered the city; on the 29th December, the Holy Inquisition detected him founding 'some feeble ghost of an Egyptian lodge.' He was imprisoned, and condemned to death for freemasonry. His sentence was commuted to imprisonment for life in the fortress San Leon, where, in spite of his 'elixir of immortal youth,' he died, 1795, aged 52 years. His wife ended her days in a convent. His *Mémoires Authentiques*, posthumously circulated in Paris, were *not* authentic.—See Carlyle's *Miscellaneous Essays*, art. Count Cagliostro.

CAGNOLA, Luigi Marchese, a distinguished Italian architect, was born at Milan in 1759—died 1833. Belonging to an ancient and wealthy family, he could afford to follow the bent of his own inclination, and devoted himself earnestly to the study of architecture. His master-works are two triumphal arches. The first is the famous *Arco della Pace*, in Milan, commenced in 1807, but not finished until 1838. It is constructed of white marble, and, with the exception of the *Arc de l'Etoile*, in Paris, is both the largest and noblest structure of the kind in Europe, reaching a height of 78 feet. On the top of the arch is a bronze figure of Peace, in a car drawn by six horses, while the sides are richly adorned with innumerable bas-reliefs. The second forming the *Porta di Marenga, or Porta Ticinense*, is also a work of great beauty, and is much admired. Besides these may be mentioned the *Campanile* (Bell-tower) at Urgnano, in the Bergamese.

CAGOTS is the name given to a tribe of men, of manners and customs akin to those of the gypsies, who are found scattered through various parts of Bearn and Gascony, in France. They are usually thought to be the descendants of the Visigoths, who remained in France after their defeat by Clovis, in the 5th century. Until the French Revolution of 1790, they received even worse treatment than that which generally falls to the lot of the remnants of conquered races. They were forced to wear a peculiar dress, were forbidden to practise all but the most menial trades, and were obliged to live isolated, either in separate villages or in separate quarters of the towns. So complete was their estrangement from the other inhabitants, that they were forced to enter the churches by doors specially set apart for them. Since that Revolution, they have been placed, as regards the law, on an equal footing with other citizens, but socially they are still regarded as a degraded race. Their language has been, so far back as is known, a corrupt dialect of that spoken in the surrounding country; but their blue eyes, fair hair, and fair complexion, mark them out as ethnologically distinct, and speak to a Teutonic origin. From a great liability to the diseases afflicting cretins, probably caused by their exposed manner of life and insufficient nourishment, they were at one time erroneously thought to belong to that unfortunate class. Tribes, whose history and present condition greatly resemble those of the C., are to be found in Britanny, where they receive the name of 'Caqueux;' and in Poitou, Maine, and Anjou, where they receive the name of 'Colliberts.' See Michel's *Histoire des Races Maudites de la France et de l'Espagne* (History of Outcast Races in France and Spain), Par. 1847.

CAGSA'NA, a town near the southern extremity of the island of Luzon, Philippines, with a population of about 13,000.

CAHE'TÉ, or CAETE, a small town of Brazil, in the province of Minas Geraes, about 250 miles north of Rio de Janeiro. The town is tolerably built, has some churches, a hospital, primary school, electoral college. Agriculture and mining are carried on. Pop. about 6000.

CA'HIR, a town in the county of Tipperary, Ireland, on the Suir, beautifully situated at the east end of a valley between the Galtees and Knockmeledown Mountains, 8 miles north-west of Clonmel. In the town is the seat of the Earl of Glengall, with a park which extends along the river for two miles below the town. Cahir Castle, an ancient irregular Norman structure of considerable extent, is situated on a rock on the left bank of the Suir. It was taken by the Earl of Essex in 1599, and by Cromwell in 1650; it has been lately restored. C. has extensive flour-mills, and a pop. of (1871) 2694. There are large barracks near Cahir.

CAHORS (anciently, *Divona*), a town in the department of Lot, France, is situated on a small rocky peninsula, formed by a bend of the river Lot—here crossed by three bridges—about 60 miles north of Toulouse. The streets of C. are steep and narrow, and present many specimens of antique architecture. It has a fine cathedral, and several Roman remains, including those of a magnificent aqueduct. There is an obelisk to Fénélon, who was a student at the university here. The town was taken and pillaged by Henri of Navarre in 1580. It has manufactures of cotton-yarn, woollens, leather, paper, glass, &c.; the district produces wine in considerable quantities. The population in 1872 was 11,416; and in 1876, 12,190.

CAI'COS, or CAY'OS, or KEYS, a term applied to numberless rocky islets of the West Indies, and that generally with a reference to some more considerable island in the neighborhood. Thus, to take the Bahamas as an instance, there are the Keys of Providence, of Eleuthera, of Abaco, &c. But more specifically the name is often appropriated to the more southerly members of the group just mentioned—North, West, East, Grand, and other Keys together covering about 450 square miles, and containing about 5000 inhabitants. They lie between 21° and 22° N. lat., having been transferred, with a local president, from the government of Bahama to that of Jamaica. The revenue is about £8000. The imports are valued at nearly £30,000; and the exports (consisting chiefly of salt) at £25,000.

CAI'FA, or HAI'FA, a seaport on the coast of Syria, situated exactly opposite Acre, upon a spur of Mount Carmel, and on the south side of a wide semicircular bay, four miles across. It is the ancient Hefa, or Sycaminopolis. It covers but a small space of ground, and contains no edifice of any note except a few minarets. The houses are built of rough unhewn sandstone, plastered over with lime—the roofs flat. Pop. about 2000—Moslems, Christians, and Jews. C., having a better anchorage than Acre, is fast eclipsing that city as a port, and in recent years almost all the trade of Acre has been transferred to it. Consular agents from England, France, &c., have, within twenty years, been established at C.; and among other improvements are a coffee-house and billiard-room, things rare in Syria. Several cargoes of barley, wheat, and sesame seed are yearly shipped at C., and exported to Great Britain and France. C. is surrounded by beautiful gardens of palm, olive, orange, citron, fig, mulberry, and pomegranate trees.

CAILLIÉ, René or Auguste, a French traveler, noted for his journey to Timbuktu, was born 19th September 1799, at Mauzé, in the department of Deux-Sèvres. Having gone to Senegal, and engaged in trading with the natives, he learned, about 1826, that the Geographical Society of Paris had offered a premium of 10,000 francs to the first traveler who should reach Timbuktu. Provided with a stock of goods for barter, C. started from Sierra Leone, March 22, 1827, and after some delay caused by illness, he reached the mysterious city in April 1828, where he remained 14 days. On leaving Timbuktu, he accompanied a caravan across the Sahara Desert, reaching the coast of Tangier. After hearing and examining his statements, the Society awarded to him the offered prize, with a pension of 1000 franks, and the order of the Legion of Honor. His notes of travel, arranged by M. Jomard, were published under the title *Journal d'un Voyage à Temboukton et à Jenné dans l'Afrique Centrale*, &c. (3 vols., Par. 1830). In England, doubts were raised as to the veracity of C., but without just grounds. C. died at his estate, in the neighborhood of Paris, May 25, 1838.

CAIN, the first-born of Adam and Eve. His history, as recorded in the book of Genesis, is mysterious and inexplicable, and the traditions which a later superstition has gathered round it, have thrown no light on its dark perplexity. As the first murderer, his memory has always been profoundly execrated by the Christian Church; yet such is the perversity of human nature, that one sect—if not more—of the pseudo-Gnostics found his actions and character so much to their liking, that they called themselves *Cainites* (130 A.D.), and invented an explanation of his alleged crime, which, like most of the Gnostic heresies in the early church, sprang out of the deep-rooted fundamental error of the 'two principles.' The Cainites believed that C. was the offspring of the intercourse of a superior Power with Eve, and Abel of an inferior Power; that their characters corresponded to their paternal parentage, and that the slaying of Abel only symbolized the victory of the superior over the inferior Power. The subsequent punishments of C. were regarded as the persecutions of Abel's father—i. e., the Jewish God. For the same reason, they highly honored all the reprobates of the Old Testament—such as the people of Sodom, Esau, Korah, Dathan, and Abiram—whom they looked upon as the victims of the hatred of Jehovah. It is unfortunate that we possess only distorted and fragmentary accounts of this.

as of all the other heretical sects. The Cainites are also said to have denied the dogma of the resurrection of the body, to have rejected the New Testament, and accepted a gospel of Judas, the betrayer, whom they also reverenced for the singular reason that his crime, by procuring the death of Christ, secured the salvation of men.

CAINOZO'IC (Gr. 'recent life'), a geological term, synonymous with Tertiary, introduced with other words by Mr. Phillips, to avoid the confusion which attended the use of the terms primary, secondary, and tertiary, owing to the various meanings attached to them by geologists.

ÇA IRA (French for 'It will go on!'), the well-known refrain of the song beginning with—

'Ah, ça ira, ça ira, ça ira!
Les aristocrates à la lanterne!'

which must always be remembered as associated with the most terrible scenes of the French Revolution. Like the *Marseillaise*, the *Carmagnole*, and the *Chant du Départ*, it became a French national song, and was styled the *Carillon National*. The melody, taken from another song, is said to have been a favorite air with the unhappy Marie Antoinette.

CAIRD, Rev. John, D.D., a minister of the Established Church of Scotland, and one of the most eloquent living preachers in Great Britain, was born at Greenock in 1820. He studied at the university of Glasgow, and in 1845 was ordained to the pastorate of the church of Newton-upon-Ayr, whence in 1847 he was translated to Lady Yester's Edinburgh. Here his popularity was extraordinary, but the demands made on his physical energies were so great, that he found it necessary to retire to the country, and accepted, in 1849, the country charge of Errol, in Perthshire. A sermon which he preached before the Queen in 1855, in the church of Crathie, and which was published, by royal command, under the title of *The Religion of Common Life*, was universally admired throughout Great Britain; translated on the continent under the auspices of Chevalier Bunsen, who wrote a preface to it, and suddenly carried the fame of the author into all parts of the Protestant world. In 1857 Dr. C. accepted a call to Glasgow. In 1858, he published a volume of sermons, marked by beauty of language, strength of thought, and earnest sympathy with mankind. He received the degree of D.D. in 1860. In 1862, he was appointed Professor of Divinity, and in 1873, Principal of Glasgow University. In 1880 he published an important work on *The Philosophy of Religion*.

CAIRN, or CARN, a Celtic word signifying a protuberance, a heap, a pile. In that sense, it appears in the names of hills and other natural objects in Scotland, Ireland, Wales, Cornwall, and Brittany. It is also applied to artificial heaps of unhewn stones, which, among archæologists, have come to be generally known as 'cairns.'

There are several kinds of cairns. The simplest and most common form seems to be a conical pile of stones of no great size. Next is what may be called the fenced or ringed C.—a heap of stones girdled round by large unhewn stones set upright in the ground. Some cairns have two, and a very few have three such concentric girdles; in some instances, there are concentric rows of upright stones within the cairn. Many cairns are found in the neighborhood of the circles of unhewn stone pillars which antiquaries used to style 'Druidical.' In a few instances, cairns are found at the end of an avenue of standing stones. Some cairns are fenced round by a narrow ditch and a small earthen rampart. A very few cairns have unhewn flat stones on their tops; a still smaller number are surmounted by an unhewn stone pillar. A few are oblong in shape.

Cairns were erected, doubtless, for several purposes. It appears from record that they were often raised to distinguish the marches or boundaries of lands. One C. near Balmoral, on the Highland Dee, is said to have been erected as a mustering-place for the men of Strathdee, who took its name, *Cairn-na-cuimhne*, or 'C. of Remembrance,' for their slogan or war-cry. In later times, places where great crimes had been committed were marked by cairns; thus, 'Mushet's C.,' in the Queen's Park at Edinburgh, shows the spot where a wife was murdered by her husband, under circumstances of peculiar atrocity, in 1720. But that the great purpose of the C. was sepulchral, is shown by the human remains found in so many of them. '*Disjectis et erutis, ossa inveniuntur, et quibusdam honor nominis adhuc manet*,' says Robert Gordon of Straloch, writing of Scotch cairns in 1654. 'For the cairns or heaps of stones in several parts of Ireland,' wrote Thady O'Roddy in 1617, 'some of them were heaped as monuments of battles, some made in memory of some eminent persons buried in such a place.' A Highland suppliant would have said to his benefactor: *Curri mi cloch er do charne*, 'I will add a stone to your cairn.' The bones found in cairns are generally calcined or half-burned, and enclosed either in what are called *cists*—small rude coffins of unhewn stones—or in urns of earthenware, which, again, are in many cases protected by stone cists. Along with the bones are often found flint arrow-heads, flint axe-heads, stone hammers, stone rings, glass beads, implements of bone, bones of horses and oxen, spear-heads, and other weapons of bronze. In some instances, human bones are found unburned, enclosed in stone cists about three feet long, or, more rarely, of the full size of a man. In one case, as many as seventeen stone cists were found in one cairn.

Many cairns are of considerable size. Each of three cairns at Memsie, near Fraserburg, in Aberdeenshire, was about 300 feet in circumference, and about 40 feet high. A C. in the parish of Minnigaff, in Galloway, was 891 feet in circumference. Several of the larger cairns are what is called 'chambered'—that is, have internal galleries or cells. Of three large ringed cairns at Clava, on the banks of the Nairn river, near the battle-field of Culloden, one was found to contain a gallery, about 2 feet wide, leading from the south side of the C. to a circular chamber in the center, about 15 feet in diameter, built of unhewn and uncemented stones, each course overlapping the other so as to meet at the top in that sort of rude dome which has received the name of the 'beehive house' (q. v.). The Boss C., on the moor of Dranandow, in the parish of Minnigaff, had two galleries crossing each other—each 80 feet long, 4 feet wide, and 3 feet high.

But of all the 'chambered' cairns, the most remarkable is that at New Grange, on the banks of the Boyne, near Drogheda, in Ireland. It is 400 paces in circumference, and about 80 feet high, and is supposed to contain 180,000 tons of stones. In 1699, it was described by Edward Llhwyd, the Welsh antiquary, as 'a mount or barrow, of very considerable height, encompassed with vast stones, pitched on end, round the bottom of it, and having another, lesser, standing on the top.' This last pillar has disappeared; of the outer ring of pillars, ten still remain, placed at about ten yards one from another. 'The cairn,' says Mr. Wakeman in his *Archæologia Hibernica* (Dublin, 1848), 'in its present ruinous condition, presents the appearance of a grassy hill partly wooded; but, upon examination, the coating of earth is found to be altogether superficial, and in several places the stones, of which the hill is entirely composed, are laid bare. The opening [which is nearly square, and lined by large flags] was accidentally dissovered about the year 1699. The gallery, of which it is the external entrance, communicates with a [dome-roofed] chamber or cave nearly in the center of the mound. This gallery, which measures in length about 50 feet, is, at its entrance, 4 feet high; in breadth about 3 feet. Towards the interior, its size gradually increases; and its height, where it forms the chamber, is 18 feet. The chamber is cruciform, the head and arms of the cross being formed by three recesses—each containing a basin of granite. The sides of these recesses are composed of immense blocks of stone, several of which bear a great variety of carving, supposed by some to be symbolical. The majority of these carvings must have been executed before the stones had been placed in their present position. The length of the passage and chamber from north to south is 75 feet, and the breadth of the chamber from east to west 20 feet. Of the urns or basins in the recesses, that to the east is the most remarkable. It is formed of a block of granite, and appears to have been set upon, or rather, within, another of somewhat larger dimensions.' The Irish antiquaries believe that the chambered C. of New Grange—'the Cave of Achadh Aldai,' as it was called, from Aldai, the ancestor of the Tuatha De Danaan kings—was opened and rifled by the Norsemen in 862. About a mile from it, on either side, are other two cairns of nearly equal size, named Knowth and Dowth. The latter was opened in 1847, and found to contain a gallery, a cruciform chamber, a basin or sarcophagus, and carved stones, all of the same type as those of New Grange.

Engravings of the sculptures, in both cairns, are given in Mr. W. R. Wilde's *Boyne and Blackwater*, pp. 192—207 (Dublin, 1850), and some of them are obviously of the same character with sculptures found in Scandinavia; at Locmariaker, and at Gavr Innis, in the Morbihan, in Britanny; in one of the cells of a tumulus opened in 1853 at Pickaquoy, near Kirkwall, in Orkney; among the ruins of an ancient fort at the Laws, near Dundee; at the ancient forts of Rowtin Lynn, and Old Bewick, in Northumberland; and on one of the standing stones near Penrith in Cumberland, called 'Long Meg and her Daughters.'

Cairns are most frequent in stony countries. Where, as in many parts of England, stones are scarce, the barrow or earthen mound came in place of the C., from which it differs only in the materials of which it is made. So also in Scandinavia. Cairns, or *dysser*, as they are there called, are rare in Denmark, but of more common occurrence in Sweden and Norway.

CAIRNGO'RM STONE, or simply CAIRNGORM, a name often given by jewelers, and particularly in Scotland, to brown or yellow quartz or rock-crystal, because found at Cairngorm, in Aberdeenshire. The same mineral is found in many other localities, as at Olivet near Orleans, in Brazil, and in Siberia. In Cairngorm

and the neighboring district of Mar, it occurs both in the granite rock and in the alluvial soil. It differs from common colorless quartz or rock-crystal only in the presence of a very little oxide of iron or manganese, to which it owes its color. It is much used as an ornamental stone. The yellow variety is not unfrequently called topaz, although quite different from the true topaz, which it resembles chiefly in color, having neither its hardness nor its brilliancy. The topaz is, however, sometimes found along with it in the granite and gneiss districts of Mar and Cairngorm. The brown variety is sometimes called SMOKY QUARTZ, and when of a good and uniform color is by some preferred to the yellow.

CAI'RO (Arabic, *Musr el Kahirah*, 'the victorious capital'), the capital of modern Egypt, is situated in lat. 30° 2′ N., and long. 31° 16′ E., in a sandy plain betwixt the right bank of the Nile and the ridge of Mokattam, and near the point of the delta of the Nile. From the foundation of the city in 969, the Fatimite califs of Africa, who brought the bones of their ancestors with them from Kairon, reigned for ten generations over the land of Egypt.

The calif Hakem, who built a mosque near Bab-el-Nassr, and who is the supposed founder of the Druse religion, was the third in this succession. In the year 1171, Saladin usurped the throne from the last of the Fatimites. His descendant, Moosa-el-Ashref, was deposed in his turn in 1250; from that time till the year 1517, when the city was stormed and taken by Sultan Selim, C. was governed by a succession of Mameluke kings. C. was occupied by British troops in 1882.

The city of C. occupies about three square miles, and is surrounded by a low wall. Of late years it has been greatly improved. It is lighted with gas, and many fine broad streets have been opened through the crowded districts. The bazaars are well and richly supplied. The houses, which are generally two or three stories high, are all built of variegated brick, with interlinings of wood, and have flat roofs. The city is divided into different quarters, one quarter being appropriated to the Turks, one to the Christians, one to the Jews, &c.; so that every religious sect has its own quarter, which is separated from the adjoining one by strong gates at the end of the streets; these are closed at night, and guarded by a porter, who opens the gate when any one wants to pass.

The most remarkable buildings in the city of C. are its minarets and mosques. The minarets are the most beautiful of any in the Levant, of a prodigious height, and built of alternate layers of red and white stone. The most ancient of all the minarets is that attached to the great mosque of Sultan Tayloon. This mosque was built in the year of the Hegira 265 (879 A.D.), before the foundation of the city, and consists of an immense cloister or arcade built on pointed arches, being the earliest extant in that form. Another magnificent mosque is that of the Sultan Hassan, situated in the place of the Roumayli, near the citadel, and which was finished about the year 1362 A.D. It has two very elegant and high minarets, and the mosque, in consequence of its size, and the thickness of its walls, was frequently seized and made use of as a fortress by the insurgents in the numerous rebellions and insurrections which were always taking place at C. under the rule of the Mameluke kings. Stains of blood are still to be traced on the marble walls of the courtyard.

The population of C. consists of the ruling class, who are all Turks; Arabs, the former conquerors of the land, who form the bulk of the population, all the petty tradesmen and cultivators of the soil being of Arab origin; Copts, who are descended from the original lords of the land, the ancient Egyptians; Jews, Armenians, Syrians, Africans, and Europeans. Pop. (1872) 350,000. The Copts, a mere fraction of the population, completed, in 1867, a fine, lofty, spacious church. Since 1863 the part of C. occupied by Europeans has been handsomely rebuilt. In 1876, C. was connected by rail with Heluan, one of the numerous bathing-places lying to the south.

Of objects worthy of note in the environs of C., there may be mentioned the tombs of the califs, situated about a mile beyond the walls, which are magnificent and imposing buildings, forming beautiful specimens of Arabian architecture. The mausoleum of Sultan Bergook is a triumph of Saracenic architecture. The public gardens, which consist of groves of orange, citron, palms, and vines, are very beautiful. The trade of C. is rapidly increasing. The exports consist mainly of native products, such as ivory, gum, wood, hides, ostrich feathers, cotton, and sugar; while the imports are cotton and woollen goods, prints, hardware, cloth, furniture, shawls, indigo, sheep, tobacco, &c. The manufactures of C. embrace silk and cotton fabrics, gunpowder, glass lamps, sugar, sal ammoniac, weapons, and iron ware. C. is a great seat of learning, and popular education has recently advanced. The government college and the national schools are largely attended, while several thousand pupils attend the theological university attached to the mosque of Ezher. The schools comprise a commercial and juridical school at the Darb Algamâmiz, a school of arts and industry at Boolak (q. v.), and military schools at the Abbasseeyah. The language spoken at C. is Arabic, which, though not the purest, is superior in pronunciation to that spoken in Syria. C. is the official residence of the Khedive of Egypt, and the residence of a consul-general from Great Britain, France, &c. C. has railway connection with Alexandria and Suez, and there is also a line to Upper Egypt.

CAISSO'N, in military matters, is a name sometimes given to a tumbril or ammunition wagon. It is more frequently applied, however, to a large wooden chest or frame, loaded with powder, shells, or both, and buried several feet deep in the ground under some fortification; this destructive combination is to be blown up if there be danger of the enemy approaching and taking possession of that particular part of the defence-work. The French give the name of *caisson pour les vivres* to a large chest, carried with the army, and capable of containing 800 rations.

CAISSON, in relation to shipping, is an apparatus for lifting a vessel out of the water for repairs or inspection. It is usually a hollow structure, sunk by letting water into it. There is an air-chamber inside, which allows it to sink only to a certain depth. In that state it is hauled under the ship's bottom, the traps or openings are closed, the water is pumped out, and the caisson rises with the ship upon it.

In another arrangement, a platform is sunk to a certain depth in the water, and is suspended by iron screws from a strong wooden framework; the ship is floated upon the platform, steadied by shores, and lifted high and dry by means of levers, wheels, pinions, and screws.

CAI'THNESS, a maritime county, the most northerly on the mainland of Scotland. It is triangular in shape; length from north to south, 40 miles; greatest breadth, 30 miles; area, 712 square miles. Except in the west and south, where the mountain-range (composed of granite and gneiss) dividing C. from Sutherland attains, in its highest point, a height of more than 2300 feet, the general aspect of C. is level and bare, being in great part moorland and destitute of trees, while the sea-coast is bold and rocky, with many bays, inlets, promontories, and caves. On the north coast are Dunnet Head and Duncansby Head; and on the west side of the last-named head is a spot of green turf, called John o' Groat's House, where John de Groot or Groat of Warse settled with his brothers in James IV.'s time, and built a house. There are no navigable rivers in C., and no lakes of importance. The climate is damp and chilly, but snow rarely lies on the plains above a day or two at a time. Thunder is rare, but auroræ are seen almost nightly. There are no manufactures, properly so called, although weaving is carried on to some extent. Coal has not been found in C.; the common fuel is peat. The chief crops are oats, bear, turnips, and potatoes. The parts of the surface under tillage are generally a deep fertile loam on a strong till clay. In the north-east the soil is sandy. The crops are 20 days later in ripening than in the Lothians. The occupants of many of the small farms divide their time between farming and fishing. There are herring, ling, cod, salmon, and lobster fisheries.

The herring-fishery in July and August employs about 1500 boats, a part of which come from other parts of the Scotch coasts. Wick is the chief seat of the British herring-fishery. The average number of barrels cured annually in the ports of C. may be stated at 200,000. The other exports are cattle, oats, wool, and flagstones, of which, as well as of freestone and slate, C. contains quarries. Wick is the only parliamentary borough in C.; another town is Thurso, an old burgh of barony. Of the total acreage, which is 455,708 acres, some 35,000 are in corn, 17,000 in green crops, and 32,000 in grass. Pop. (1881) 38,865. The county returns one member to parliament, and Wick unites with Kirkwall, Dornoch, Dingwall, Tain, and Cromarty, in returning another. A railway, completed in 1874, and extending to Wick and Thurso, connects C. with the south. In early times, C. is supposed to have been inhabited by Celts; these afterwards mixed with Danes and Norwegians. C. in the middle ages, was subject to the kings of Norway. David II. adopted the weights and measures of C. for all Scotland. The Scandinavian origin or mixture of the people of C. is shown by their tall forms and soft fair features, and their speaking English instead of Gaelic. C. has remains of Picts' houses, round towers, &c.

CAITHNESS FLAGSTONES are dark-colored bituminous schists, slightly micaceous and calcareous, valuable on account of their great toughness and durability for pavements, cisterns, and various other purposes, and accordingly are largely exported. They belong to the Old Red Sandstone, and contain abundant remains of fossil fishes.

CAIUS, DR. JOHN, the person from whom Caius College, Cambridge, takes its name, was born at Norwich in 1510. His real name was Kaye or Key, which he Latinized into Caius. He was educated at Gonville Hall, university of Cambridge; and at the age of 20, turned into English Chrysostom's *Method of Praying to God*, which was followed by a translation of Erasmus *On True*

Theology. He next went abroad, and resided in Italy for several years, studying medicine. On his return to England, he practised with success at Cambridge, Shrewsbury, and Norwich. Henry VIII. appointed him anatomical lecturer to the Company of Surgeons in London. In 1547, he was elected a fellow of the College of Physicians, of which he was subsequently made president. He also became physician to Edward VI., Queen Mary, and Queen Elizabeth. In 1557, he obtained permission to elevate Gonville Hall into a college, which took the name of Caius College, and of which he became master. This office he held till his death, in July 1573. His principal work is, *A Boke or Counseill against the Disease commonly called the Sweate or Sweatyng Sicknesse. · Anno Do.* 1552. C., however, wrote a great number of works on a variety of subjects, critical, antiquarian, and scientific.

CAIUS COLLEGE. See GONVILLE AND CAIUS COLLEGE.

CAIVA'NO, a town of southern Italy, in the province of Naples, and 8 miles north of the city of that name. It was a place of considerable strength in the middle ages, and still retains many remains of its walls and towers, though they have suffered severely in the various revolutions of Naples. Pop. 10,000.

CA'JEPUT (*Melaleuca Cajeputi* or *M. minor*), a tree of the natural order *Myrtaceæ*, sub-order, *Leptospermeæ*, from the leaves of which the pungent, aromatic, volatile oil, called *Oil of Cajeput*, is obtained by distillation. The C. tree is common on the mountains of the Moluccas. It is rather a small tree, with a crooked trunk, thick spongy bark, white wood (whence the name C., properly *kayuputi*, signifying white wood), elliptical-lanceolate alternate leaves, and terminal spikes of white flowers. The greater number of the species are natives of Australia, some of them are very beautiful shrubs and frequent ornaments of British hot-houses. Much of the oil of C. of commerce is prepared in the island of Banda. It is said that two sackfuls of leaves yield scarcely three drachms of the oil, which is green, transparent, limpid, with a strong penetrating odor, and agreeable only when much diffused.

CA'LABA TREE. See CALOPHYLLUM.

CALABA'R, the name of a coast district of Upper Guinea, Africa, the limits of which are not clearly defined; but it is usually understood to extend between the river Benin and New Calabar, called by the Portuguese, Rio del Rey, and as far north as the Kong Mountains. The surface is low and flat, and the climate unhealthy. Yams, which are the principal food of the inhabitants, are raised in plenty, and also the sugar-cane, and palms, from which palm-oil is obtained in large quantities. The inhabitants are polygamists, and make human sacrifices to good and evil spirits. The United Presbyterians have had a mission here since 1846, which is beginning to produce beneficial changes.

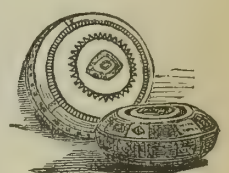
CALABAR (OLD), a river of this district, enters the Bight of Biafra, about 52 miles west-north-west of Fernando Po, by an estuary about 9 miles in breadth. It is navigable by steamers for about 200 miles above its mouth, and abounds in crocodiles. The chief towns on its banks are—Duke Town, situated on its estuary; Creek Town, further up, both seats of British missions; Acoono Coono, and Omun.—CALABAR (NEW), a branch of the Niger falling into the Bight of Biafra, in lat. 4° 30′ N., and long. 7° 7′ E. It has a bar across its mouth, which prevents the entrance of vessels drawing more than 12 feet; but some miles up it has an average depth of 30 feet.

CALABAR BEAN, a very remarkable medicinal agent, which has been introduced into the new edition of the British Pharmacopœia (1867). It is the seed of *Physostigma venenosum*, a twining, half-shrubby plant, a native of Western Africa, of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, nearly allied to the kidney bean, but of a genus distinguished by the hood-shaped stigma, and the deeply-furrowed hilum of the seed. The following are the leading characters of the bean itself: 'About the size of a very large horse-bean, with a very firm, hard, brittle, shining integument, of a brownish-red, pale chocolate, or ash-gray color. Irregularly kidney-shaped, with two flat sides, and a furrow running longitudinally along its convex margin, ending in an aperture near one end of the seed. Within the shell is a kernel, consisting of two cotyledons, weighing on an average about 46 grains, hard, white, and pulverizable, of a taste like that of the ordinary edible leguminous seeds, without bitterness, acrimony, or aromatic flavor. It yields its virtues to alcohol, and imperfectly to water.' It is used in the form of an emulsion by the natives of Africa, as an ordeal when persons are suspected of witchcraft. About twenty years ago, Dr. Christison very nearly fell a victim to his zeal for science in experimenting on some specimens of this bean which had been sent to Edinburgh by some African missionaries, dangerous symptoms having been produced by 12 grains of the kernel which he swallowed. In 1861, Dr. Thomas R. Fraser tried the effects upon himself of doses of 6, 8, and 10 grains. The general symptoms were epigastric uneasiness, great feebleness, dimness of vision, salivation, giddiness, and irregular, feeble, and slow heart's action. About the same time, he made the interesting discovery, that when placed on the eyeball this substance contracts the pupil, and produces near-sightedness; and it is now frequently employed for these purposes by ophthalmic surgeons. In 1864, 50 children were poisoned by eating these beans, which were swept out of a ship at Liverpool. A boy aged six years, who ate six beans, died very rapidly. The chief symptoms in these cases were griping, vomiting, and contracted pupils; the face was pale, the eyes bright and protruding, and in trying to walk, the children staggered as if they were drunk. Dr. Fraser, in a paper which he communicated to the Royal Society of Edinburgh in 1866, maintains that, in mammals, death is generally produced by a combination of syncope (faintness) with asphyxia (suffocation); the symptoms of the one or the other depending on the dose, which, when large, at once destroys the heart's action.

It has been used medicinally in small doses (one to ten grains of the powder, or $\frac{1}{16}$ to $\frac{1}{8}$d of a grain of the extract) in chorea, tetanus, general paralysis of the insane, and other diseases of the nervous system. Being now a recognized medicinal agent, it is satisfactory to know that the dangerous and even fatal effects of excessive doses may be prevented by administering belladonna (night-shade), or its active principle, atropia, as a counter-poison. This fact has been established by Dr. Fraser in a communication to the Royal Society of Edinburgh, embracing the results of 500 experiments on dogs and rabbits. So unmistakable is the power of the antidote, that it can prevent even three times a fatal dose of the kernel from causing death in those animals. Belladonna has also an opposite action on the eye to that of this substance, as it dilates the pupils and produces long-sightedness. When the pupil is contracted by Calabar bean, it may be dilated to its normal, or to a greater, size by belladonna; and when it is dilated by belladonna, it may be reduced to its normal, or to a less, size by Calabar bean.

CALABASH TREE (*Crescentia Cujete*), a tree found in the West Indies and in the tropical parts of America, of the natural order *Bignoniaceæ* (q. v.), suborder *Crescentiaceæ*. In height and size it resembles an apple-tree, and has wedge-shaped leaves, large whitish fleshy flowers scattered over the trunk and older branches, and a gourd-like fruit, sometimes a foot in diameter. The wood of the tree is tough and flexible, and is well adapted for coach-making. But the most useful part is the hard shell of the fruit, which, under the name of *calabash*, is much used in place of bottles for holding liquids, and for goblets, cups, water-cans, &c. These shells may even be used as kettles for boiling liquids, and they will bear this several times without being destroyed. They are sometimes highly polished, carved with figures, tinged with various colors, and converted into ornamental vessels. The rinds of gourds are sometimes similarly used, and called calabashes.

Calabash Tree.



Carved Calabashes.

CALA'BRIA, the south-west peninsula of the kingdom of Italy, bounded north by the province of Basilicata. Its greatest length, from the southern border of Basilicata to Cape Spartivento, is about 160 miles. In its northern part it has a breadth in some places of more than 60 miles, which suddenly contracts, between the Gulfs of Sant' Eufemia and Squillace, to not more than 16. Its entire area is nearly 7000 square miles, and its population, in 1881, amounted to 1,258,225. It is traversed throughout its entire length by the Apennine Mountains (q. v.), whose summits in the region in the north of C., known as La Sila, and the Aspromonte, in the south, are crowned with pines, while forests of oak and beech cover their sides. The valleys between the various hills

afford rich pasture, especially in the north, to which, in spring-time, whole colonies migrate with their flocks and herds. There is no river of any importance in C.; but the valleys and plains, watered by such streams as there are, are very fertile, yielding wheat, rice, cotton, liquorice, saffron, the sugar-cane, &c., and also the vine, orange, lemon, olive, fig, and mulberry, in luxuriance. Iron, alabaster, marble, gypsum, and antimony, are among its minerals. The fisheries of its coasts, particularly the tunny and anchovy fisheries, are important, and afford employment to a large number of the population. Manufactures are in a backward state. Silk is the staple article. The district is very subject to earthquakes. For purposes of administration, C. is divided into the provinces of Cosenza, which has a population of 451,271—capital, Cosenza; Catanzaro, with a population of 434,217—capital, Catanzaro; and Reggio, with a population of 372,737—capital, Reggio.

In ancient times, the name C. was given to the south-east peninsula, nearly corresponding to the modern province of Lecce, no portion of which is included in modern C., which answers to the ancient *Bruttium*. The name C., as applied to the district now known by that name, appears to have originated with the Byzantines sometime prior to the conquest of the country by the Normans. A colony of the Vaudois or Waldenses of Piedmont was founded in C. in 1340, and for some time enjoyed great prosperity, but was extirpated in 1560—1561. The destruction of this colony is one of the blackest passages of the history of religion in Italy.

The Calabrians are a proud, fiery, and revengeful race. They were long celebrated as among the fiercest of banditti; but the crimes which in former times made them infamous are no longer frequent. They strenuously resisted the power of France during the Napoleonic campaigns, and were not finally subdued until 1810.

CALA'DIUM. See Cocco.

CALAHO'RRA, a town of Spain in the province of Logroño, 24 miles south-east of the city of that name, is situated on the small river Cidacos, about 2 miles from its confluence with the Ebro. C. occupies the site of the ancient *Calagurris*, celebrated in classic history for the obstinate but unsuccessful resistance it offered (78 B.C.) to Afranius, Pompey's legate, when the citizens slaughtered their wives and children for food rather than surrender. C. was the birthplace of Quintilian the rhetorician. It has an old cathedral, and a trade in the agricultural produce of the rich district in which it is situated. Pop. about 8000.

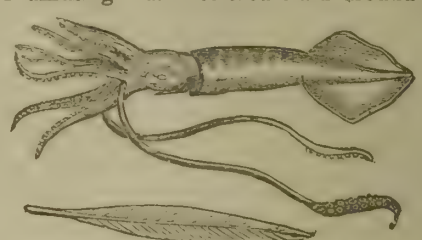
CALAIS, a seaport town of France, in the department of Pas-de-Calais, on the Strait of Dover, near its narrowest part, the distance from the town of Dover not being more than 26 miles. There is here a lighthouse 190 feet high. In 1879 it was determined to encircle C. with vast new fortifications, and make it once more a fortress of the first class. On the south and east, low marshy grounds, which those in the city have the means of submerging, stretch up almost to the walls. The town, adjacent country, and port are commanded by the citadel, which is situated at the west end of the town, while numerous forts, by their cross-fire, defend the weakest points. The harbor, which is nearly dry at low tide, and which has rarely more than from 15 to 18 feet of water in it, is formed by two moles, which project about three-quarters of a mile into the sea. Being one of the chief ports of debarkation for travelers from England to France, it has daily steam communication with Dover—with which it is also connected by submarine telegraph—and with London and Ramsgate several times a week. The city, which is entered from the sea by a drawbridge and gate, erected in 1685 by Cardinal Richelieu, is square in form; its streets are, for the most part, broad and well paved; and its ramparts form pleasant promenades. But it is on the whole a dull place. It has few objects of interest, the most noticeable being the cathedral, with a fine picture of the 'Assumption' by Vandyck.

It has become a manufacturing town of some importance. The chief manufactures are bobbin-net (tulle) and hosiery. Numerous mills have been built; steam-engines are multiplying; and the inner ramparts have been removed to make room for factories. Hats and gloves are extensively made. It has also distilleries, salt-refineries, and ship-building. C. sends many boats to fish for herring and cod on the coasts of Scotland and Iceland. Water, which used to be scarce, is now brought in abundance from the neighborhood of Guines. Its exports consist of eggs, corn, wine, brandy, &c. In 1873, a school of artillery was established in C. Pop. (1876) 12,573.

In the 9th c., C. was but a small fishing-village. In the following c., it was much improved by Baldwin IV., Count of Flanders, and enlarged and strengthened by Philippe of France, Count of Boulogne. After a long siege, it was captured by Edward III. of England, whose hard terms, and the self-devotion shown by six of the citizens, who were saved by Queen Philippa, form one of the most interesting pages of history. The English retained it until 1518, when it was captured by the Duke of Guise, since which time (with the exception of two years, 1596—1598, when it was in the possession of the Spaniards) it has remained in their hands. In 1659, Charles II. of England resided some time here; and about a quarter of a century later, James II. arrived here with French troops for the invasion of England, which the destruction of the French fleet prevented him from accomplishing. Louis XVIII. landed here in 1814, after his exile.

CALAMANDER WOOD, a cabinet-wood of the greatest value, resembling rose-wood, but much surpassing it in beauty and durability. The tree which produces it is *Diospyros hirsuta* (see DIOSPYROS), a species of the same genus which produces ebony; it has oblong obtuse leaves, which are downy beneath, and flowers without stalks and crowded; and is a native of the south-east of India, and of Ceylon, particularly of the forests at the base of Adam's Peak. But this tree 'has been so prodigally felled, first by the Dutch and afterwards by the English, without any precautions for planting or production, that it has at last become exceedingly rare,' so that wood of considerable size is scarcely to be procured at any price. It yields veneers of unusual beauty, 'dark-wavings and blotches, almost black, being gracefully disposed over a delicate fawn-colored ground.' Its density is very great, a cubic foot weighing nearly 60 lbs., and it takes an exquisite polish. The name C. W. is supposed to be a corruption of Coromandel wood.

CA'LAMARY, SQUID, or SLEEVE-FISH (*Loligo*), a genus of cephalopodous mollusks of the order *Dibranchiata*, and family *Teuthidæ*. The body is of an elongated form, firm, fleshy, tapering, and flanked towards its posterior extremity by two triangular fins. The body contains a *gladius*, or internal shell, which is horny and flexible, narrow and pen-shaped, with the shaft produced in front. The mouth is furnished with eight arms. Calamaries have the power of diffusing a dark-colored fluid around them in the



Common Calamary (*Loligo Vulgaris*), *a*, gladius.

water like the cuttle-fish. The different species are distributed over all parts of the world. Several are found in the British seas. In some seas, however, they abound much more, and form a principal part of the food of some of the larger fishes and of whales. The Common C. or Squid (*L. vulgaris*) is of a bluish color, speckled with purple. It grows to nearly a foot and a half in length, without reckoning the head and arms, which add to the length about half a foot more. See CEPHALOPODA.

CALAMIA'NÉS, a group of islands in the Eastern Archipelago, in lat. about 11° 25′—12° 20′ N., and long. 120° E. Calamianes, the name of the largest of the group, is about 35 m. long, and 15 m. broad, elevated and fertile, with abundance of animals, such as deer and hogs. The group, with the northern part of Palawan, forms the Spanish province of C., the poorest in the Philippines.

CA'LAMINE, an ore consisting essentially of carbonate of zinc. The name is said to be derived from the Greek and Latin *calamus*, a reed, because when fused it adheres to the base of the furnace in a reed-like form. Its primary form is a rhomboid, and it occurs in small obtuse-edged crystals, also compact and massive. It is white, yellowish-white, brown, green, or gray; is sometimes opaque, sometimes translucent; is brittle, and has an uneven conchoidal fracture. It occurs in beds and veins in rocks of various kinds, but most commonly in limestone. Mendip, Madlock, Alston Moor, Leadhills, and Wanlockhead are British localities. C. is an important ore of zinc. In the duchy of Limburg, in the Netherlands, about 1,500,000 lbs. of it are annually extracted from the mines.

CA'LAMINT (*Calamintha*), a genus of plants of the natural order *Labiatæ*, nearly allied to BALM (q. v.) (*Melissa*). The Common C. (*C. officinalis* formerly *Mellisa Calamintha*) is not unfrequent in England. It has whorls of flowers (*verticillasters*), on forked many-flowered stalks, and serrated leaves, with an agreeable aromatic odor, not unlike that of some kinds of mint. It is used by the country people to make herb-tea, and as a pectoral medicine.—The LESSER C. (*C. Nepeta*), also an English species, is used in the same way.

CA'LAMITE, a genus of fossil plants whose true position has not been satisfactorily ascertained. They appear first in the De-

vonian rocks, and rise through the intermediate formations to the Oolitic series, where they are represented by a single species. They reach their culminating point in the Coal-measures, where 39 species have been determined. The tall straight stems rose from a swampy clay soil in profusion in the forests of sigillaria, and formed a striking and characteristic feature in the coal flora, though they supplied little material for the structure of coal. They are hollow-jointed cylinders, with longitudinal furrows, giving the fossil the appearance of *Equiseta;* from this resemblance, botanists have generally considered them as huge 'horsetails.' Hooker has been unable to detect any traces of structure, in carefully prepared specimens, or the presence of those siliceous stomata which characterize *Equiseta*, and which would have been preserved in the fossil state, and Fleming has shown that the furrows are markings on the interior cavity. While, therefore, it is certain, that they are not 'horsetails,' the absence of fructification makes every attempt to give them their position but guess-work. Hooker supposes them nearly allied to Ferns, or Club-mosses; Brongniart ranks them among Gymnospermous Dicotyledons. The upper part of the stem, and the foliage, if any, have not been noticed. The root termination was conical, the joints decreasing downwards in size and length. From the scars on the upper portion of each joint, there proceeded filaments, which were supposed to be leaves, but are really roots. These are shown in the species figured—a species common in the English coal-field.

Fragment of Calamite (*C. cannæformis*).

CA'LAMUS, the reed pen which the ancients used in writing, was made of the stem of a reed growing in marshy places, probably *Arundo Donax* (see REED), of which the best were obtained from Egypt. The stem was first softened, then dried, and cut and split with a knife (*scalprum librarium*), as quill pens are made. To this day, the Orientals generally write with a reed, which the Arabs also call *Kalâm*.

CALAMUS, a genus of palms. See RATTAN and DRAGON'S BLOOD.

CALAMUS, a name sometimes given to the Sweet Flag (*Acorus Calamus*). See ACORUS. See also next article.

CA'LAMUS AROMA'TICUS, the name given by the ancients to a plant to which they ascribed important medicinal virtues. It is by no means ascertained what the plant is: the most probable opinion appears to be that of Dr. Royle, who supposes it to be one of the sweet-scented grasses which yield the grass-oil (q. v.) of India, to which he has given the name of *Andropogon calamus aromaticus*. See LEMON-GRASS. The C. A. of the Greeks and Romans came from the East. The *Sweet Calamus* and *Sweet Cane* mentioned in Scripture (Exod. xxx. 23, and Jer. vi. 20) are probably the same with the calamus aromaticus.

CALAMY, EDMUND, an eminent English divine, was born in London, 1600; studied at Pembroke Hall, Cambridge, where he attached himself to the Calvinistic party; and afterwards became domestic chaplain to the Bishop of Ely. In 1626, he was appointed lecturer at Bury St. Edmunds, but resigned his office when the order to read the *Book of Sports* began to be enforced. In 1639, he was chosen minister of St. Mary's, Aldermanbury, London. He now entered warmly into the controversies of the time, and became noted as a leading man on the side of the Presbyterians. He had a principal share in the composition of *Smectymnus*, a work intended as a reply to Bishop Hall's *Divine Right of Episcopacy*, and one of the most able and popular polemics of the day. Like the mass of the Presbyterian clergy, he was monarchical and not republican in his political opinions. He disapproved, therefore, of the execution of Charles, and the protectorate of Cromwell, and did not hesitate to avow his attachment to the royal cause. He was one of the deputies appointed to meet Charles II. in Holland, and congratulate him on his restoration. His services were recognized by the offer of a bishopric, which he refused from conscientious scruples. The increasing tyranny and intolerance of the High Church party compelled him to give up even his royal chaplaincy. He died October 29, 1666.—Two of his sons were educated for a religious profession: the one, Dr. BENJAMIN C., became a High Churchman, and wrote *A Discourse against a Scrupulous Conscience;* the other, EDMUND C., was ejected for nonconformity, and had a son, also named Edmund, who acquired some reputation as the biographer of the ejected clergy.

CALA'NDO, in music, an Italian expression, meaning diminishing by degrees from forte to piano; it differs from decrescendo or diminuendo, as the tempo, at the same time, is slightly retarded, but not so much as in ritardando. The proper performance of the C. is purely a matter of good taste and feeling, depending on the performer.

CALA'NDRA. See CORN WEEVIL.

CALANDRO'NÉ, a wind-instrument, used by the Italian peasants, on which they play simple melodies, and also sometimes accompany their national songs. It has the holes of the common flute, but the intonation is produced as in the common pipe.

CALAS, JEAN, a Frenchman, remembered as the unhappy victim of fanaticism and the shocking mal-administration of justice, was born at Lacaparède, in Languedoc, March 19, 1698. He lived as a tradesman in Toulouse, where he had a very good reputation. One evening after supper (October 13, 1761), the eldest son of the C. family, Marc Antoine, a youth addicted to gambling, and subject to fits of deep melancholy, was found hanged in the warehouse. There was not a shadow of a reason for doubting that the unhappy young man had committed suicide; but popular rumor accused the father, or other members of the C. family, of murdering the eldest son, 'because he had contemplated conversion to Catholicism.' It was also asserted that a young man named Lavaysse, who was in the house on the fatal evening, had been despatched 'by the Protestants of Guyenne to perpetrate the murder.' The clergy exerted all their influence to confirm the populace in their delusion. At Toulouse, the White Penitents celebrated with great solemnity the funeral of the young man, and the Dominican monks erected a scaffold and placed upon it a skeleton, holding in one hand a wreath of palms, and in the other an abjuration of Protestantism. The family of C. was, in consequence of the popular excitement, brought to trial for the murder, and several deluded and (most probably) some bribed witnesses appeared against them. A Catholic servant-maid, and the young man Lavaysse, were also implicated in the accusation. C. in his defence, insisted on his uniform kindness to all his children; reminded the court that he had not only allowed another of his sons to become a Catholic, but had also paid an annual sum for his maintenance since his conversion. He also argued from his own infirmity that he could not have prevailed over a strong young man, and referred to the well-known melancholy moods of the deceased as likely to lead to suicide; and, lastly, he pointed out the improbability that the Catholic serving-maid would assist in such a murder. But all his arguments proved unavailing, and the parliament of Toulouse sentenced the wretched man—by a majority of 8 votes against 5—to torture and death on the wheel. With great firmness and protestations of his innocence to the last, the old man died on the wheel, March 9, 1762.

His property was confiscated. His youngest son was banished for life from France, but was captured by the monks, and compelled to abjure Protestantism. The daughters were sent to a convent. The young man Lavaysse was acquitted, and the widow of C. escaped into Switzerland, where she was so fortunate as to excite the benevolent interest of Voltaire, who brought the whole affair before the public, and, in his book *Sur la Tolérance*, proved that C. had fallen a victim to religious hatred and popular fanaticism. A revision of the trial followed, and, after full investigation, the parliament at Paris declared (March 9, 1765) C. and all his family innocent. Louis XV. gave to the bereaved family the sum of 30,000 livres; but, strange to say, neither the parliament of Toulouse nor the fanatical monks were ever brought to account for this horrible judicial murder!

CALASA'YA BARK. See CINCHONA.

CALASCIBE'ETA, or CALATAS-CIBETTA (Saracenic = Castle of Xibeth, or Scibet), a town of Sicily, near its center, 54 miles south-east of Palermo, in the province of Caltanisetta. The town is mean and dismal looking, and is built on a steep and isolated height, the summit of which is 2570 feet above the sea, and commands a magnificent view. It was founded in 1080. The only object worthy of notice is the tower of the principal church, which is of early architecture. Pop. 5600.

CALASIA'O, a town of the island of Luzon (Philippines, with a population of 18,000, who are engaged in the manufacture of straw-hats, cigar-cases, &c.

CALASPA'RRA, a town of Spain, in the province of Murcia, 40 miles north-west of the city of that name. The inhabitants, numbering 5275, are chiefly engaged in agricultural pursuits.

CALATABELLO'TA, a town of Sicily, in the province of Girgenti, and 27 miles north-west of the city of that name. In the immediate vicinity is the site of the ancient *Triocala*, the chief fortress of the insurgents in the second Servile war, 103—100 B.C. Pop. about 6000.

CALATAFI'MI, a town of Sicily, in the province of Trapani, situated 8 m. S.W. of Alcamo, in a very fertile district. It is ill-built, and has a ruinous old Saracenic castle, Kalat-al-Fimi, from which it derives its name. There is a remarkable Mosaic altar in the church of Santa Croce. Here, in 1860, Garibaldi's troops defeated the Neapolitan soldiers. Pop. 9500.

CALATAGIRO'NE, or CALTAGIRO'NE, a city of Sicily, in the province, and 34 m. S.W. of the city of Catania. It is well built, with wide streets, and has the fame of great wealth. It has manufactures of cotton fabrics and pottery. Pop. (1872) 25,978.

CALATANAZO'R, a town of Aragon, Spain, about 10 miles south-west of Soria. It is celebrated for a great victory over the Christians obtained by Al-Mansur in 1001. Pop. 1500.

CALATAYU'D, a city of Aragon, Spain, situated on the Jalon, near its junction with the Jiloca, about 48 miles south-west of Saragossa. It is built at the base of two rocky ridges, and out of the ruins of ancient *Bilbilis*, which lay about 2 miles to the east. The city is divided into a new and old portion, the former of which is composed of mean old buildings. The latter has some good streets and handsome squares. C. has a noble old castle, and among its other most noteworthy public edifices are the two collegiate churches and the Dominican convent. In the neighborhood are some curious stalactitical caves. It has manufactures of linen and hempen fabrics, woollens, paper, leather, &c., and a trade in agricultural produce. Pop. 11,537.

CALATRA'VA, an order of knighthood in Spain, instituted at Calatrava (q. v.). The statutes of the order, framed by the chapter-general of the Cistercian monks, were sanctioned by the Bishop of Toledo in 1164, and afterwards by the pope. At subsequent periods, many privileges were added. After the death of the king, their patron, some of the knights were no longer willing to obey the abbot, and they consequently separated themselves from the monks, and elected a grand-master, Don Garcias de Redon.

At a later period, they again united themselves to the Cistercians, after they had gained rich possessions from the Moors both in Spain and Portugal. When Castile had fallen into anarchy, and the other kingdoms were exhausting themselves by internal feuds, the war against the unbelievers was almost entirely carried on by the knights of Calatrava. Their almost uniform success, however, gave rise to rashness; the knights were defeated by Emir Jacob ben Yuseff, nearly all of them perished, and Calatrava was occupied by the Moors. After this disaster, the knights transferred their seat to the Castle of Salvatierra, by the name of which they passed for a long time afterwards. A truce of 12 years having been concluded, during which the order revived, the knights were able, at the battle of Las Navas de Tolosa, in 1212, again to turn the tide in favor of the Christians. They then returned to Calatrava. Notwithstanding their splendid achievements, the knights of C. never possessed the vast wealth of their brethren of St. James of Compostella (q. v.), a fact which is probably to be accounted for by their having ceded a part of their conquests to the orders of Alcantara and Aviz. But their grand-masters, who were chosen from the highest families in Spain, were very powerful, and exercised a vast influence on public affairs. They did not, however, escape the jealousy of the crown. Two of them were accused of treason, and died on the scaffold; and on the death of the 13th grand-master, in 1489, the administration of the order was transferred to the king by a bull of Pope Innocent VIII. By way of compensation for the loss of their independence, the knights were permitted to marry once, though they were still bound to make vows of poverty, obedience, and conjugal chastity; and latterly to profess belief in the immaculate conception. Their original costume consisted of a coat of white mail, with a white scapulary, a black cap, and a pilgrim's hood; but this dress the Anti-pope Benedict XIII., in 1397, granted them permission to exchange for a civil apparel. Their present costume is a white mantle, with a red cross cut out in the form of lilies upon the left breast; while the cross of the order has the same symbol on a silver ground. Two convents for nuns were attached to the order, and were at one time richly endowed. The nuns, attached to the Order of C. in 1519, wore the dress of Cistercian nuns, with the cross of the order on the left side of the capoch, fastened to the scapulary.

Red Cross of Knights of Calatrava.

CALATRAVA LA VIEGA, a ruined city of Spain, situated on the Guadiana, about 12 miles north-east of Ciudad Real. In the middle ages it was a strongly fortified place, but nothing now remains but a single tower. Its defence against the Moors, undertaken by Raymond, abbot of Fitero, and Diego Velasquez in 1158, after it had been abandoned by the Templars, is famous on account of its having originated the Order of the Knights of Calatrava, long one of the most honorable in Spain. The town was called C. la Viega, or Old Calatrava, in order to distinguish it from the convent of the knights of the Order of Calatrava, erected in the neighborhood in 1214, and which was called Calatrava la Nueva.

CALBU'RGA, a town of the Nizam's dominions in Hindustan, about 110 miles to the West of Hyderabed. It stands on a tributary of the Beemah, which is itself a tributary of the Kistna or Krishna. It has been successively the capital of Hindu and Mohammedan sovereignties.

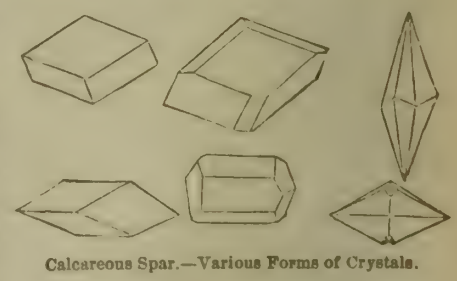
CALCAIRE GROSSIER (Fr. 'coarse limestone'), the French representative of the Bracklesham Eocene beds. It consists of compact limestones with seams of chert, and intercalated marls and freestones. The fossils are fresh water and marine mollusca; so abundant are they that in one spot near Grignon no less than 400 distinct species have been procured. Associated with the fresh-water remains are the bones of reptiles and mammalia.

CALCAIRE SILICEUX (Fr. 'siliceous limestone') is the French representative of the Bembridge Eocene strata. These compact siliceous limestones extend over a wide area in the Paris basin. The few fossils they contain are fresh water and land shells.

CALCA'REOUS, in Chemistry, is a term applied to substances containing much lime (Lat. *calx*). Thus, *C. waters* are those which hold in solution much carbonate and sulphate of lime, and which are generally known as hard waters, and form a deposit in kettles and other vessels when heated therein.—*C. rocks* are those in which lime forms the prevailing element. They may be chemically formed, as in the case of tufas, where a saturated solution of carbonate of lime in water is deposited from evaporation or other causes; but they are generally aqueous rocks, the materials of which are supplied by animal remains. Thus, many rocks, like the mountain-limestone, are composed of shells, corals, and encrinites; while others, like chalk, consist of foraminifera and fragments of other minute testacea. A crystalline structure, varying in degree from the partially crystallized carboniferous limestones to the saccharine statuary marble, is produced in calcareous rocks by metamorphic action.

Oolite is a variety of limestone composed of small egg-like grains resembling the roe of fish. The existence of lime in rocks can always be detected by the application of dilute nitric or muriatic acid, when it effervesces from the liberation of the carbonic acid. Pure lime is obtained from calcareous rocks by calcining them—i. e., by driving off the carbonic acid and other volatile matter by heat.—*C. soils* are produced from the disintegration of calcareous rocks. When the rocks are perfectly pure, they generally yield barren soils, as in many chalk and limestone districts of Britain; but when the lime is mixed with clay, so as to form marl, and has a little vegetable matter added, it forms an excellent though rather light soil. Calcareous soils are difficult of drainage, owing to the property that soft lime has of retaining water, although it easily yields it up by evaporation. Some soils are consequently soon dry at the surface after rain, but yet rarely suffer severely from drought.

CALCAREOUS SPAR, or CALC-SPAR, the name usually given by mineralogists to carbonate of lime, rhombohedral in its crystallization. It differs from arragonite only in crystallization. See ARRAGONITE. C. S. occurs in all geological formations, and is one of the most abundant of all minerals. It often completely fills cavities in rocks and although it has been prevented by want of space from assuming a crystalline form, is readily divided by the knife and hammer into rhomboids, the primary form of its crystals being a rhomboid, of which the greatest angles are 105° 5'. Its secondary forms are more numerous than those of any other mineral. More than seven hundred have been observed. One of the most common, a rather elongated pyramid, is sometimes called *Dog-tooth Spar*. C. S. is colorless and transparent, except in consequence of impurities which may be present in it; and when perfectly transparent, it exhibits in a high degree the property of double refraction of light, which was first discovered in it by Bartholinus. The presence of foreign substances frequently renders C. S. gray, blue, green, yellow, red, brown, or even black.



Calcareous Spar.—Various Forms of Crystals.

The name *Iceland Spar* has often been given to C. S., at least to the finest colorless and transparent variety, because it is found in Iceland, massive in trap-rock. *Slate Spar* is a lamellar variety, often with a shining, pearly lustre, and a greasy feel, of which Wicklow in Ireland, and Glen Tilt in Scotland are localities.

CALCAREOUS TUFA, CALC-TUFF, or TUFACEOUS LIMESTONE, a mineral which in its chemical composition is nearly identical with limestone and marble; but is distinguished by its spongy and cellular structure. It is generally rather soft, brittle, and friable, but sometimes it is sufficiently hard to be used as a building stone. The *travertino*, used for building at Rome, is a hard calcareous tufa. The color of C. T. is generally yellowish-gray, sometimes yellow or yellowish-brown. It occurs massive, or assumes many uncrystalline forms, as tubular, botryoidal (like clusters of grapes), cellular, &c. Sometimes it incrusts animal and vegetable remains. It is frequent in the neighborhood of calcareous springs. It is sometimes used as a filtering-stone.

CALCE'DONY. See CHALCEDONY.

CALCEOLA'RIA (Lat. *calceolus*, a little shoe), a genus of plants of the natural order *Scrophulariaceæ* (q. v.), of which there are numerous species, natives of South America, chiefly of that part of the Andes which is more than 9600 feet above the sea, a few of them reaching almost to the utmost limits of vegetation; although some are found in lower and warmer situations, and some in the southern extremity of the American continent. They abound so much in some parts of Chili and Peru, as to give a peculiar aspect to the landscape. The calyx in this genus is 4-partite; the corolla, 2-lipped; the lower lip remarkably inflated, so as to form a bag; and the shape of the whole in some species considerably resembling that of a slipper. There are only two fertile stamens, and the capsule is semi-bivalvular with bifid valves. Some of the species are shrubby, some herbaceous, almost all the herbaceous species being perennial. Many of them have corymbs of numerous showy flowers. Yellow is the color which chiefly prevails in the flowers of the original species, and next to it purple; but the art of the gardener has succeeded in producing varieties and hybrids which exhibit many other rich and delicate tints. Calceolarias have been florists' flowers since about 1830, the curious appearance of the flowers combining with their beauty to render them attractive, and in no genus is the production of hybrids more easily or frequently effected. They are easily propagated by cuttings. Few plants require more liberal supplies of water.

They are generally treated in Britain as half-hardy or as greenhouse plants.—Some of the species are used in South America for dyeing. The roots of *C. arachnoidea*, a parent of many of the hybrids in our gardens, are largely employed in Chili, under the name of *Relbum*, for dyeing woollen cloths crimson.

CALCINA'TION, or CALCI'NING (see CALX), is the process of heating or roasting in furnaces or in heaps the various metallic ores. It is resorted to as the first stage in the extraction of the majority of the common metals from their ores, and is essentially a process of oxidation.

CA'LCIUM is the metal present in chalk, stucco, and other compounds of lime. It may be obtained by passing a powerful currrent of voltaic electricity through fused chloride of C. (CaCl) when the metal separates in minute globules. It is a yellowish-white metal, can be rolled into sheets, and hammered into leaves, and is intermediate between lead and gold in hardness. It is represented by the symbol Ca, has the atomic weight or equivalent 20 (new system, 40), and has the density 1·578, or nearly half as heavy again as water. At ordinary temperatures, it slowly tarnishes by oxidation, and when placed in contact with water, it rapidly decomposes the water (HO), forming lime (CaO), whilst hydrogen escapes. To be retained bright, C. must be kept under the surface of naphtha. At a red heat, it melts and burns with a dazzling white light, accompanied by scintillations. See LIME.

CALCOTT, SIR AUGUSTUS WALL, R.A., a distinguished English landscape painter, was born at Kensington, London, in 1779. In 1803, he devoted himself to landscape painting; in 1810, was made a member of the Royal Academy; was knighted in 1837; and in 1844, made conservator of royal pictures. His landscapes are remarkable for their beauty, clear definition of objects, good drawing, and truthful natural coloring. He has been called the English Claude, a designation to which he is not altogether unentitled. He died November 1844.

CALCOTT, JOHN WALL, a distinguished musical composer, elder brother of the above, was born at Kensington, 1766. Too nervous to be a surgeon, for which he was intended, he devoted his attention to music, and in 1785 won three of the four gold medals annually given by the Catch Club, the admired *O Sovereign of the willing Soul* being one of the successful pieces. During the next ten years, he obtained twenty of the medals given by the same society. In 1785, he was made Bachelor, and five years afterwards, Doctor of music at Oxford. In 1805, he published his *Musical Grammar;* in the following year his mind gave way under the continuous strain to which it had been subject. He recovered again, but only for three years, when he relapsed, and continued insane until his death in May 1821. He was one of the most eminent composers belonging to the British school of music, and especially celebrated for his glee compositions. His choicest productions were published in two volumes by his son-in-law, Mr. Horsley, in 1824.

CA'LC-SINTER, a mineral, chemically identical with the purest marble and calcareous spar, but peculiarly characterized by its fibrous structure. It is formed from water holding carbonate of lime in solution, and occurs generally incrusting the roofs, walls, and floors of caves, particularly those in limestone rocks; often assuming curious and even fantastic forms. Macalister's Cave, in the Isle of Skye, and the limestone caves of Derbyshire, are the most celebrated British localities. But the stalactitic cave of Antiparos, in the Grecian Archipelago, is a far more famous locality for this mineral, which is often called *Calcareous Alabaster*, and used for the same purposes with the true alabaster (q. v.), to which it is in some respects preferable, particularly as not being liable to injury from exposure to the air. Volterra, in Tuscany, is another very famous locality for Calc-sinter.

CA'LCULATING MACHI'NE. The most remarkable application hitherto made of machinery, is perhaps that through which it has been used to relieve the scientific inquirer to a very great extent of the fatigue of manipulating figures, which consumes so much of his time and energies. Various machines have been constructed for this purpose, differing in the extent of their faculties —to use words more suitable to thinking beings than to engines— and somewhat in the principles of their construction. By the *Arithmometer*, for instance, a machine invented by M. Thomas of Colmar, all ordinary arithmetical operations are executed without fatigue to the operator; and by a machine contrived by M. M. Scheutz, which rests on the principle of *Differences* (q. v.), on the turning of a wheel, the successive terms of any series whose law may be confided to it, are produced—the machine at the same time *printing* a large proportion of its results, and thus providing for the accuracy of its tables. It is a fact of which the nation should be proud, that our countryman, Mr. Babbage, is universally acknowledged as the instigating and guiding genius in the progress of these remarkable inventions.

Among his inventions was a *Difference Engine*, of very comprehensive powers, indeed capable of managing series so complex that the differences of its terms do not reach zero until we ascend to the seventh order (*vide* art. DIFFERENCES, CALCULUS OF). An immense range of nautical and astronomical tables lie within the limits just defined; and the machine further tabulates approximately any series whatever that can be treated by the *Method of Differences*. While engaged in constructing the *Difference Machine*, Mr. Babbage, probably through his increased experience of the capabilities of machinery, was led to form a new conception —that, namely, of the *Analytical Machine*. He actually succeeded so far as to devise the means of making his machine perform all the elementary operations of addition, subtraction, multiplication, and division; and it is clear that all changes that can be produced on quantity are merely combinations of these. If, then, he could but have made his machine perform these operations at command, and according to any special order, it could have clearly developed any function whatever whose law is ascertained and fixed. A solution of this difficulty was suggested by the Jacquard Loom (q.v.), in which the *cards* oblige a machine capable of working *any* pattern to work out one particular pattern; and Mr. Babbage having succeeded so far as to form a machine capable of executing any development, expected, by means of *cards of operations*, to compel his C. M. to work according to one fixed law, and no other. Government, however, did not see its way to make the further grants required for this machine, and at Mr. Babbage's death in 1871, nothing further had been done towards its completion. The *Difference Machine* is now lying, an unfinished curiosity, in the museum of King's College, London. Both machines will be found described in the third volume of Taylor's *Scientific Memoirs*. The *Difference Engine*, constructed by Grant for the university of Pennsylvania, is said to be less expensive than Babbage's, and less complicated than Scheutz's, though provided like it with an apparatus for printing the results.

CA'LCULUS, or STONE (in Medicine), a hard concretion formed within the animal body, in consequence of the deposition in the solid form of matters which usually remain in solution. See CONCRETION. The concretions most commonly termed calculi are those formed in the kidneys or bladder (*Urinary C.*); and those formed in the gall-bladder or biliary ducts (*Biliary C.*). Both of these give rise to very painful symptoms, and may even threaten life.

Biliary C., or *Gall-stone*, may generally be presumed to exist when excessively severe pain suddenly arises in the right side beneath the border of the ribs, and when in a few hours jaundice comes on, showing that some obstruction has existed to the outward flow of the bile. But the absolute proof that these symptoms depend on C. is often wanting. The pain is fortunately transitory, but is more severe while it lasts than almost any other known form of suffering, unless it be that of a C. in the kidney and ureter. It may be relieved by large doses of opium, but the

remedy requires to be cautiously given, as even in medical hands fatal accidents have occurred. Gall-stones, when impacted in the ducts, sometimes have proved fatal; but much more frequently they find their way, sooner or later, into the intestines. They are almost invariably composed of cholesterine (q. v.), with coloring matter and mucus, arranged in layers in a semi-crystalline disposition.

Urinary C. is a disease of all ages, but most common in advanced life and in the male sex. It is also very frequent in gouty persons or among those who pursue sedentary occupations, and live freely. It is rare among those who live much in the open air, or who take much violent exercise, and use little animal food and wine. Among sailors it is peculiarly rare. In certain parts of the country, the disease is said to be frequent, as in Norfolk, and perhaps along the east coast of Scotland. In India, too, where some of the predisposing circumstances mentioned above can hardly be said to prevail, stone is by no means uncommon. It would appear therefore, that the predisposing causes of C. are still very imperfectly understood. In its early stages, the disease usually presents itself in the form of *Gravel*, shown by the passage of numerous very small portions of gritty concretions, which may be observed in the urine as a deposit like sand, or like small grains of Cayenne pepper. When such deposits occur frequently, especially if they are present at the time of passing the urine, and not merely after it has cooled, there is reason to apprehend the formation of calculus. If, in these circumstances, there are pains of a dull character in the loins, with occasional twinges of sharper suffering, no time should be lost in seeking medical advice. If a fit of very severe pain should occur in a person for some time affected with gravel, if the urine be bloody, if agonizing twinges, commencing in the loins, sting downwards into the thigh or the groin it is probable that a stone has already formed in the kidney, and is being displaced towards the bladder.

C. in the bladder is at first attended with little suffering, as compared with that caused by the stone in its passage downwards from the kidney; but unless removed or evacuated, the C. is sure to enlarge, and it then becomes the cause of one of the most painful diseases that afflict humanity. The existence of a stone in the bladder, however, should never be taken for granted without a surgical examination, as all the symptoms are deceptive in certain cases. The most striking, and perhaps the most trustworthy evidence of stone in the bladder, apart from the use of the sound (see LITHOTOMY), is smarting and burning pain experienced after the bladder has been emptied, together with occasional temporary stoppage in the flow of the urine. The correct appreciation of all the symptoms, however, demands considerable familiarity with such cases.

The discovery of the tendency to urinary C. at an early period of its growth, has been greatly aided by the use of the microscope and of chemical tests. Generally speaking, it may be said that whenever the urine, after standing for a few hours, can be observed to contain more sediment than a very slight cloudiness towards the bottom of the vessel, there is room for careful inquiry into the existence of some derangement of the health. But all sediments are not equally apt to determine C., nor is the treatment of the different kinds of sediment at all similar; care should therefore be taken to determine, from time to time, whether the character of the sediment may have undergone a change, so that the treatment may be adapted accordingly.

Alternating Calculus—from Dr. Marcet's Essay on Calculus.

a, uric acid nucleus; *b*, oxalate of lime; *c*, phosphates of lime, and of magnesia and ammonia.

The chief varieties of urinary C. are—1. Uric acid (red sand); 2. Urates of ammonia, soda, lime, &c. (brick-dust sediment); 3. Phosphates of ammonia and magnesia, lime, &c.; 4. Oxalate of lime; 5. Carbonate of lime (chiefly in domestic animals); 6. Cystine; 7. Xanthic oxide (a very rare form, discovered by Dr. Marcet). Calculi are frequently found to be composed of numerous successive layers, having a perfectly distinct chemical composition. Urates and phosphates in particular frequently succeed each other, and form what is called an alternating calculus.

When C. has once fairly formed in the urinary passages, it seems probable that no absolute cure exists except the removal of it, if possible, from the body (see LITHOTOMY and LITHOTRITY); but in the stage of gravel, and still more in the earlier stages detected by careful examination of the urine, much may be done to check the tendency to this distressing and dangerous malady. The chief remedies consists in careful regulation of the diet and mode of living, together with the use of solvents adapted to the particular form of deposit found to be habitually present. See URINE.

CA'LCULUS, THE INFINITESIMAL, otherwise sometimes called the Transcendental Analysis, is a branch of mathematical science which commands, by one general method, the most difficult problems in geometry and physics. The merit of the invention of this powerful mathematical instrument has been claimed for Leibnitz, but is undoubtedly due with equal justice to Newton, who laid the foundations for it in that celebrated section of his *Principia* in which he demonstrates the chief theorems regarding the ultimate values or limits of the ratios of variable quantities. The view of one class of writers is, that these distinguished men invented the C. simultaneously and independently; and it is the fact that Leibnitz's system is unfolded from premises differing somewhat from those of Newton. See FLUXIONS. Another class of writers hold that Newton is the real inventor, and that to Leibnitz no more can be conceded than that he was the first who, using the suggestions of Newton's genius, gave a systematic statement to the principle of the transcendental analysis, and invented its appropriate symbolic language. He had the doctrine of limits before him when he wrote, and did little more than unfold more fully the logic of the processes therein suggested, and exhibit them in algebraical forms.

The Infinitesimal C., both in its pure and applied forms, whether of geometry or mechanics, is a branch of the science of number; its symbols are of the same kind, are operated on according to the same laws, and lead to analogous results.

It differs from the other branches of the science of number, such as arithmetic and algebra, in regarding number as continuous—i. e., as being capable of gradual growth and of infinitesimal increase, whereas they deal with finite and discontinuous numbers. It differs from ordinary algebra in another respect. In the latter, the values of unknown quantities, and their relations with each other, are detected by aid of equations established between these quantities *directly;* in the C., on the other hand, the equations between the quantities are not directly established, but are obtained by means of other equations primarily established, not between them, but certain derivatives from them, or elements of them. This artifice is most fertile, for it can be shown that in the great majority of cases the relations of quantities concerned in any problem may more easily be inferred from equations between these their derivatives or elements than between themselves.

It will be seen that the C. created a new notion of number—as continuous or growing. It is now necessary, in order to a proper conception of it, that a precise idea should be formed of a *differential*. The simplest idea of a differential is unquestionably that got by considering number as made up of infinitesimal elements, and a differential or 'infinitesimal' as being the value of the difference between a number at one stage of its growth and at another *very* near it. Every finite number being—in the view of the C. as first conceived by Leibnitz—composed of an infinite number of these infinitesimal elements, certain axioms at once present themselves regarding infinitesimals; as, for instance, 'that a finite number of them has no value at all when added to a finite quantity.' Many other such axioms readily follow, from which, on this view, the whole theory of the infinitesimal C. may be constructed. But there are logical objections to this mode of forming the theory of the transcendental analysis, and of three views that have been propounded, that now universally accepted as the most logical, and as being capable of the easiest application, is that founded on the method of limits, already referred to as the invention of Newton. The meaning of a differential on this view will now be explained.

It is clear that the C. can be applied only where numbers may have the continuous character—i. e., where they are or may be conceived as being variable. If two unknown quantities are connected by a single equation only, we clearly have the condition satisfied, as where y and x are connected by the equation.

$$(1) \quad y = F(x),$$

where F is a sign denoting some *function* of x, as tan. x, cos. x, x^2, &c. This equality may be satisfied by innumerable values of y and x. One question which the C. solves is, how does y vary when x varies? To solve it, and, at the same time, show how the doctrine of limits affects the definition of a differential, suppose x, y, and $x + Dx$, $y + Dy$, to be two pairs of values of the variables which satisfy the above equation; then

$$(2) \quad y = F(x), \quad \text{and} \quad (3) \quad y + Dy = F(x + Dx).$$

From (2) and (3) we have, by subtraction,

$$(4) \quad Dy = F(x + Dx) - F(x);$$

whence we have the ratio

$$\frac{Dy}{Dx} = \frac{F(x + Dx) - (Fx)}{Dx}$$

This ratio will generally change in value as Dx and Dy diminish,

till, as they both vanish, which they must do simultaneously, it assumes the form $\frac{0}{0}$. Taking this form, it ceases to have a determinate actual value, and it is necessary to resort to the method of limits, to ascertain the value to which it was approaching, as Dx and Dy approached zero. Let, then, dx and dy be any quantities whose ratio is equal to the limiting ratio of the increments Dx, Dy, so that

$$\frac{dy}{dx} = \text{limit} \frac{Dx}{Dy}$$

as Dx and Dy approach zero. Then dx and dy are the differentials of x and y. It may be observed that where x and y are connected as above, they cannot vary independently of one another. In the case assumed, x has been taken as what is called the *independent* variable, the question being, how does y vary when x varies. If y were made the independent variable, it would be necessary to solve the equation $y = F(x)$, if possible, so as to express x in terms of y. The result would be an equation $x = \phi(y)$. This being obtained, we should find $\frac{dx}{dy} = \text{limit} \frac{Dx}{Dy}$ as before. It will be seen that on this view differentials are defined merely by their ratio to one another. Their actual magnitude is perfectly arbitrary. This, however, does not render an equation involving differentials indeterminate, since their relative magnitude is definite, and since, from the nature of the definition, a differential cannot appear on one side of an equation without another connected with it appearing on the other.

The idea of a differential being once comprehended, the reader will be able to understand in a general way, the main divisions of the C., which we shall now briefly delineate. So much is clear from what has been stated, that there must be two main divisions —one by which, the primary quantities being known, we may determine their differentials; and another by which, knowing the differentials, we may detect the primary quantities. These divisions constitute the Differential C. and Integral C. respectively.

1. The Differential Calculus.—Recurring to the formula already given we know

$$\frac{dy}{dx} = \text{limit} \frac{Dy}{Dx} = \text{limit} \frac{F(x + Dx) - F(x)}{Dx}.$$

It is clear that, in the general case, $\frac{F(x + Dx) - F(x)}{Dx}$ at the limit will still be some function of x. Calling it $F'(x)$, we have generally $\frac{dy}{dx} = F'(x)$. $F'(x)$ is called the first differential coefficient of y or $F(x)$. Being a function of x, it may be again differentiated. The result is written

$$\frac{d^2y}{dx^2} = F''(x),$$

$F''(x)$ being the second differential coefficient of y or $F(x)$; and again $F''(x)$ may be a function of x, and so capable of differentiation. Now, it is the object of the differential C. to show how to obtain the various differentials of those few simple functions of quantity which are recognized in analysis, whether they are presented singly or in any form of combination. Such functions are the sum, difference, product, and quotient of variables, and their powers and roots; exponentials, logarithms; and direct and inverse circular functions. The C. so far is complete as we can differentiate any of those functions or any combination of them—whether the functions be explicit or implicit; and with equal ease we may differentiate them a second or any number of times. This C. is capable of many interesting applications as to problems of maxima and minima, the tracing of curves, &c., which cannot here be particularly noticed.

2. The Integral Calculus deals with the inverse of the former problem.—The former was: Given $F'(x)$, to find $F''(x)$, $F'''(x)$ and so on. The present is in the simplest case—viz., that of an explicit function: Given $\frac{dy}{dx} = F'(x)$, to find $F(x)$. The methods of the Integral C., instead of being general, are little better than artifices suited to particular cases; no popular view can be given of these. In many cases, integration is quite impossible. The explanation of *integration by parts*, by *approximation*, *definite integrals*, and *singular solutions*, is far beyond the scope of the present work The reader is referred to any of the numerous text-books on the subject. The Integral C. has applications in almost every branch of mathematical and physical science. It is specially of use in determining the lengths of curved lines, the areas of curved surfaces, and the solid contents of regular solids of whatever form. The whole of the lunar and planetary theories may be described as an application of the integral C., especially of that branch of it which deals with the integration of differential equations. It is applied, too, in hydrostatics and hydrodynamics, and in the sciences of light, sound, and heat. In short, it is an instrument without which most of the leading triumphs in physical science could never have been achieved.

Calculus of Variations.—The foundation of this C. is a method of differentiation, but of quite a peculiar kind. As above explained, the object of the differential C. is to determine the form which a function, such as $F(x)$, will assume if x receive an indefinitely small increment, such as Dx. In the C. of variations, the object is to ascertain and lay down the laws of the changes supervening on a slight alteration of the *form of the function*, or should $F(x)$ become Fx. This C. commands with ease a class of problems called problems of isoperimeters, which were formerly insoluble. It has also power over mechanical problems, and many departments of high physics cannot be touched without its aid. Mr. Airy and Professor Jellet have both written works on the subject, which may be consulted.

Calculus of Finite Differences, Calculus of Functions.—For brief notices of these growths from the original Transcendental Analysis, see the articles under the headings Difference and Functions.

CALCU'TTA (*Kali Ghatta*, the ghaut or landing-place of the goddess Kali), the capital of the province of Bengal, and metropolis of British India, is situated on the left bank of the river Hooghly, an arm of the Ganges, in 22° 35′ N. lat., and 88° 27′ E. long., about 100 miles from the sea by the river. C. was founded by Governor Charnock in the year 1686, by the removal hither of the factories of the East India Company. In 1700, three villages surrounding the factories having been conferred upon the company by the emperor of Delhi, in recognition of a present made to Azim, a son of Aurungzebe, they were forthwith fortified, and received the name of Fort William, in honor of the reigning king; but the place was subsequently termed Calcutta, the name of one of the villages. In 1707, C. had acquired some importance as a town, and was made the seat of a presidency. In 1756, however, a great misfortune befell the rising town; it was unexpectedly attacked by Surajah Dowlah, the Nawaub of Bengal, and being abandoned by a number of those whose duty it was to defend the place, it was compelled to yield after undergoing a two days' siege. Only 146 men, however, fell into the enemy's hands, but these were treated with heartless cruelty. Cast at night into a confined cell, about 20 feet square—the notorious 'Black Hole' (q. v.)—they endured the most unheard-of sufferings, and in the morning it was found that only 23 out of 146 had survived the horrors of that night. The city remained in the hands of the enemy until eight months afterwards, when Clive arrived in the country from England. In conjunction with Admiral Watson, Clive succeeded in recapturing the town, and afterwards concluded a peace with the Nawaub. Soon after this, and subsequent to the important victory of Plassey, the possessions of the East India Company were greatly extended by means of grants made by the emperor of Delhi, and C. once more resumed its career of progress, and advanced rapidly in prosperity. In 1852, C. was erected into a municipality, the proprietors paying assessments, and electing commissioners to apply the proceeds of these assessments in cleansing, improving, and embellishing the town. In 1837, the population of the town proper amounted to 229,700; in 1872 it had increased to 447,601, or with Howrah and suburbs, 892,429, (1881, without Howrah, 683,458).

Besides these, thousands of the three and a half millions who sleep at night in the surrounding districts of Hooghly and the twenty-four Pergunnahs, flock during the day to C., on foot, by boat, or by railway, to their daily toil. The inhabitants are mostly Hindus; but there is also a good proportion of Mohammedans About 20,000 are Europeans; 20,000 Eurasians, or the progeny of white fathers with native mothers; and there is a considerable number of Armenians, Greeks, Jews, Parsees, and negroes. The city extends for about five miles along the river, and is somewhat less than two miles in breadth at its broadest part, the area being about eight square miles, and comprised for the most part between the river and the Circular Road, a spacious roadway which marks the landward boundary of the city proper. Beyond this road there lie extensive suburbs, the chief of which are Chitpore on the north, Nunden Baugh, Bahar-Simleah, Sealdah, Entally, and Ballygunge on the east, and Bhowaneepore, Allipore, and Kidderpore on the south. The villages of Sulkeah, Howra, and Seebpoor are situated on the opposite side of the river, and contain the saltgolahs or warehouses of the government, extensive manufactories, dockyards and ship-building establishments. The appearance of the city as it is approached by the river is very striking; on the left are the Botanical Gardens, destroyed by the cyclones of 1867 and 1870, but since replanted, and the Bishop's College, a handsome Gothic edifice, erected by the Society for the Propagation of the Gospel in Foreign Parts; on the right is the suburb of Garden Reach, with its handsome country seats and beautiful gardens; further on are the government dockyards and the arsenal; beyond these is the Maidan Esplanade, which has been termed the Hyde

Park of India, being the favorite place of resort of the *élite* of C. for their evening drive. Here, near the river, lies Fort William, the largest fortress in India, having been constructed at a cost of £2,000,000, and occupying, with the outworks, an area of about half a mile in diameter. It is garrisoned by European and native soldiers, mounts 619 guns, and its armory contains 80,000 stands of small-arms. Facing the Esplanade, among other fine buildings, is the Government House, a magnificent palace erected by the Marquis of Wellesley. Beyond this, extending northwards along the river bank, is the Strand, two miles in length, and 40 feet above low water, with various ghauts or landing-places.

It is adorned by many fine buildings, including the Custom-house, the new Mint, and other government offices, and the appearance given by these and other edifices has gained for C. the appellation of 'City of Palaces.' Among its other places of interest mention may be made of the Sudder Dewanee Adawlut, the principal court of justice; the town-hall, a fine building; the Bengal Club, Writers' Buildings, Bank of Bengal, Jesuits' College, Medical College, university, theater, besides various churches, mosques, Hindu temples, and pagodas and numerous bazars. There are a number of monuments throughout the city, the most noticeable being those erected to the Marquis of Wellesley and Sir David Ochterlony. Although the European quarter of the town is distinguished for its fine public buildings and commodious dwelling-houses, the quarters occupied by the natives present a very different appearance, their houses being in most instances built of mud or bamboo and mats, and the streets narrow and unpaved. Considerable improvements have, however, been effected of late; new and wider streets have been opened through crowded quarters; brick houses are fast replacing the huts, and an extensive system of drainage has been carried out, to the no small advantage of the inhabitants. The cyclone of November 1867 destroyed 30,000 native houses, and that of June 1870 was likewise very destructive.

The water supply of C. has recently been very much improved. Formerly, the water was kept in large tanks, interspersed throughout the city, whence it was borne by water-carriers or *bahisties* in large leather bags. But within the past five years, a supply of excellent water has been obtained from the Hooghly, about 15 miles above C., where it is filtered and sent down by pipes in the usual way. The result of this has been a marked improvement in the health of the city. Gas has now taken the place of the oil-lamps which were formerly in general use for lighting the streets at night. Tramways have been recently tried in some of the principal streets, but as yet with little success. A canal girds a part of the city beyond the Circular Road.

The communications of C. afford great facilities for its extensive commerce. There are several lines of railway to various parts of India; the East Indian to Benares, Delhi, and Multan, its present terminus, whence it is to be continued to Kurachee; the Eastern Bengal, the extension of which to Gulundu was opened in 1871; and the Calcutta and South-eastern to the mouth of the Ganges.

The great Indian Peninsula Railway branches off from the East Indian, and connects C. with Bombay and Madras. C. is also connected by electric telegraph with the principal towns of India, and can communicate with England by three different lines. Uninterrupted communication is kept up with Great Britain by numerous and well-appointed steamers and sailing-vessels. This intercourse has been greatly facilitated by the opening of the Suez Canal. Navigation on the Hooghly is dangerous, owing to the shifting sands; and though much has been attempted, little has been effected in the way of remedying the evil. The river, adjacent to the city, varies in breadth from a quarter of a mile to nearly a mile. Ships of 2000 tons can ascend to C.

The growth of scientific and literary societies, here and elsewhere in India among the native communities, indicates a degree of progress and intellectual activity very hopeful for the future of India. The principal of these in C. are the Bengal Asiatic Society, founded in 1784 by Sir W. Jones, possessing a fine library, and a valuable and extensive museum; the Bethune Society, for the promotion of intercourse between European and native gentlemen; the Dalhousie Institute, for the literary and social improvement of all classes of the community; the Bengal Social Science Association, and others. The university of C. was founded in 1857, on the same basis as the London University, and exercises functions over Bengal, the north-west Provinces, Oudh, and the Central Provinces. Colleges have been instituted to prepare intending students. In 1879-80, of 3512 candidates for admission to the university of C., 1291 passed the required examinations. Other educational institutions are numerous in C. The principal places for religious instruction are Bishop's College, intended chiefly for the education of missionaries and teachers, and the institutions of the Established and Free Churches of Scotland for the same purpose, all which are ably conducted.

C. may be regarded as the great commercial center of Asia. One-third of the whole trade of India is done here. In 1877, the exports amounted to £26,596,018, exclusive of treasure, and the imports to £16,693,813. The chief exports are jute, cotton, rice, sugar, indigo, coffee, tea, saltpetre, linseed, shellac, buffalo horns, hides, castor-oil, cutch, gunny, bags, &c. The jute exported in 1872 was valued at £4,000,000, the indigo at £2,500,000, and the tea at £1,400,000. In the same year 658 sailing-vessels and 301 steamers, with a total tonnage of 999,614, arrived in the Hooghly; and 637 sailing-vessels and 301 steamers, with a total tonnage of 957,523, sailed. The principal industries are sugar refining, cotton manufacturing, flour, saw, and oil mills, and ship-building docks. Several newspapers are published. There are a few banks and numerous insurance and other companies, with a Chamber of Commerce.

Living is comparatively cheap, and most of the luxuries of life, as well as its necessaries, are to be had in the unpretentious shops of C. as readily as in most European towns. The annual fall of rain averages 64 inches; the temperature in the shade ranges in July from 78° to 87°, and in December from 60° to 79°.

C. is the headquarters of the governor-general of India, and the seat of the government, the supreme courts of justice, and of the court of appeal for the province of Bengal.

CA'LDAS, or CALDE'TAS (Lat. *callidus*, hot), the Spanish for warm springs (*aquas*, waters, being understood), which are very abundant in the Peninsula, where a great number of places have received their names from the presence of these mineral waters; such as C. de Malavella, C. de Estrac, and C. de Mombuy, in Catalonia; C. de Reyes, C. de Cuntis, and C. de Tuy, in Galicia; C. de Taïpas, C. de Faveios, C. de Rainhas, and C. de Renduse, in Portugal. The name has also passed into the topography of the New World. There is a C. in Brazil, which is noted for its hot sulphur springs.

CA'LDER, a river in the West Riding of Yorkshire. It rises in a marsh on the borders of Lancashire, near Burnley, runs tortuously east in the deep valley of Todmorden, past Halifax, Dewsbury, and Wakefield. It then runs north-east, and after a total course of 40 miles, it joins the Aire near Pontefract, that river falling into the Ouse. The C. is important as forming a considerable portion of the canal route through Yorkshire and Lancashire, between the east and west coasts of England.

CA'LDERON (Don Pedro) DE LA BARCA HENAO Y RIANO, was born in Madrid, in the year 1601, and received his early education in the Jesuits' College at Madrid. Afterwards, at Salamanca, he studied chiefly history, philosophy, and law. His poetical genius was precocious. Before he was 14 years old, he had written a drama, *El Carro del Cielo* (The Celestial Chariot). In early life he gained, by his poetry, and also by his fertile invention of decorations, &c., for festive occasions, the patronage of several distinguished persons, and, on leaving Salamanca, 1619, was well received by the courtiers at Madrid. Love of military adventure induced him to enter the army, 1625; and, after serving with distinction in Milan and the Netherlands, he was recalled to the court of Philip IV., a prince fond of theatrical amusements, by whom he was employed to superintend various court-amusements, and especially to invent dramas for the Royal Theater.

In the following year C. was made knight of the order of San Jago, and took part in the campaign in Catalonia. Peace brought him back to poetry. The king gave him a pension, contrived to let him cultivate uninterruptedly his fertile dramatic genius, and spared no cost in securing for his plays a splendid initiation on the stage. In 1651, C. received from the head of the order of San Jago permission to enter the church, and, in 1653, was appointed to the chaplaincy of the arch-episcopal church of Toledo; but as this post removed him too far from the court, he was appointed chaplain in the Royal Chapel at Madrid, 1663, and received, with other favors, a pension charged on the revenue of Sicily. In the same year he was appointed a priest in the brotherhood of San Pedro, and, shortly before his death, was elected by his brethren as their *capilan mayor*. He died May 25, 1681, leaving his considerable property to the fraternity of San Pedro, by whom a splendid monument to his memory was raised in the church of San Salvador at Madrid. Fame and pecuniary prosperity had accompanied his career. The chief cities of Spain—such as Toledo, Seville, and Granada—had paid him, from time to time, large sums of money for writing their *Autos Sacramentales*, or *Corpus Christi* pieces. In these compositions, C. excelled all his predecessors, and esteemed them more highly than all his other works, though in many respects the latter display the author's genius quite as remarkably.

Spain numbers C. among its greatest poets, and criticism must allow that many of the defects in his works are to be ascribed to circumstances, and the times in which he lived, rather than to the native tendencies of his genius. He is characterized by brilliancy of fancy, elegance of versification, and a richness of detail, which from its very abundance often becomes tedious. His collected dramatic works—including many pieces of intrigue, heroic comedies, and historical plays, of which some deserve the title of tragedy—amount to 128. Among his romantic tragedies, the

Constant Prince (*El Principe Constante*) holds the first rank. Besides these, he wrote 95 *Autos Sacramentales;* 200 *Loas* (preludes); and 100 *Saynetes* (divertissements). His last play, *Hado y Divisa*, was written in his 80th year. His shorter poems have perished; but his dramas have held their place on the stage better than those of Lope de Vega himself. The most complete edition of his dramas appeared at Madrid (9 vols., 1683—1689); another was published by Apuntes (10 vols., Madrid, 1760—1763). Goethe and Schlegel have made him popular in Germany, but in Britain he is not well known, and in France not cared for.

CALDERON, Don Serafin Estebanez, a Spanish poet, was born at Malaga about the commencement of the century, studied law at the university of Granada, and in 1822 became professor of poetry and rhetoric there. A volume of poems which he published shortly after procured for him some distinction. Subsequently, he became an advocate in his native city, but still continued faithful to the muses. In 1830, he went to Madrid, where he published anonymously his *Poesias del Solitario* (1833). He also wrote several articles on Andalusian manners for the *Cartas Españolas*, the only literary journal at that period in Spain. In 1836 he was appointed civil governor of Logroño, but an accident obliged him to return to Madrid, where he devoted himself to collecting MSS. of the old national literature, to be the basis of a great critical edition of the *Cancioneros* and *Romanceros*. C. wrote likewise a fine novel, *Cristianos y Moriscos*. To the literature of the Spanish Moors he paid great attention. His *Escenas Andaluces* (1847) are a series of lively sketches of Andalusian life. At his death in Feb. 1867, he left behind him a work on the *Expediciones y Aventuras de los Españoles en Africa*. The Spanish government purchased his very valuable library.

CALDERWOOD, David, an eminent Scottish divine and ecclesiastical historian, descended of a good family, was born in 1575, and about 1604 was settled as Presbyterian minister of Crailing, Roxburghshire. Opposed to the designs of James VI. for the establishment of Episcopacy in Scotland, on that monarch's visit to his native country in 1617, he and other ministers signed a protest against a bill, then before the Scots parliament, for granting the power of framing new laws for the church to an ecclesiastical council appointed by the king, and in consequence he was summoned before the High Commission of St. Andrews. Refusing to submit, he was committed to prison for contumacy, and then banished the kingdom. He retired to Holland, and in 1623 published there his celebrated controversial work, entitled *Altare Damascenum*, &c., in which he rigorously examined the origin and authority of Episcopacy. In 1622, a pretended recantation of his protest was published at London by a venal writer, Patrick Scott. While on the continent, C. was known by the quaint appellation of Edwardus Didoclavius, being an anagram on his name Latinized. After King James's death in 1625, he returned to Scotland, and for some years was engaged collecting all the memorials relating to the ecclesiastical affairs of Scotland, from the beginning of the Reformation there to the death of James VI.

In 1638, he became minister of Pencaitland, near Edinburgh; and in 1643 was appointed one of the committee for drawing up the *Directory for Public Worship in Scotland*. He died at Jedburgh in 1651. From the original MS. of his *History of the Kirk of Scotland*, preserved in the British Museum, an edition was printed for the Wodrow Society, in 8 vols., 8vo. (Edin. 1842—1845), edited by the Rev. Thomas Thomson.

CALDIE'RO (ancient *Caldarium*), a decayed town of North Italy, about nine miles east of Verona. Its thermal springs were in repute as early as the 1st c. of the Christian era, and continued to enjoy popularity until the commencement of the 16th c., after which they gradually became neglected, and are now little visited. The Austrians repulsed the French here in 1796.

CALEDO'NIA, a kind of poetical name applied to Scotland; being a resumption of that given by the Romans to the country north of the Wall of Antoninus, which ran between the Firths of Forth and Clyde. Among the chief tribes of this region were the Caledonii, whence the whole country has been called Caledonia. Tacitus speaks of the Caledonians as having red hair, large limbs; being naked and barefooted; living in tents without cities; supporting themselves by pasturing cattle, by the chase, and by certain ferries; addicted to predatory warfare; and fighting in chariots with shields, short spears and daggers. They are supposed to have been of Gaelic or Celtic origin, and to have painted their bodies, whence the name Picti or Picts, by which, according to many writers, they were afterwards known. Agricola was the first Roman general to come in contact with the Caledonians. In 84 A.D. he defeated them, now united to repel a common enemy, under their chief Galgacus, at the Mons Grampius (or Graupius), the site of which has not been determined. The Romans overran the north-east of Scotland as far as the Moray Firth, and formed many encampments (of which remains still exist), but they never reduced the country to a Roman province. Roman coins and military relics have been found in connection with these camps. The name of Caledonii disappears about the beginning of the 4th c., when the inhabitants of Scotland begin to be spoken of as Scots (q. v.) and Picts (q. v.).

CALEDONIA, New. See New Caledonia.

CALEDONIAN CANAL, a chain of natural lakes united by artificial canals, running across the north of Scotland in a straight line from north-east to south-west, from the North Sea to the Atlantic, through Glenmore, or the Great Glen of Albin, in Inverness-shire, and touching Argyleshire at the south end. The sea and fresh water lochs in this line are Beauly, Ness, Oich, Lochy, Eil, and Linnhe. The canal was formed to avoid the dangerous and tedious navigation of ships, especially coasting vessels, round by the Pentland Firth, Cape Wrath, and the Hebrides; the distance between Kinnaird's Head and the Sound of Mull by this route being 500 miles, but by the canal only 250, with an average saving of 9½ days for sailing vessels. The C. C. begins in the Beauly Firth, near Inverness, whence a cut of 7 miles joins Loch Ness, which is 24 by 1½ mile. A cut of 6 miles joins Loch Ness and Loch Oich, which is 3½ by ½ mile. Another cut of 2 miles joins Loch Oich and Loch Lochy, which is 10 by 1 mile; and a fourth cut of 8 miles joins Loch Eil at the village of Corpach, 2 miles north of Fort William. This ship-communication is 60½ miles long, 37½ miles being through natural lochs or lakes, and 23 miles by artificial cuts. Each cut is 120 feet broad at surface, and 50 at bottom, and 17 deep. The highest part is Loch Oich, which is 94 feet above the sea. There are in all 28 lochs, each 170 to 180 feet long, and 40 wide, with a rise or lift of water of 8 feet. Eight of the lochs, called Neptune's Staircase, occur in succession near the west end of the canal. Some large mountain streams between Lochs Eil and Lochy are conducted in huge culverts under the canal and by a new cut, the Lochy water is turned into the Spean. The practicability of this great work was first shown by a survey under government in 1773 by the celebrated James Watt; but it was not till 1803 that it was begun under Mr. Telford. The whole line was opened for ships in 1823. After three years of repair, it was re-opened 1847. Ships of 500 to 600 tons, fully laden, can pass through the canal.

The canal and tonnage rates for sailing vessels are each a farthing per mile per ton, and a half of this for vessels under 125 tons. Steamers pay 2s. a ton. Of £1,368,203 expended on this canal, from 1803 to 1856, £1,242,387 were voted by parliament, and, £90,748 were from canal dues. Heavy gales and rains in December, 1848 and January, 1849, did much damage to the canal, which was repaired by a government grant of £10,000. For the year ending April, 1881, the total income of the canal was £7498, whereas the expenditure amounted to £7726—a state of accounts unusually favorable. There is a regular steam communication by the canal between Glasgow and Inverness. The scenery is wild and romantic on both sides of the canal, and has many other objects of interest to the tourist, such as Fort William, Ben Nevis, Inverlochy Castle, Tor Castle, the ancient seat of Cameron of Locheil, Glen Spean, Glen Roy, with its Parallel Roads, Fort Augustus, the Fall of Foyers, and Inverness.

CA'LEMBOURG, or CA'LEMBOUR, the French name for a pun (q. v).

CA'LENDAR (from Calends, q. v.), the mode of adjusting the months and other divisions of the civil year to the natural or solar year. The necessity of some division and measurement of time must have been early felt. The phases or changes of the moon supplied a natural and very obvious mode of dividing and reckoning time, and hence the division into months (q. v.—see also Week) of 29 or 30 days was, perhaps, the earliest and most universal. But it would soon be observed that, for many purposes, the changes of the seasons were more serviceable as marks of division; and thus arose the division into years (q. v.), determined by the motions of the sun. It was soon, however, discovered that the year, or larger division did not contain an exact number of the smaller divisions or months, and that an accommodation was necessary; and various not very dissimilar expedients were employed for correcting the error that arose. The ancient Egyptians had a year determined by the changes of the seasons, without reference to the changes of the moon, and containing 365 days, divided into twelve months of 30 days each, with five supplementary days at the end of the year. The Jewish year consisted, in the earliest periods, as it still does, of twelve lunar months, a thirteenth being from time to time introduced, to accommodate it to the sun and seasons; this was also the case with the ancient Syrians, Macedonians, &c. The Jewish months have alternately 29 and 30 days; and in a cycle of 19 years there are seven years having the intercalary month, some of these years having also one, and some two days more than others have, so that the length of the year varies from 353 to 385 days.

The Greeks, in the most ancient periods, reckoned according to real lunar months, twelve making a year; and about 594 B.C., Solon introduced in Athens the mode of reckoning alternately 30 and 29 days to the month, accommodating this civil year of 354

days to the solar year, by occasional introduction of an intercalary month. A change was afterwards made, by which three times in eight years a month of 30 days was intercalated, making the average length of the year 365¼ days. See METONIC CYCLE.

The Romans are said to have had originally a year of 10 months; but in the times of their kings, they adopted a lunar year of 355 days, divided into 12 months, with an occasional intercalary month. Through the ignorance of the priests, who had the charge of this matter, the utmost confusion gradually arose, which Julius Cæsar remedied, 46 B.C., by the introduction of the JULIAN CALENDAR, according to which the year has ordinarily 365 days, and every fourth year is a leap-year of 366 days—the length of the year being thus assumed as 365¼ days, while it is in reality 365 days, 5 hours, 48 minutes, and 50 seconds; or 11 minutes 10 seconds less. Cæsar gave to the months the number of days which they still have.

So comparatively perfect was the Julian style of reckoning time, that it prevailed generally among Christian nations, and remained undisturbed till the renewed accumulation of the remaining error of eleven minutes or so had amounted, in 1582 years after the birth of Christ, to ten complete days; the vernal equinox falling on the 11th instead of the 21st of March, as it did at the time of the Council of Nice, 325 years after the birth of Christ. This shifting of days had caused great disturbances, by unfixing the times of the celebration of Easter, and hence of all the other movable feasts. And accordingly, Pope Gregory XIII., after deep study and calculation, ordained that ten days should be deducted from the year 1582, by calling what, according to the old calendar, would have been reckoned the 5th of October, the 15th of October 1582; and in order that the displacement might not recur, it was further ordained that every hundredth year (1800, 1900, 2100, &c.) should not be counted a leap-year, excepting every fourth hundredth, beginning 2000. In this way the difference between the civil and the natural year will not amount to a day in 5000 years.

In Spain, Portugal, and part of Italy, the pope was exactly obeyed. In France, the change took place in the same year, by calling the 10th the 20th of December. In the Low Countries, the change was from the 15th December to the 25th; but it was resisted by the Protestant part of the community till the year 1700. The Catholic nations, in general, adopted the *style* ordained by their sovereign pontiff; but the Protestants were then too much inflamed against Catholicism in all its relations, to receive even a purely scientific improvement from such hands. The Lutherans of Germany, Switzerland, and, as already mentioned, of the Low Countries, at length gave way in 1700, when it had become necessary to omit *eleven* instead of ten days. Scotland adopted the new reckoning in 1600. In England, a bill to this effect was brought before the parliament in 1585, but did not get beyond a second reading in the House of Lords; and it was not till 1751, after great inconvenience had been experienced from the difference of the reckoning for nearly two centuries, that an act was passed (24 Geo. II., 1751) for equalizing the style in Great Britain and Ireland with that used in other countries of Europe. It was then enacted that eleven days should be omitted after the 2d of September 1752, so that the ensuing day should be the 14th. Russia, Greece, Roumania, and the minor countries belonging to the Greek confession, still adhere to the *old style*; an adherence which renders it necessary when a letter is thence addressed to a person in another country, that the date should be given thus:—April $\frac{1}{13}$ or $\frac{\text{Jun. } 27}{\text{July } 9}$; for it will be observed, the year 1800, not being considered by us as a leap-year, has, interjected another (or twelfth) day between old and new style.

The C. of the French Republic remains to be noticed, which was adopted in consequence of a decree of the National Convention in 1793. The midnight preceding the autumnal equinox of 1792 was fixed upon as the new epoch, from which the years were to be reckoned as the Year One, the Year Two, &c. The year was divided into 12 months, each of 30 days, to which new names were given, as *Vendémiaire* (vintage month), *Brumaire* (foggy month), &c.; and instead of weeks, each month was divided into periods of 10 days, called *Primidi, Duodi, Tridi*, &c. Five *complimentary* days were added at the end of each year, which were the *Fête du Génie, Fête du Travail*, &c. By Napoleon's command, this new system was abolished, and the use of the Gregorian C. resumed on January 1, 1806.

CALENDAR OF PRISONERS, in the practice of the criminal law in England, is the technical term given to the list of all prisoners' names in the custody of the sheriff of each county, prepared for the assizes. When the business is over, and the trials concluded, the clerk of assize makes out in writing four lists of all the prisoners, with separate columns, containing their crimes, verdicts, and sentences, leaving a blank column, in which, if the judge has reason to vary the course of the law, he writes opposite the names of the capital convicts—*to be reprieved, respited, transported*, &c. These four calendars, being first carefully compared together by the judge and the clerk of assize, are signed by them, and one is given to the sheriff, one to the jailer, and the judge and the clerk of the assize respectively keep another. If the sheriff receives afterwards no special order from the judge, he executes the judgment of the law in the usual manner, agreeably to the directions of his calendar. In every county, this important subject is settled with great deliberation by the judge and the clerk of assize, before the judge leaves the assize-town; but probably in different counties, with some slight variation, as in Lancashire, no calendar is left with the jailer, but one is sent to the home secretary.

CA'LENDERING is the term applied to the process of finishing by pressure the surface of linen, cotton, and other textile fabrics. It is usually done by passing the fabric between cylinders pressed together with great force; hence the origin of the term, which is a corruption of *cylindering*.

The familiar domestic processes of starching and ironing afford the simplest illustrations of the object and result of calendering. The domestic mangle effects the same object as the flat iron, and is a near approach in construction to the C. engines of the manufacturer, no traversing-box of stones being used in the new patent mangles.

The cylindrical C. machine is said to have been introduced into this country by the Huguenots, driven here by persecution. The cylinders were originally of wood, but the liability to warping is a strong objection to these.

The modern calender usually consists of four, five, or six cylinders or 'bowls' set vertically in a strong iron frame, with suitable driving gear, and furnished with weights suspended over a pulley to produce the required pressure. This sometimes amounts to, or even exceeds, 20 tons, including the weight of the rollers. In a five-roller machine, the arrangement is this: The center roller is of iron or copper, made hollow for the admission of steam or a red-hot heater, the one immediately above and that directly below it are of paper; and the remaining two, one at the top and the other at the bottom, are of cast-iron. At least one of the rollers is always of paper, as it has more elasticity than metal, and is not liable to warp, like wood. It consists of sheets of brown paper or pasteboard, densely packed and compressed on an iron axis. The edges of these form the surface of the roller, which is turned and polished, an operation of some difficulty.

Before the final rolling in the C. machine, the fabric is first lightly smoothed by passing over warm cylinders. Cotton goods are starched with a starch prepared from flour, and the starch is sometimes thickened with plaster of Paris, porcelain clay, or a mixture of these, to give a fictitious appearance of stoutness, which of course vanishes when the article is washed. For ordinary C. the fabric is then simply passed between plain cylinders, which produces the desired effect by flattening the otherwise round threads. When, by means of a hot cylinder, with a pattern raised upon it, the amount of this flattening is unequal on different parts of the cloth, the beautiful effect known as 'watering' is the result. *Glazing* is produced by combined rubbing and pressure; the rollers, one of which is heated, being made to move with different velocities, so that one side of the fabric is rubbed as well as pressed by the roller whose surface moves with the greater rapidity. Before the invention of these rubbing cylinders, glazing was effected by rubbing the surface of the fabric with a polished flint. Calendering is done on a very large scale in some manufacturing towns, such as Manchester and Glasgow. In Dundee, where half a century ago it was not the custom to calender the linen at all, there are now more than 1000 hands employed in this branch of industry. Machines similar in construction to the one above described, but with all the rollers of iron, and also called calenders, are used for rolling india-rubber into sheets for coats, shoes, &c.

CA'LENDS. The Romans made a threefold division of the month into *Calends, Nones*, and *Ides*. The C. always fell upon the 1st of the month; the Nones in March, May, July, and October, on the 7th; and the Ides on the 15th; and in the remaining months, the Nones on the 5th, and the Ides on the 13th. The C. were so named because it was an old custom of the College of Priests on the first of the month to *call* (or assemble) the people together to inform them of the festivals and sacred days to be observed during the month; the Nones received their name from being the *ninth* day before the Ides, reckoning inclusively; and the Ides from an obsolete verb, signifying to divide, because they nearly halved the month. This threefold division also determined the reckoning of the days, which were not distinguished by the ordinal numbers first, second, third, &c., but as follows: Those between the C. and the Nones were termed *the days before the Nones;* those between the Nones and the Ides, *the days before the Ides;* and the remainder, *the days before the C.* of the next month. Thus, the Ides of January, happening on the 13th of that month, the next day would not be termed by a Latin writer the 14th, but *the 19th before the C. of February*, reckoning inclusively, i. e.

reckoning both the 14th of January and the 1st of February, and so on to the last, which was termed *pridie Calendas*.

Ad Calendas Græcas, a Roman proverbial saying, practically equivalent to 'never.' The Roman C. were often appointed as days for payment of rent, interest, &c.; but as the Greeks had no C., a postponement of payment *ad Calendas Græcas*, simply meant a refusal to pay altogether. It is said that the Emperor Augustus frequently used the phrase, which afterwards became a proverb.

CA'LENTURE, a Spanish term (*calentura*) applied to a species of temporary delirium or fever occurring on board ship in hot climates, and probably due to the effect of exposure to the direct rays of the sun. The descriptions of the disease seem rather fanciful and contradictory, and the term is nearly obsolete. See *Dictionnaire des Sciences Médicales*.

CALHOUN, JOHN CALDWELL, an eminent American statesman, descended from an Irish family who founded the Calhouns' Settlement in South Carolina, was born at Abbeville, South Carolina, March 18, 1782. Having gained distinction at the bar, he was sent to congress in 1811, where he soon made himself the leader of the war-party against England. Author of the tariff of 1816, so favorable to his native state, he in 1817 was named minister of war by President Monroe, and reduced the confused state of affairs in his department to order, and made a great reduction in the expenditure of the army without sacrificing its efficiency.

This early part of C.'s career was marked by broad and patriotic views, to which his subsequent preference of southern interests presented an unfavorable contrast. The tariff of 1828 not being very favorable to the Southern States, C. still adhered to the government, hoping that the president, Jackson, would veto the measure; but as this hope was disappointed, C. went to South Carolina, and there (1829) carried in the legislature the notorious resolution, 'that any state in the Union might annul an act of the Federal government.' To this decision, Virginia, Georgia, and Alabama gave in their adhesion, and threatened a dissolution of the Union. President Jackson promptly used energetic measures to make this resolution of no effect. C. lost popularity, and despairing of reaching the presidency, resigned his vice-presidency; but soon afterwards was elected into the senate. In 1838, he delivered his famous speech on slavery, and continued to agitate on behalf of the slave-holding interest and for a dissolution of the Union, both with voice and pen, until his death, which took place at Washington, March 31, 1850. In his private character, C. was blameless; but in his career, as a statesman he is understood to have implanted in the minds of his partisans those principles which culminated in the late war for the dissolution of the Union. During many years, he had been employed in his work on *The Philosophy of Government*, in which he vindicates the doctrine of state sovereignty, and which, along with other works, was posthumously published.

CALIA'NO, a small town of the Austrian Tyrol, situated on the left bank of the Adige, about 9 miles south of Trent. It figures in history as the place where the Austrian archduke, Sigismund, won a signal victory over the Venetians in 1487. Being a place of considerable military importance, it was also contested in the campaigns of 1797 and 1809.

CA'LIBRE, or CA'LIBER, is a technical name for the diameter of the bore of a firearm, whether a piece of ordnance or a small-arm. The ordnance from which solid shot are projected are usually denoted by the weight of each shot, as 24-pounder, 68-pounder, &c.; but mortars, and such guns as project shell or hollow shot, are more usually denoted by the C., such as 13-inch mortar, 10-inch shell-gun, &c. The C. of the chief kinds of firearm will be noticed under the proper headings; but it may here be observed, generally, that the C. of English ordnance has been greatly increased within the last fifty years, partly by boring up old guns, and partly by casting new.

CA'LICO-PRINTING is that department of the art of dyeing which takes cognizance of the production of a colored pattern on cloth. It appears to have been first practised at *Calicut* in India —hence the term *calico;* and the *pallampoors*, or large cotton chintz counterpanes, which have been manufactured in the East Indies for centuries, are evidence of the successful practice of the art in that country. From the East Indies, the art spread to Asia Minor and the Levant, thence to Augsburg in Bavaria; from whence, at the beginning of the 18th c., it spread to Alsace in France, to Switzerland, and ultimately to England and Scotland. The term is strictly applicable to the production of colored patterns on cotton cloth or calico; but as now employed, it includes all the processes followed in the formation of a colored pattern on cotton, linen, worsted, and silk goods, as also mixtures of two or more of these, such as the fabric called *de laine*, which is composed of cotton and worsted.

The first operation connected with the printing of cloth is the removal of the surface-hairs or minute threads which communicate a fibrous down or nap to the surface of the cloth, and if allowed to remain, would interfere with the uniform application of the colors. The surface down is got rid of by the process of singeing, during which the cloth is drawn over a red-hot iron or copper bar or plate, or through a series of gas jets. The apparatus generally used for *hot-plate singeing* consists of a furnace surmounted by a metal plate, which is sometimes ridged on the surface. The cloth having previously been joined at the ends, to make a long length, and been placed on a winch-roller, is first brought in contact with roller brushes, which raise the nap on the cloth, then passes over the white-hot metal cylindrical bar, and is wound on to a second winch-roller.

The process is repeated twice on the face of the cloth, being the surface to be printed on, and once on the back. *Gas-singeing* is accomplished by drawing the cloth through brushes, and then over a horizontal pipe, perforated with rows of small holes, or slit from end to end, so that the gas issuing therefrom burns as a narrow sheet of flame. The cloth is not only allowed to come in contact with the burning gas, but the flame is transmitted through the cloth, and a suction-apparatus is often placed immediately above, so as to draw the flame through more effectually. When well singed, the cloth undergoes the process of bleaching (q. v), and is thereafter calendered. See CALENDERING.

There are several modes of applying the colors to cloth, and these are respectively named—1. The Madder style; 2. The Padding style; 3. Topical style; 4. Resist or Reserve style; 5. Discharge style; and 6. China blue or pottery style. These various processes are at one in being intended to fix upon the cloth the different colors; but they differ from each other more or less in the several steps through which the cloth is passed, though occasionally there is little or no line of separation; and at times the cloth is treated by one method, and subsequently by another style.

The *madder style* is that in which a certain fixing agent or mordant is printed on the cloth, which is then introduced into the coloring matter in a dye-vat, when the mordant, having an attraction alike for the fibre of the cloth and for the coloring matter, acts the part of glue or paste, and cements the color to the cloth. Originally, madder was the only coloring substance employed in this style; but nowadays, by far the greater number of dye-stuffs, vegetable and animal, including cochineal, logwood, &c., are attached to cloth in this manner. The fixing agents or mordants generally employed are different strengths of *red liquor* (acetate of alumina), *iron liquor* (acetate of iron), and mixtures of these. These are thickened with wheat-starch, potato-flour, roasted starch or dextrine, and gum-arabic, so that the mordant may not run when it is placed on the cloth by the pattern-block or by the printing-machine. After the mordant has been imprinted on the cloth, the latter is hung in a warm airy room, where it can easily dry, but where it is at the same time surrounded by a moist atmosphere.

The result is, that the mordant is decomposed, the acetic acid is evolved, and the alumina or iron is left attached to the fibre of the cloth in the state of an insoluble sub-salt, which cannot be dissolved by water. As some of the mordant is still left in its original soluble condition, it is necessary to wash the cloth free from this, else, during the dyeing operation, the soluble part of the mordant would run on to those parts of the cloth not intended to be colored, and thus produce a blotted appearance. To obviate this, the cloth, having undergone the process of *drying and ageing*, is then introduced into a vat containing water, through which is diffused some cow-dung, dung substitute—a preparation of bone ash, sulphuric acid, carbonate of soda, and glue—or bran. The result of this process of *dunging* is the removal of the soluble part of the mordant, as also the starch or thickening agent, leaving the decomposed or insoluble mordant adhering to the fibre. The terms *dung*-fixing, *substitute*-fixing, and *bran*-fixing, have reference to the employment of one or other of these agents at this stage of the operation. When the cloth has been well washed from the dunging, it is introduced into the vat or dye beck containing the coloring matter. The whole is heated by steam-pipes, and the cloth being placed on a sparred reel kept in motion, is repeatedly wound out of the vat, and returned thereto. The result is, that wherever the mordant adhered to the cloth, the coloring matter is attached thereto, and little or no trace of color adheres to the unmordanted parts. The last operation is the *clearing*, or *brightening*, during which the colored cloth is introduced into warm baths of water containing soda, soap, or, for the more delicate tints, bran, and is thereafter acted on by weak acid solutions. The object is to clear the colors, and at the same time to confer upon them the property of resisting the fading action of the air and sun for a much longer time. The different shades of color which can be obtained from the same madder beck or vat, with different mordants, are very numerous, and include reds, lilacs, purples, chocolates, and blacks. Thus, when a weak solution of red liquor (acetate of alumina) is employed as the mordant, a light red tint is procured; with a stronger aluminous mordant, a deep red is formed on the cloth; with a more or less dilute solution of iron liquor (acetate of iron), the cloth is colored lilac, violet, or purple; with a strong solution of iron liquor, black is obtained. Indeed, the same piece of cloth stamped in different places with the various

strengths of aluminous and iron mordants, and mixtures of these, and immersed in the madder-bath, will be obtained dyed with all the shades mentioned; and in this manner, many of the beautiful variegated colored dresses and handkerchiefs are prepared for market.

The *padding style* in C. is intended mainly for the impregnation of cloth, in whole or in part, with mineral coloring substances. When the cloth is to be entirely colored, it is immersed wholly in a vat containing the mordant. When the color is to appear as a pattern on the fabric, the mordant is applied by a pattern block, or by the printing-machine. In either case, the cloth is thereafter thoroughly dried, and washed in various solutions, and then introduced into a vat containing the substance to form the color. Thus, if a piece of cloth is to be entirely impregnated with *chrome yellow*, it is first treated or *padded* in a solution of 8 parts of bichromate of potash ($KO2CrO_3$) to a gallon of water dried, and then placed in a vat containing a solution of 6 or 8 ounces of acetate or nitrate of lead (PbOA, or $PbONO_5$) to the gallon of water. The result is that the chromate of lead ($PbOCrO_3$) is formed in the tissue of the cloth; and when the latter is washed and dried, the yellow color still adheres to the cloth firm and fast. To print a yellow pattern on cloth, 7 to 9 ounces of acetate of lead, and the same quantity of nitrate of lead, are dissolved in a gallon of water, thickened with starch, and placed upon the cloth according to pattern. After drying, the cloth is first immersed in water containing a little carbonate of soda, and ultimately in a solution of bichromate of potash, when the pattern becomes fixed in bright yellow, insoluble in water. To produce *Prussian blue* on cloth, it is treated with acetate and sulphate of iron, dried, washed with warm chalk-water, and immersed in a very weak solution of yellow prussiate of potash. A pattern in Prussian blue is produced by printing a pattern in the cloth with the iron solutions thickened with gum, and thereafter proceeding as above. Chrome green is produced in a similar way, by using sulphate and acetate of copper, thickened with glue, and thereafter arsenious acid with potash; and also other colors, such as iron buff or chamois, manganese bronze, &c.

The *topical style* in C. is the process whereby certain coloring matters which are insoluble in water, and cannot therefore be applied to cloth by the modes suggested under the madder and padding styles, are treated at once with the mordant, and the mixture by one operation transferred by block, or otherwise, directly on the surface or *top* of the cloth, and hence the term *topical*. Indigo, safflower, and arnotto are instances of such insoluble coloring substances; and when these and other dye-stuffs, such as logwood and Brazil wood, are treated with water, thickened with starch and nitro-muriate of tin (known as *spirits*) added, with occasionally a little of other salts, such as nitrate of copper, the result is the formation of *spirit-colors*, which can be printed on the surface of cloth, and possess a certain degree of fixity.

The permanency of these *spirit-colors*, however, is very much increased, and the general appearance improved, by afterwards subjecting the goods to the action of steam in a wooden chest or box, when the term *steam-colors* is applied.

The *resist style* in C. is that in which certain materials are placed on the surface of cloth, to protect it from the adherence of the mordants, and consequently, to keep that part of the cloth from being attacked by the coloring matter. These materials are termed resists, reserves, or resist-pastes, and they are divisible into mechanical and chemical. The *mechanical resists* are such substances as fats, resins, oils, wax, and pipe-clay. A common resist for silk and woollen goods is a mixture of 2¼ of resin and 1 of suet; and it is principally in the color-printing of silk and woollen dresses and handkerchiefs that mechanical resists are employed, though they are occasionally used for the printing of cottons. The chemical resists may act on the mordant or on the color. Thus, if it be desirable to remove the mordant, and thus leave certain parts of the cloth unable to attach color, the printing of a pattern with some acid substance on the cloth will form with the mordant a soluble salt, which can be readily removed by washing, whilst the parts which have not been so acted on by acid are not dissolved away by the washing, and still retain the full power in the color-vats to cause the adhesion of the color. For this purpose, where an iron or aluminous mordant has been employed, it is customary to print thereon in the requisite pattern, lemon-juice or lime-juice (containing citric acid), tartaric or oxalic acid, and bisulphate of potassa, or a mixture of two or more of these, thickened with pipe-clay, China-clay, gumarabic, dextrine (British gum), gum-Senegal, or a mixture of these; occasionally, chloride of tin is employed. Sulphate of zinc, sulphate and acetate of copper, and the chloride of mercury, are used to resist the adherence of indigo blue.

The *discharge style* in C. comprehends the employment of similar materials to those used in the resist style, but *after* the cloth has been colored or dyed, and for the purpose of discharging the color, or bleaching the cloth at certain parts, according to pattern. The dischargers for organic coloring matters are chlorine and chromic acid. The chlorine is employed in the form of bleaching-powder (q. v.), and the cloth already dyed is printed with a solution of tartaric acid (or other acid), thickened with pipe-clay and gum, then dried, and passed through a solution of bleaching-powder, when the decoloration occurs, as already explained under BLEACHING.

The chlorine is also applied by placing a number of folds of colored cloth between perforated pattern-plates, and subjecting the whole to great pressure; a solution of chlorline (obtained by adding an acid to a weak solution of bleaching-powder) is allowed to percolate down through the perforations of the plates, and the cloth immediately underneath, so that only those spots are bleached while the rest of the cloth is so highly compressed as to keep the liquid from coming in contact therewith. The well-known Turkey-red handkerchiefs are *patterned* in this way. The chromic acid is generally employed in discharging indigo color. The cloth, already entirely blue, is soaked or padded in bichromate of potash, and then an acid discharger printed thereon; and whenever the acid discharger (tartaric, oxalic, citric, or hydro-chloric acid) comes in contact with the blue cloth containing the bichromate of potash chromic acid is liberated, and destroys the color. Instead of acting upon the colored cloth, the discharger may be employed to carry off the mordant. Thus, cloth treated wholly with a mordant, and thereafter printed with a pattern in acid, has the mordant removed at those parts where the pattern block has placed the acid. Mineral colors can also be discharged in a similar way.

The *China blue or pottery style* in C. is a modification of the topical style, where indigo is deposited on cloth in the insoluble state, and is thereafter manipulated with, so as to impregnate the cloth with the indigo more or less strongly, and thus produce different shades of blue.

The above descriptions of the various operations in C. have special reference to cotton cloth; and though many steps of the manipulative processes apply equally well to linen, silk, worsted, de laines (worsted and cotton), yet considerable modifications in mode of treatment and material employed are required in the successful color-printing of all texture containing animal fibre, such as silk and wool. Where the printing of such fabrics differs essentially from the processes already indicated, special reference will be made under SILK and WOOL. The different coloring matters employed in C. being identical with those used in dyeing, will be considered under general popular title DYE-STUFFS; and the mode of compounding these into the various colors and shades, will be more appropriately introduced under DYEING.

CA'LICUT, a seaport in the district of Malabar, which, though on the west side of the peninsula of Hindustan, yet forms part of the presidency of Madras. In lat. 11° 15′ N., and long. 75° 50′ E., it is distant from Goa and Bombay respectively 300 and 566 miles. It was the first spot in India visited by Vasco da Gama, being then the chief emporium on the coast, with stately dwellings and magnificent pagodas. So populous and powerful was it, that it twice repulsed the Portuguese, slaying their commander in 1509, and expelling Albuquerque himself, after a momentary success on his part, in 1510. It stands near the mouth of a small river of the same name, appearing to have possessed at one time a tolerably good haven. Gradually, however, this harbor has been filled up with sand; and now its anchorage is merely an open roadstead, at a distance, at least for large vessels, of two or three miles from land. Independently of this physical disadvantage, the ravages of war and the competition of superior localities contributed to the decay of Calicut. Accordingly, in 1792, when it fell into the hands of the English, the city was little better than a ruin. Since then, it has made considerable progress, and in 1871 was found to have 47,962 inhabitants. From C., *calico* is understood to have derived its name, just as *cambric* from Cambria, in the north-east of France.

CA'LIF (Turk, a successor), the title of Mohammed's successors in temporal and spiritual power, from which the historians of the middle ages designated the Arab empire founded by these princes, the CALIFATE. This empire, for two or three centuries, exceeded even the Roman empire in extent. As Mohammed died without leaving any sons, a contest arose concerning the inheritance of his power, which terminated (632 A.D.) in the triumph of Abubekr (q. v.), one of his father-in-laws, over Ali, his nephew and son-in-law. Abubekr now assumed the title of Califet-Resul-Allah—i. e, Representative or Deputy of the Prophet of God. He sent forth his armies for the extension of Mohammedanism, and after several victories over the forces of the Byzantine empire, conquered Syria. He was succeeded in 634 by Omar, another father-in-law of Mohammed, by whom Egypt and Jerusalem were annexed to the califate. He assumed the title of Emir-al-Mumenin—i. e., Prince of the Faithful—a title which all subsequent califs retained. Othman, a son-in-law of the Prophet, was the third C., and was elected by six persons appointed by Omar before his death. During his reign (644—656 A.D), the Arabian empire grew with extraordinary rapidity, being extended into

Persia, and westward along the north coast of Africa as far as Ceuta. The Byzantine emperors recovered Egypt; but it was wrested from them again at a prodigious expense of blood. The people of Medina elected Ali-ben-Abi-Taleb as C. upon the death of Othman. The Shiites regard him as the first true Imam or high-priest, and honor him and his son Hassan almost equally with Mohammed himself. Contests against rivals prevented him from doing much for the extension of the califate.

Moawijah, the governor of Damascus, having made himself really independent during Ali's life, and having extended his power over Syria, Egypt, and part of Arabia, became C. in 661, and founded the dynasty of the Ommiades, making the califate hereditary. He removed the seat of the califate to Damascus. His armies ravaged Asia Minor, and laid siege to Constantinople, but could not take it. He made important conquests, however, in Central Asia. The califate did not remain long in the family of Moawijah, and it frequently happened that in one or other of the subject countries a governor raised himself to a temporary independence; and rival califs frequently contended for power. Abdalmelek (685—705 A.D.) united all the Moslems under his dominion. Under his son, Walid I., the califate reached its zenith of prosperity, the Arabs conquering Turkestan in 707, Galatia in 710, and Spain in 711. Under Hesham, the progress of the Arabs in the west was arrested by Charles Martel at Tours (732 A.D.) and at Narbonne (736 A.D.). The dynasty of the Ommiades in Asia terminated with Merwan II. in 752, giving place to that of the Abbasides. But a branch of the Ommiades founded an independen tcalifate at Cordova, and another founded one in Arabia, which subsisted till the 16th century. Abul-Abbas (750—754 A.D.), the first Abbaside C., signalized himself by his cruelty and the torrents of human blood which he shed. His successor, Abu-Jafar, called Al-Mansur, a patron of the arts, but a persecutor of Christians, founded Bagdad (q. v.), and removed the seat of the califate thither. From the beginning of the 9th c., the Arab empire, which had suffered much from corruption and internal disorganization under the last califs of the Ommiade dynasty, and had never completely recovered, showed increasing signs of decay. Even under the C. Harun-al-Raschid, whose praises the eastern poets were accustomed so much to celebrate, independent kingdoms were established (800 A.D.) by the Aghlabides in Tunis, and the Edrisides in Fez. In 821, Taher, the governor of Khorassan, made himself independent, and established a dynasty there, and other governors of provinces followed his example. But under the C. Al-Mamun, the Arabians conquered Sicily and Sardinia, the former of which they held till it was taken from them in 1035 by the Normans; and the latter till it was conquered by the Pisans in 1051. The C. Motassem (833—842 A.D.) was the first to employ Turkish soldiers; but the practice was followed by his successors; and the Turkish body-guard soon became a formidable power in the califate, and about the middle of the 9th c. assumed the right of deciding the succession to the throne.

Many of the califs, meanwhile, were base voluptuaries, and of the others, some were of little capacity, and their power rapidly declined. Ere the middle of the 10th c., the califs themselves exercised a mere nominal sovereignty, whilst the emirs, like the mayors of the palace towards the close of the Merovingian dynasty among the Franks, possessed all real power. The princes of the Fatimide dynasty, which succeeded that of the Aghlabides in Tunis, having made themselves masters of Egypt in 970, assumed the title of C., so that there were now three califates—at Bagdad, at Cairo, and at Cordova. In the 11th c., the califs of Bagdad were still acknowledged as the spiritual chiefs of all the Moslems; but their temporal power scarcely extended beyond the walls of Bagdad. Bagdad itself became the prey of a Mongol horde in 1258, and the representative of the califs fled to Egypt, where, under the protection of the Mamelukes, who had made themselves masters of that country in 1250, he retained his title and spiritual power, which he transmitted to his successors, who continued to reside there till the Turks conquered Egypt in 1517, when the last of them was carried to Constantinople; and since that time the Turkish sultans have assumed the title of C., and claimed to be regarded as the spiritual chiefs of all the Moslems, a claim to which little respect has ever been paid except within the limits of their own empire.

CALIFO'RNIA. This name was at first applied to a peninsula on the west side of Mexico, but was gradually extended to an indefinite portion of the adjoining continent, as far north as the parallel of 42°. The original C., however, and its augmentation were distinguished from each other as Old and New, Lower and Upper. In 1848, partly by conquest and partly by purchase, continental C., down to the parallel of 32° 28′, was ceded to the United States. After existing as a *territory* for two years, it was, in 1850, constituted one of the United States, bounded N. by Oregon, E. by Nevada and Arizona, S. by Lower C., and W. by the Pacific. Between the two Californias of the present day, the American one and the Mexican one, there is nothing in common but the name.—1. *Mexican C.* is the peninsula above mentioned, which, though considerably longer than Great Britain, is yet so narrow as to be very little larger than Scotland. From end to end, it is one ridge of mountains, which here and there rise to about 5000 feet above the sea. A few favored spots yield fruits and grains in abundance; but generally speaking, the productions are unimportant, for even trees, and those of no great size, are found only towards the southern extremity of the country. The population does not exceed 25,000—the oldest and most considerable town, Loretto, on the east side, containing barely 1000 inhabitants.

On the west side is the magnificent harbor, peculiarly on a coast so destitute of shelter, formed by the Bay of Magdalena and the island of Santa Margarita.—2. *American C.*, vaguely claimed, under the name of New Albion, by Drake for England in 1579, lay unoccupied till 1767, when it was invaded by Franciscan friars, the successors in Mexico of the newly expelled Jesuits. These zealous apostles, backed, when necessary, by armed coadjutors, planted various missions, bringing under their influence, such as it was, the great mass of the aborigines. Under such circumstances, the new province became pre-eminent, even in Spanish America, for everything that could paralyze the progress of a community. Anglo-Saxon speculators engrossed most of the trade; American trappers walked through the land as if it had been their own; the Muscovites established, in the north, a town under the ominous title of *Ross* or *Russia;* and a Swiss adventurer of the name of Sutter, who had carved out for himself a *New Helvetia*, virtually set the government at defiance. But the discovery of gold in Sutter's mill-race during 1847, and the political transfer of 1848, taken together, changed, as if by a miracle, the aspect of affairs. The matchless harbor of San Francisco became the grand mart on the Pacific, presenting a center of attraction to the restless and energetic of every race and every clime. Between 1850 and 1855, the population increased from 92,597 to 327,000; in 1870 it was 560,247; and in 1880 it was 864,686, of whom 75,000 were Chinese. The total yield of gold in this state up to 1875 was about 1,000,000,000 dollars. In 1874 the value of the gold and silver produced was 20,300,531 dollars, and in 1881, 19,870,000 dollars. C. possesses the richest quicksilver mine in the world—that of New Almaden—which at one time produced from 2,500,000 lbs. to 3,500,000 lbs. per annum. It now yields about 1,000,000 lbs. In 1864, 15,000 tons of copper were exported, to be smelted at Swansea and Boston, but not nearly so much is now produced. Platinum has been found in many of the placers. There is coal in nearly all the coast counties; and asphaltum is produced. Other mineral products are iron, tin, and borax. In the year 1881–82, C. shipped 870,472 barrels of flour, and 22,170,000 centals of wheat. In 1881, there were 100,000 acres of vineyards, and the produce of the vintage was 9,000,000 gallons of wine.

Silk culture is making rapid progress; and the woollen factories of C. consume nearly 6,000,000 lbs. of wool annually, while about 30,000,000 lbs. are exported. Manufacturing industry has lately greatly increased, the chief manufactures being woollen goods, flour, iron, glass, wine, sugar, and silk. The amount of taxable property, real and personal, as assessed in 1878, was 584,583,651 dollars. The state debt amounted in the same year to 3,403,000 dollars.

The country is mountainous, and is cut into coast and interior by a subordinate range from Oregon. The interior is subdivided into the valleys of the Sacramento and the San Joachim—two rivers from the north-east and the south-east, which enter the noble haven of San Francisco. The former is the chief seat of the 'diggings.' Since the completion of the Pacific Railway, terminating in San Francisco, C. has been visited by many pleasure-seekers attracted by its magnificent scenery. The most celebrated district is the Yosemite Valley (q. v.). C., with a lovely and salubrious climate, produces fruits and grains freely, under advantageous circumstances of soil and situation. In the growth of timber, however, it appears to be almost unrivalled. Fremont measured one tree that was 21 feet in diameter, or 66 in circumference; and another has been seen, which, with a length of 150 yards, is nearly 120 feet in girth. A *Sequoia gigantea* in Mariposa county is 274 feet in height. Besides San Francisco, the state contains the cities of Sacramento (the capital), Oakland, Stockton, San José, Los Angelos, Marysville, and San Diego, with a fine port. The university of C., near Oakland, was established in 1869 : there are besides several colleges.

CALIFORNIA, GULF OF, an arm of the Pacific Ocean, which divides the peninsula above described from the rest of Mexico. It was originally known as the Sea of Cortez, having been discovered under his auspices, and explored by himself; and it has, from its shape, been occasionally designated the Adriatic of the New World. It is 700 miles in length, and varies in width from 40 to 100 miles. At its northern extremity, it almost touches the territory of the United States, receiving therefrom the united streams of the Gila and the Colorado. The gulf contains many islands,

particularly towards its head, and has long had a pearl-fishery. At the east side of the entrance stands Mazatlan, on a river of the same name, now the most frequented port of the neighboring regions.

CALI'GULA, Caius Cæsar Augustus Germanicus, Roman emperor (37—41 A.D.), the youngest son of Germanicus (nephew of Tiberius) by Agrippina, was born 31st August, 12 A.D., at Antium, and was educated in the camp, where the soldiers gave him the by-name C., from the half-boots (*caligæ*) which he wore. On the death of his brother Drusus, he was made augur in his stead; and on the death of Tiberius (37 A.D.), who, it was suspected, had received foul-play at his hands, it was found that he had been appointed co-heir along with the grandson of Tiberius, but the senate and the people allowed C. supreme and sole authority. In the beginning of his reign, he appeared hardly likely to fulfil the threat of Tiberius, who had talked of educating C. 'for the destruction of the Roman people.' He was, to appearance, lavishly generous and merciful, pardoning even those who had been the instruments of cruelty against his own family. But this ostentatious magnanimity was itself a disease, an unwholesome affectation, founded on no principle, or even humanity of heart, and co-existed with the most savage voluptuousness and lust. Consequently, when illness, the result of his vicious life, had weakened his faculties, the lower qualities of his nature obtained the complete mastery. In addition to the senseless prodigality with which he commenced his career—expending in one year the enormous wealth left by Tiberius (720 millions of sesterces)—he began to manifest the most barbarous propensities. He banished or murdered his relatives, excepting his uncle Claudius and sister Drusilla (with whom he carried on incestuous intercourse); filled Rome with executions, confiscating the estates of his victims; amused himself, while dining, by having victims tortured and slain in his presence; and uttered the wish 'that all the Roman people had but one neck, so that he might decapitate Rome at one blow!' To vie with Xerxes, he made a bridge of ships over the bay between Baiæ and Puteoli (a distance of three Roman miles and six hundred paces), and celebrated the exploit by a costly banquet on the middle of the bridge, and by collecting on it great numbers of people, and causing them to be drowned. His favorite horse was stabled in a palace, fed at a marble manger with gilded oats, was made a member of the college of priests, and afterwards raised to the consulship. As a climax to all his absurdities, he declared himself a god, and had temples erected, and sacrifices offered to himself. To gratify his monstrous desires, he shrunk from no infamy; he robbed, plundered, and taxed his subjects to a degree which seems almost incredible, and when even these means proved insufficient, he established a brothel in his own palace, and sent out his slaves to solicit the public patronage for it. At length a conspiracy was formed against him, and he was assassinated 41 A.D.

CALI'PPIC CY'CLE. See Period.

CALI'TRI, a town of Italy, in the province of Avellino, near the Ofanto, and about 7 miles east-north-east of Conza. It has a population of 6200, who are chiefly engaged in agricultural pursuits. Sheep are reared to a considerable extent in the vicinity.

CA'LIVER was a matchlock or firearm about midway in size and character between an arquebus and a musket; it was small enough to be fired without a rest or support.

CALI'XTINES, a Bohemian religious sect, so named from the Latin *calix*, a cup, because they contended for giving the cup, as well as the consecrated wafer, to the laity. Their confession of faith (1421) contained the following articles: 1. That the word of God ought to be freely and regularly preached by the priests of the Lord throughout Bohemia; 2. That the eucharist in both kinds ought to be administered to all burdened with 'no mortal sins,' according to the language and command of the Saviour; 3. That the clergy should separate themselves from secular affairs; 4. That all 'mortal sins,' and especially public ones, such as debauchery and simony, and any other disorders contrary to the law of God, should be prevented or punished by those who were the lawful authorities in such matters. In other main points they were moderate followers of John Huss, and were opposed to the more extreme sect of Taborites (q. v.). Their peculiar articles of faith were conceded by order of the council at Basel (1433); and having prevailed over the Taborites in the conflict which took place at Boehmischbrod 30th May 1434, they became the dominant party in Bohemia, and exercised considerable influence over political affairs. Gradually, however, the C. lapsed from the severity of their four articles, while the schism of the energetic Taborites, and later of the Bohemian Brethren (q. v.), rendered them completely powerless. At the beginning of the 16th c., they had ceased to possess any importance, and only served to prepare the way for Protestantism.

CALIXTUS, Georg (properly, *Callisen*), an eminent theologian of the Lutheran Church, was born 14th Dec. 1586, at Medelbye in Schleswig; studied at Flensborg and Helmstedt; and, in 1605, became professor of philosophy in the latter of these cities. Two years after, he betook himself to theology, and attracted great attention by the breadth and originality of his views. After traveling for some time in Germany, Holland, England, and France, where he made the acquaintance of the most learned men of his time, he returned to Helmstedt in 1613, and was appointed professor of theology. His genius, the depth of his knowledge, and his large experience of the world and of men, which he had acquired in his travels, developed in him a spirit of great tolerance towards all who held their religious opinions honestly, whatever these might be. Although his dissertations on the Holy Scripture, transubstantiation, communion in one kind, &c., are acknowledged by learned Catholics to be about the most solid and admirable which have been composed by Protestants against the distinctive doctrines of Catholicism, he was, on account of some statements in his work, entitled *De Præcipuis Religionis Christianæ Capitibus* (Helmstedt, 1613), which seemed favorable to Catholic dogmas, and of others in his *Epitome Theologiæ Moralis* (Helmstedt, 1634), *De Tolerantia Reformatorum*, &c. (Helmstedt, 1658), which approached too near to the Reformed or Calvinistic standpoint, declared guilty of abominable heresy by the adherents of the letter of the Concordienformel—i. e., the orthodox and dogmatically rigid Lutherans. C. felt keenly that the polemical harshness of Lutheranism was a serious obstacle in the way of a great Catholic Christianity, and that Protestantism must assume another form before it could hope to become the religion of Europe. Under this conviction, C. endeavored to show that the oldest and most fundamental articles of the Christian faith—viz., the facts embodied in the 'Apostles' Creed'—were common to all Christian sects. In subsequent dissertations, having stated that the doctrine of the Trinity was less distinctly taught in the Old than in the New Testament, and that good works were necessary to salvation; and finally, at the religious conference of Thorn, in 1649, whither he was sent as a mediator by the Elector of Brandenburg, having been on more intimate terms with the Calvinistic than the Lutheran theologians, C. was accused of apostasy. Fortunately, however, he had powerful friends, who stood firmly by him, and through the help he was enabled to retain his professorial chair till his death, on the 19th March 1656.

CALL, a term often used in reference to various theological and ecclesiastical subjects.—1. The command or invitation to believe in Jesus Christ, is designated the *call of God*, or the *gospel call*. Calvinistic theologians make a distinction between a *general* and a *special* or *effectual* call. The former is addressed, they say, to all to whom the word of God comes; but it is insufficient of itself to induce any man to the act of faith, and requires, in order to its efficacy, that it be accompanied by the special and irresistible grace of the Holy Spirit. They are careful, however, to state that the general or outward calling by the word always precedes and accompanies the special and effectual calling by the Spirit. The notion of an inward call by the Spirit of God in the soul, unconnected with outward calling by the word, belongs not to Calvinistic, but to mystic theology.—2. A call to office in the church, and particularly to the ministry of the gospel, is regarded by Christians generally as proceeding from God; and the Church of England requires of candidates for ordination an express profession that they trust they are so moved of the Holy Ghost.—3. A call by the people who are to be under the pastoral care of the minister has generally been regarded in the Christian church as necessary to the establishment of the pastoral relation. But there have been great differences of opinion as to what constitutes a sufficient call, and great differences of practice with regard to it. Some of the principal ecclesiastical dissensions in Scotland have had their origin in this question. The election of a pastor by the *Christian people* of his *parish* or *congregation*, has been contended for by many as the true call, or the best kind of it; others, approving of patronage with certain limitations, contended no less earnestly for the right of the people to be consulted, so that without their concurring by a call, the patron's presentee should not be held entitled to be inducted into the pastoral office; and according to the practice of the Church of Scotland, this concurrence was always at least formally sought. Questions concerning the call and its proper value, supposed to have been determined by the Earl of Aberdeen's Act, passed when the *Disruption* of the Church of Scotland took place in 1843, were not finally settled until the passing of the Act for the Abolition of Patronage (1874), which gives the right of calling to the congregation. See Scotland, Church of; Free Church of Scotland; and Patronage.

CALL, a stipulated sum to be paid towards a share in a joint-stock undertaking. For example, in a £10 share, there are usually at least four calls of £2 10s. each, the calls being made at intervals of not less than three months.

CALL, a military musical term meaning a signal on the trumpet.

CALL is a metal whistle used by the boatswain and his mate on shipboard. Various strains or kinds of sound produced denote signals or orders for hoisting, heaving, lowering, veering, belaying, letting-go, &c. These sounds are as much attended to by seamen, as those of the drum, bugle, and trumpet are by soldiers. At one time, a gold call, with a chain, used to be the badge of an admiral.

CALL OF THE HOUSE is an imperative summons to every member of parliament of either House on some particular occasion, when the sense of the whole House is deemed necessary. In the *House of Lords*, when any urgent business is deemed to require the attendance of the lords, it has been usual to order the House to be called over; and this order has sometimes been enforced by fines and imprisonment upon absent lords. On some occasions, the Lord Chancellor has addressed letters to all the peers, desiring their attendance, as on the illness of George III., 1st November 1810. The most important occasion on which the House was called over, in modern times, was in 1820, for the trial of Queen Caroline.

When the *House of Commons* is ordered to be called over, it is usual to name a day which will enable the members to attend from all parts of the country. The interval between the order and the call has varied from one day to six weeks. If it be really intended to enforce the call, not less than a week or ten days should intervene between the order and the day named for the call. The order for the House to be called over is always accompanied by a resolution, 'that such members as shall not then attend be sent for, in custody of the sergeant-at-arms.' And it was formerly the custom to desire the Speaker to write to all the sheriffs to summon the members to attend. On the day appointed for the call, the order of the day is read and proceeded with, postponed, or discharged, at the pleasure of the House. If proceeded with, the names are called over, according to the counties, which are arranged alphabetically. The members of a county are called first, and then the members for every city or borough within that county. The counties in England and Wales are called first, and those of Scotland and Ireland in their order. This point is mentioned, because it makes a material difference in the time at which a member is required to be in his place.—See May's *Proceed. in Parl., on Attendance of Members*.

CALL TO THE BAR is the formal expression by which the admission of law-students to the rights and privileges of the degree of barrister in England and Ireland is publicly announced. In Scotland the corresponding expression is *Passing Advocate*. See BARRISTER; INNS OF COURT; and ADVOCATES, FACULTY OF.

CA'LLA, a genus of plants of the natural order *Araceæ*, or, according to some botanists, of the natural order *Orontiaceæ*, which is distinguished from *Araceæ* only by having hermaphrodite flowers. The genus *Calla* is characterized by a flat spathe (q. v.), within which is a cylindrical spadix (see SPATHE) covered with naked flowers, appearing as a mere mixture of stamens and pistils, and a one-celled ovary with 6—8 erect ovules. The known species are few, and natives of very different climates. *C. palustris* is found in swamps in Europe, Siberia, and North America, but not in Britain. It has a creeping root-stock, and heart-shaped, stalked leaves, the midrib of which is prolonged beyond the blade into a point; the spathe is white, and the spadix yellow. The root-stock is extremely acrid and caustic; but being deprived of its acridity by grinding, boiling, and macerating, is made by the Laplanders into a kind of bread called *Missebroed*, which they hold in high estimation.—The well-known and beautiful *Richardia Ethiopica* was formerly included in this genus, and is often still called Calla.

Calla palustris.

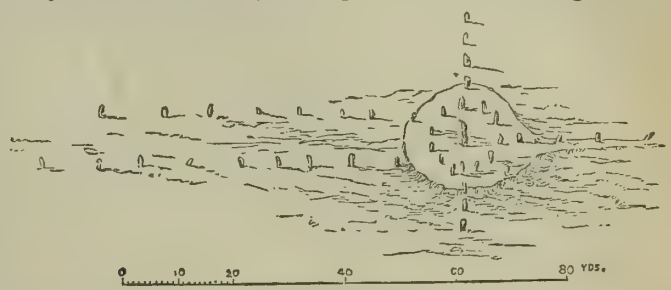
CA'LLANDER, a village in Perthshire, on the left bank of the Teith, 16 m. N.W. of Stirling. It lies in a beautiful and romantic situation, surrounded by high mountains and Highland lakes. Hence it is much frequented by tourists, who make this place a center to visit Benledi, the Trosachs, the Bracklin Falls, and Lochs Lubnaig, Vennachar, Achray, and Katrine. Pop. (1881) 1522.

CALLA'O, the port of Lima, the capital of Peru, connected with that city by a railway of 6 miles in length. It stands in lat. 12° S., and long. 77° 13' W. Fine harbor-works, with extensive pier and dock accommodation, were completed in 1875. The roadstead is large, free from rocks, and safe, being sheltered by the island of San Lorenzo. The exports are guano, specie, copper, cotton, bark, and hides. C. contains about 20,000, inhabitants. The present C. dates only from 1746, when the original city was destroyed by an earthquake. C. was bombarded in 1880, during the war between Chili and Peru.

CALLCOTT, SIR AUGUSTUS. This name has been erroneously spelled CALCOTT (q. v.).

CALLCOTT, JOHN WALL. See CALCOTT.

CA'LLERNISH, a district on the west coast of the island of Lewis, about 16 miles from Stornoway, remarkable for its circles of Standing Stones (q. v.). There are four circles, at no great distance from one another, but without any visible relation. The principal one, of which the figure gives a bird's-eye view, is of a more than usually elaborate design. 'A double line of upright stones run parallel to each other in a northerly direction, while a single line of similar stones is projected from the south, east, and west points, thus giving a cruciform figure to the structure. A stone of larger dimensions than any of the others occupies the center of the circle, and completes the whole. . . . . That the position was chosen and laid down from astronomical observation, can easily be demonstrated by visiting the spot on a clear night, when



Callernish Circle..

it will be found that by bringing the upper part of the single line of stones extending to the south to bear upon the top of the large stone in the center of the circle, the apex of that stone coincides exactly with the pole-star. . . . . The stones themselves are not columnar, or shaped into any form; they are simply broad, flat blocks of gneiss—the all-prevailing rock from the Butt of the Lewis to Barra Head. The following are their dimensions: diameter of circle, about 40 feet; length of west line, 43 feet; length of east line, 38 feet; length of south line, 69 feet; length of avenue, 270 feet; breadth of avenue, 27 feet; average height of stones, 6 to 8 feet; height of center stone, 12 feet. There are 13 stones in the circle including the center one, 19 in the avenue, 5 in each of the east and west, and 6 in the south arm. The measurements of height are taken from the present level; but it must be borne in mind that there is a bed of peat-moss, 4 or 5 feet thick, through which the stones rise from the clay beneath; this gives a height of 16 to 17 feet to the center stone, and from 10 to 13 feet to the others, exclusive of the foundation.' *Notice of the Stone Circle at Callernish*, communicated to the Society of Antiquaries of Scotland, by Mr. Henry Callender, March 1857.

CALLI'CHTHYS (Gr. *kalos*, beautiful, *ichthys*, a fish), a genus of fishes of the family *Siluridæ* (q. v.), having the body almost entirely covered by four rows of large, hard, narrow, scaly plates, two rows on each side. The head is also protected by a sort of helmet. The mouth is small, the teeth very small; two long barbules hang from each angle of the mouth. The species of this genus are natives of warm climates, particularly of South America. They are interesting because, when the streams or pools which they inhabit dry up, they make their way across the land to some other piece of water, even although at a considerable distance. They also sometimes bury themselves in the mud of wet meadows, out of which they are digged. They have no special organs for carrying a supply of water with them, like the climbing perch, but are supposed to retain a little between the plates of their body. A still more interesting part of the natural history of these fishes is their making regular nests, generally of leaves, in which they deposit their eggs, near the margin of the water, at the beginning of the rainy season, the male and female uniting in watching them until they are hatched. These habits are shared by the species of the allied genus *Doras*, in which the lateral plates are broader, keeled, and each ending in a spine.

CALLI'GONUM, a genus of plants of the natural order *Polygoneæ* (q. v.), having a quadrangular fruit (*achenium*, q. v.), winged at the angles. The best known species is *C. Pallasia*, a succulent shrub found on the sandy steppes near the Caspian Sea, and in the lower part of the basin of the Volga, where its acid fruit and its also acid shoots often serve to allay the thirst of the

Kalmucks and of weary travelers. Its root strikes deep into the sand, is swollen at its upper part, and when cut there, gives out a nutritious gum, resembling tragacanth (q. v.), which is also obtained by pounding and boiling it, and on which the Kalmucks feed in times of scarcity.

CALLI'MACHUS, an eminent poet, grammarian, and critic of the Alexandrian period, flourished about the middle of the 3d c. B.C. He was of a distinguished family at Cyrene, in Libya; taught grammar and belles-lettres in Alexandria; was a favorite of Ptolemy Philadelphus, and his successor, Ptolemy Euergetes; and was made principal librarian of the Alexandrian Library. He wrote many works on the most various subjects (Suidas mentions 800), but only fragments are extant; nor have we many of his poems; but the poems which we have, bear the marks of an age when the artificial had obtained a preference over the natural.

CALLING THE DIET is the Scotch term for *Arraignment* (q. v.), although the forms are different. In Scotland, excepting in cases of high treason, there is no grand jury, but the procedure is briefly as follows: Before a prisoner can be tried, a written or printed copy of the indictment preferred against him must have been served fifteen days before the trial, with a copy of the list of witnesses to be examined against him, and also of the jury panel. When, therefore, he is placed at the bar of the court, and called on to plead, he is presumed to know the nature of the charge made against him. But if it be desired by him, or by his counsel, the clerk in the first instance reads the indictment aloud in open court —the same being a well-prepared syllogistic statement of the facts, which the prosecutor is prepared to prove. He is then called upon to state his objections to the relevancy, and to have such relevancy disposed of by the court, before being called on to plead to the fact. If the judgment of the court is in favor of the objection, the prosecution for the time fails, and the prisoner is sent back to jail, to abide another indictment, unless the prosecutor chooses to abandon the case against him altogether. See INDICTMENT, VERDICT, DEFENCE.

CA'LLINGER, one of the hill-forts of Bundelcund (q. v.), elevated about 700 feet above the adjacent plain, and separated from a neighboring range of mountains by a ravine of 1200 yards in width. It is in lat. 25° N., and long. 80° 32′ E., being 112 miles to the south-west of Allahabad. From its position and size, C. must at one time have been a place of great strength. It was stormed by the British in 1812. At the south-east base of the rock stands a town of the same name, which though it is now much decayed, yet bears testimony to its ancient extent and grandeur. The locality is famous for its excavated temples of Siva.

CALLIO'NYMUS. See DRAGONET.

CALLI'OPE (i. e., the sweet-voiced) was, according to the ancients, the first of the Muses (q. v.), and presided over epic poetry, or over poetry in general. She was said to be the mother of Orpheus, of the Sirens, &c. She was usually represented with a style and wax tablets.

CA'LLIPERS, a kind of compasses with curved legs, used by turners and other workmen for measuring the diameters of cylindrical, spheriele, and other curved work. The C. are laid over the work, and opened or closed until both points just touch the periphery; then the C. are laid upon a rule, and the extent of their opening measured, or the size is compared with a pattern.

CALLI'STHENES, of Olynthus, was the son of Hero, a cousin of Aristotle. C. was born about 360 B.C.; he was educated by Aristotle along with Alexander the Great. He devoted himself to the study of natural and political history, and accompanied Alexander the Great in his expedition to India. He incurred the displeasure of the courtiers and royal favorites, and of Alexander himself, who was displeased by his remonstrating against his intended assumption of divine honors, and in general by his bold, indiscreet, outspeaking ways; and he was put to death on a pretended charge of treason, 328 B.C. Only a few fragments of his historic works remain, and these are not valuable. The *History of Alexander* ascribed to him, of which there are several MSS in the Paris Library, is evidently a production of the 7th c., and rather a romance than a history.

CA'LLITHRIX. See SAGOUIN.

CA'LLITRIS. See SANDARACH.

CALLO'SITIES. See CORNS.

CALLOT, JACQUES, one of the most eminent artists of his time, was born at Nancy, 1592. Proceeding to Rome, he commenced drawing and engraving under Thomassin in his eighteenth year. He next went to Florence, where, by numerous spirited etchings, he gained great fame, and engraved for Cosmo II., Grand Duke of Tuscany, a series of plates of court-festivals, &c. When his patron died (1621), C. returned to his native place, and increased his reputation by a copious series of etchings, including six plates of the siege of Breda. By order of Louis XIII., who invited C. to Paris, etchings of the sieges of Rochelle and the Ile Rhé were executed; but C. refused to commemorate by art the capture of his native town, and, declining the pension offered by the king, returned to Nancy, where he died, 1635. His activity as an artist was marvelous. Of his engravings, 1800 are still preserved at Dresden. As helps to a vivid conception of the manners, conditions of life, events, &c., in the 17th c., they are invaluable. C.'s 'Misères de la Guerre,' a series of 18 platès, are especially celebrated.

CALLU'NA. See HEATH.

CA'LLUS. This term was employed in old surgical works, and is still used popularly, to indicate the exuded material by which fractures of bones are consolidated together. If the broken ends are accurately adjusted to each other, there is no projection of C., but merely a slight deposition of it between the two surfaces; if, however, the adjustment is not accurate, the C. is effused in such quantity as to fill up any interspaces that may exist, and as often to form a considerable hard swelling round the seat of the fracture; any excess is, however, usually absorbed during the last stage of the repair of a fracture. When the broken ends are allowed to move upon each other—which, of course, should be always prevented, if possible—a ferule of new bone, encircling both fragments for some little distance, so as to splice them together, till they are united by a permanent C., is formed; this is termed a *provisional* callus.

CALMET, AUGUSTINE, an exegetical and historical writer, and learned Benedictine, was born at Mesnil-la-Horgue, near Commercy, February 26, 1672, and, in 1689, entered the order of Benedictines. In 1698, he was appointed teacher of philosophy and theology in the Abbey Moyen-Moutier; in 1704, sub-prior of a convent of learned monks at Münster, in Alsace; and in 1706 he went to Paris, to superintend the publication of his *Commentary on the Bible*. He was afterwards appointed prior at Lay (1715), Abbot of St. Leopold (1718), Abbot of Senones in Lorraine (1728), and died at Paris, October 25, 1757. His exegetical writings have been commended and studied with advantage by both Roman Catholics and Protestants. The *Commentary on the Bible* (23 vols., Paris, 1707—1716), though marked by the author's deficient knowledge of the oriental languages, contains valuable researches in biblical antiquities. C.'s *Historical and Critical Dictionary of the Bible* (4 vols., Paris, 1722—1728) was translated into English, German, and other languages, and has passed through many editions. His other works—a *History of the Bible*, and of the *Jews* (1718), and a *Universal History* (1735—1771)—are mere compilations; but his *History of Lorraine* is founded on original researches. Solid criticism and vigorous intellect are wanting in all his works.

CALMS, or CALM LA'TITUDES, are those parts of the ocean, near the equator, which are subject to total absence of wind for long periods together. The part of the ocean where C. are the most looked for, is between the region of the trade-winds and that of the variable winds. See WINDS. It is almost as much dreaded by seamen as a region of storms, for the ship is unnavigable; and during a calm of many weeks, food and water may be nearly exhausted, at a point too far from land for boats to reach it. Where a calm occurs unexpectedly, it is likely to be followed by violent storms.

CA'LMUCKS. See KALMUCKS.

CALNE, a parliamentary borough and ancient town of Wiltshire, on the river Marden, 31 miles north-north-west of Salisbury. It lies in one of the many valleys in the chalk escarpment of this part of England, with the plateau of the Marlborough Downs and Salisbury Plain on the east and south. In 1863, a branch line was opened to C., six miles from the Chippenham station of the Great Western Railway. The principal industry is the curing of bacon; and there are also flax, paper, and flour mills. The manufacture of woollens, formerly of importance, is now almost extinct.

There is also a weekly corn-market. Pop. (1881) 2474. The parliamentary borough (pop. 5272), formerly returning two members to parliament, but now only one, includes part of Blackland and Calstone. Many Roman remains have been found here. The West-Saxon kings had a palace at Calne, but no traces of it now remain. At a synod held here by St. Dunstan in 977, relative to the celibacy of the clergy, the floor of the room in which the synod sat gave way, precipitating all to the ground but St. Dustan, who presided. On an almost perpendicular declivity 3 miles east of C. is the figure of a *horse*, 157 feet long, in a spirited attitude. It was cut out in white chalky ground in 1780 by Dr. Allsopp, and is visible 50 miles off. Dr. Priestley resided at C. 1770—1780.

CALO'EE. See BOEHMERIA.

CALOMARDE, Don Francisco Tadeo, Count, a Spanish statesman, was born in 1775 at Villel, in Aragon. He studied at Saragossa, where he passed as an advocate. After the expulsion of the French, and the return of Ferdinand VII. in 1814, C. was among the first to hurry to Aragon, and do homage to him as an absolute monarch. As a reward of his obsequious celerity, he obtained the highest office in the *Secretaria General de Indias*, but lost it on account of accepting a bribe. On the restoration of the constitution in 1820, he unsuccessfully courted the favor of the Liberals; but when the French army in 1823 enabled the king once more to rule despotically, C. was appointed secretary of the *Cámara del Real Patronato*, one of the most influential offices in the kingdom. Not long after, the king made him Minister of Justice. While he held this function, he persecuted the Liberals with cold-blooded savageness, recalled the Jesuits, reopened the monasteries, and closed the universities. He also secretly favored the party of Don Carlos; but, on the other hand, by treating any unseasonable outbreak with a strictness bordering on cruelty, he preserved himself from the suspicion of being implicated in their schemes. In 1833, when Ferdinand was supposed to be on his death-bed, he was prevailed on by C. to reintroduce the Salic Law, by which Christina was excluded from the throne, and Don Carlos, the favorite of the Absolutists, appointed his successor. This excited the hatred of the nation; and Ferdinand recovering, abolished the law. To avoid imprisonment, C. fled to France. He died at Toulouse in 1842.

CA'LOMEL is the popular name given to one of the compounds of mercury (Hg) and chlorine (Cl), and known to scientific chemists as the subchloride of mercury (HgCl). It is prepared by taking two equal portions of mercury, dissolving one portion in hot concentrated sulphuric acid (SO_3), which forms sulphate of mercury ($HgOSO_3$), thereafter adding the second part of the metal, and triturating the whole in a mortar till the metal becomes incorporated with the sulphate of mercury. This mixture is then added to one-half its weight of common salt (NaCl), and heated in a retort, when C. sublimes, and condenses in the cool part of the receiver, as a fine white powder. A minute portion of corrosive sublimate which accompanies it, is removed by washing with water. C. is very dense. It is not soluble in water, and sparingly so in acids. It turns black on the addition of lime-water, potash, soda, or ammonia; and when heated in an iron spoon, or on a knife, it does not char, but rises in vapor, sublimes unaltered, and readily condenses again on any cool surface held near it. Although C. has been more used in British practice than any other preparation of mercury, it is not known to have been employed before the 17th century. Its medicinal virtues will be treated of with the other mercurials. See Mercury.

CALONNE, Charles Alexandre de, Controller General of Finance in France under Louis XVI., was born, January 20, 1734, at Douay. Possessing superior abilities, he studied law, and having filled successively various offices, was made, in 1783, Controller General of the Treasury. In this capacity he soon gained favor among the courtiers, who had complained of the parsimony of Turgot and Necker. C., though he found French finance in a deplorable state, was determined not to *seem* poor, gave brilliant entertainments, paid off the debts of his patron the Count of Artois, supplied the queen with sufficient pocket-money, granted pensions and gratuities to his supporters and favorites, paid off arrears, and purchased the residence of St. Cloud and Rambouillet! His means of raising money were perfectly simple —he borrowed, anticipated, issued chancery-edicts, and prolonged and augmented extraordinary taxations in a style never known before. The parliament resisted these measures, but C., backed by royal authority, carried them into execution. The crisis necessarily arrived; and in 1786, when the people could bear the extraordinary taxation no longer, C. advised the king to convoke the Assembly of the Notables, and proposed to abolish the privileges (exemption from taxes) of the noble and wealthy, to take the duty off salt, to abolish *socage* (feudal or compulsory service to the lord of the manor), and to distribute the burden of taxation more equally.

The people and the aristocracy demanded a convocation of the States General, instead of the Assembly of the Notables; but C. boldly proceeded with his plan, opened the Assembly of the Notables, February 2, 1787, and in a pleasant and florid oration, described the general prosperity of French industry and commerce, and brought his speech to a climax by confessing that the annual deficit of the treasury had risen to 115 millions of francs, and that during the time from 1776 to 1786, the government had borrowed no less a sum than about 1250 millions! The Notables, instead of proceeding with C.'s plan of reorganization, demanded from him a statement of accounts. Not being able to give this satisfactorily, he was stripped of his dignities, and banished to Lorraine. After this, C. resided chiefly in England, until in 1802 he obtained from Bonaparte permission to return to France, where he died in very embarrassed circumstances, October 30, 1802.

CALOPHY'LLUM (Gr. beautiful leaf), a genus of trees of the natural order *Guttiferæ* (q. v.), natives of warm climates. Some of the species yield valuable timber, as *C. angustifolium*, the Piney Tree, which grows at Penang, and in the islands to the eastward of the Bay of Bengal, and furnishes the beautiful straight spars called *Peon*. The resinous products of some species are valuable, and among them are some of the substances known by the name of Tacamahaca (q. v.). *C. Inophyllum*, which yields true East Indian Tacamahaca, is a very large and beautiful umbrageous tree, often planted for its shade and the fragrance of its flowers, which are white and in loose axillary racemes. It is one of the most valuable timber-trees of the South Sea islands. The timber resembles mahogany, being of equally close texture, although of lighter color, and very durable. The leaves are oblong and obtuse; the fruit—which in all this genus is a globose drupe or stone fruit —is about the size of a walnut; and a fixed oil is expressed from its kernel, which is used for lamps, &c. A similar oil is expressed from the seed of *C. Calaba*, the Calaba Tree of the West Indies, which also has white sweet-scented flowers, and of which the timber is used for various purposes, particularly for staves and cask-headings.

CALO'RIC, a term for Heat (q. v.).

CALORIC ENGINE. This was the name given by Captain Ericsson to his latest *air-engine*. There seems no reason for the change of name, unless it were meant to distinguish it from the previously well-known, though hitherto unsuccessful air-engines of the Messrs. Stirling. We shall in this article treat air and caloric engine as synonymous terms.

It is a well-known law, applicable to all thermodynamic engines, that (presupposing the merely mechanical part of the machine to be perfect) the heat converted into work bears the same proportion to the total heat given to the fluid that the range of temperature bears to the highest *absolute* temperature of the fluid. Thus supposing an engine to receive steam* at the temperature of 275° F., and discharge it at that of 120° F., the fraction of heat which it can convert into work will be $\frac{275-120}{275+461}$ or about 21 per cent. of the total heat of the fluid. This proportion would be, of course, greatly reduced in practice, owing to imperfections in the machinery, but these being equally likely to occur in all prime movers, we need not consider them here. The *lowest* limit of temperature available being practically constant, fixed either by the temperature of the atmosphere, or that obtainable in a condenser; it follows that greater economy can only be looked for in the direction of increase of initial temperature. In ordinary steam-engines, in which the pressure and temperature increase simultaneously, the latter is limited by the former, which in its turn is kept, by considerations of safety, comparatively low. When, however, *superheated* steam (steam to which additional heat has been imparted without the corresponding addition of pressure) or heated air is used, the temperature is limited only by the power of the metals composing the machine to resist the destructive action of heat, or the chemical action of the fluid at that temperature. Heated air possesses the advantage over superheated steam as a motive power, that with it an explosion, in the usual sense of the word, is rendered almost impossible, and that, if one were to occur, it would be comparatively harmless. It also, of course, enables the boiler to be dispensed with.

Air-engines, in their principal working parts, are very similar to ordinary steam-engines. The heated air is introduced into a cylinder, in which works a tightly fitting piston, which is thus compelled to move up and down, and transfers its motion to a revolving shaft by means of a piston and connecting-rod in the usual manner. The motion of the piston results in all cases from the expansion of the heated air; the air is heated by means of a furnace, is introduced below the piston, raises it, and then is allowed to escape into the atmosphere. Air-engines are almost invariably single-acting; they are sometimes worked simply by heated air, and sometimes with the air which having passed through the furnace, is mixed with all the gaseous products of combustion. The latter method has the immense advantage that it utilizes the heat which would otherwise be rejected into the chimney. The total efficiency of the machine is thus increased, although the efficiency of the engine proper, between the given pair of temperatures, remains the same.

The more heat carried away by the discharged air—the higher its temperature, in other words—the smaller evidently is, *cæteris paribus*, the range of temperature of the machine, and the less, therefore (as already explained), will be its efficiency. The distinctive principle of the Messrs. Stirling's air-engine, as of the later C. E., consists in utilizing a great part of this wasted heat, and thus economizing fuel. This effected by means of a 'regenerator,' or, more properly, 'economizer,' consisting of a chamber filled with metallic sieves of wire-gauze, through which the hot air is made to pass *outwards* from the cylinder, after having per-

* The law is the same for steam, air, or *any other fluid whatever*.

formed its work on the working-piston of the engine. As much of the escaping air is taken up by the regenerator, and its temperature thus reduced, the range of temperature of the machine is correspondingly increased. The fresh air entering the cylinder for the next stroke was compelled to pass *inwards* through the regenerator, and abstracted from it the heat left in it. In this way it did not require to receive so much heat in the furnace as would otherwise have been the case, and thus economized fuel.

This method of preventing waste of heat was first discovered by the Rev. Dr. Stirling, who obtained a patent for it in 1816. In working with air at the ordinary pressure of the atmosphere, however, the engine was found to require to be of large dimensions as compared to a steam-engine of the same power; and in order to obviate this objection, compressed air was used, the idea originating with Mr. James Stirling, C.E. Several other difficulties were successfully surmounted by the Messrs. Stirling, and eventually two improved engines were constructed, one of which was tested to fully 40 horse-power. This latter engine did all the work of the Dundee Foundry Company regularly for upwards of three years, during which period they employed no other motor. At the end of this period it was laid aside, principally owing to the repeated failure of one of the heating vessels.

Captain Ericsson, in his attempt to introduce his C. E. in the ship which bore his name, experienced precisely the same difficulties and disappointments, and tried nearly the same remedies as the Messrs. Stirling. There seems little doubt, however, that he actually believed his 'regenerator' was to make the *same heat* do work over and over again—to be a kind of perpetual motion—and under these circumstances it is not to be wondered at that his machines (notwithstanding some not very creditable manœuvring on the part of their upholders) entirely failed, and that in two years (1855) they were replaced by steam-engines.

Air engines have recently been constructed, in which the solar rays, concentrated by means of an arrangement of mirrors, are utilized as the source of heat. These have been called *solar* engines.

CALORI'METER, a measurer of the degree of heat (q. v.).

CALO'TROPIS. See MUDAR.

CALOTTISTES (*Le Régiment de la Calotte*), a society of witty and satirical men, in the time of Louis XIV., who were headed by two officers in the king's body-guard, named Torsac and Aimon. Their name was taken from the word *calotte* (a 'small cap,' worn by monks over the tonsure), and their amusement consisted in sending to any public character who had exposed himself to ridicule, a 'patent,' authorizing him to wear the *calotte*, as a covering for the weak part of his head. The armorial bearings of the *Régiment de la Calotte* consisted of various symbols of folly, with the motto, '*C'est régner que de savoir rire.*' When Torsac, its first 'generalissimo' died, the society—which occupied a position of satirical hostility to the French Academy—drew up a burlesque funeral oration, manufactured out of the pompously eulogistic phrases that the academicians were in the habit of using. As the society became audacious, and did not spare even royalty itself, it was dissolved by the minister Fleury. The *Mémoires pour servir à l'Histoire de la Calotte* (Basel, 1725) is an amusing little book. During the Restoration, the title *Régime de la Calotte* was applied to the priestly administration of affairs.

CA'LOTYPE PRO'CESS (Gr. *kalos*, beautiful, *typos*, impression), a title comprehending a variety of methods for the production of negative photographs on paper; and so named by the inventor, the late Dr. H. Fox Talbot, who exhibited the result of his experiments in the year 1840. The *principle* involved in the C. P. depends on the susceptibility to the action of daylight of a surface chemically prepared, and the *practice* consists in the preparation, and exposure in the camera, of a sheet of paper, having on one surface an even and finely divided layer of iodide of silver, nitrate of silver, and an organic acid; the image obtained on this surface being subsequently developed with gallo-nitrate of silver. It will be unnecessary here to describe the various modifications which have been introduced with the object of imparting a high degree of sensibility to the paper; one process—the best—will suffice to describe the manipulation.

Good English paper, sized with gelatine, should be chosen, the foreign starch-sized papers being unsuitable, on account of the solutions sinking in too deeply, and thus impairing that sharpness of outline which should be possessed by a good negative. The paper is then floated on one side, and for a moment only, on a solution of iodide of silver in iodide of potassium; prepared by adding freshly precipitated iodide of silver to a *strong* solution of iodide of potassium.

It is then dried, and plunged into a dish containing distilled water, which, by removing the soluble iodide of potassium, precipitates the iodide of silver in an even and finely divided condition over the whole surface of the paper, which in this state will keep good for twelve months. It is now ready to receive the *sensitive coating;* this operation, which is called *exciting* the paper, is performed in the following manner: Two solutions are prepared—one, a saturated solution of gallic acid in cold distilled water, called solution A; the other, a solution of 50 grains of nitrate of silver in one ounce of distilled water, to which one drachm of glacial acetic has been added; this is called solution B. The iodized paper obtained as above is now laid on a board having a piece of clean blotting-paper on it a little larger than the paper to be excited, and the following solution brushed over it with a clean Buckle's brush—distilled water, 1 oz.; solution A, 15 drops; solution B, 15 drops. This mixture, prepared in a chemically clean glass vessel, should be freely applied, and the excess absorbed by clean blotting-paper. The paper is now ready for exposure in the camera, and may be at once placed in the dark slide; or a stock may be thus sensitized, and preserved between folds of blotting-paper until required for use. The *time of exposure*—varying from three minutes to a quarter of an hour—is determined by the diameter and focal length of the lens employed, the aperture of the diaphragm or stop, and the amount of light prevailing at the time. The *development of the latent image*, an operation which, like the preceding, is of course conducted in a room illuminated only by yellow light, is accomplished by applying freely and uniformly over the whole surface solution A; and when the image begins to appear, applying a second quantity, to which a few drops of solution B have been previously added, to increase the intensity. The whole operation of development occupies about a quarter of an hour; and when the details are fully out, the picture should be washed with water, and *fixed*, by immersion in a solution of 1 part of hyposulphite of soda to 4 parts of water; it is then again freely washed in frequent changes of water during several hours; it is lastly *dried* and *waxed;* when it may be regarded as a finished negative, from which positive prints may be obtained, having the lights and shadows as in nature. See POSITIVE PRINTING.

CALOY'ERS, a general name for the monks of the Greek Church. The name is a corruption of two Greek words, *kalos* and *geron*, and signifies 'good old men.' The C. follow the order of St. Basil, and are divided into three ranks: the novices, called *Archari;* the ordinary professed, called *Microchemi;* and the more perfect, called *Megalochemi*. It is always from among them that bishops and patriarchs are chosen, because they are generally members of the most distinguished families of the upper and middle classes.

The C. also furnish the only learned theologians in Greece at the present day. Their monasteries are very numerous. The most celebrated in Asia is that of Mount Sinai, founded by the Emperor Justinian, and endowed with a revenue of 60,000 crowns. In Europe, Mount Athos alone has twenty, the inmates of which have so great a reputation for sanctity, that even the Turks seek an interest in their prayers. The C. are obliged to labor for the benefit of their monastery as long as they continue in it. Their religious services occupy an unnaturally large portion of their time, beginning at midnight, and continuing at intervals until sunset. They observe four Lents: the first, of eight weeks, in commemoration of the resurrection of our Lord; the second, of three weeks, in honor of the holy apostles; the third, of fourteen days, in commemoration of the Assumption of the Virgin; and the fourth in commemoration of the Advent.—There are also female C., or Greek nuns, who likewise follow the rule of St. Basil.

CA'LPEE, a city of Jhansi, one of the N.W. Provinces of India, on the right bank of the Jumna, in lat. 26° 7′ N., and long. 79° 48′ E. Pop. (1872) 15,570. It is an entrepôt for the cotton of the neighboring district. It has manufactures of cotton and paper, and is celebrated for the beauty of its refined sugar. It became British by capture and cession, respectively, in 1803 and 1806. It is 51 m. S.W. of Cawnpore, and is closely linked with it in the history of the insurrection of 1857—1858, as the headquarters of the Gwalior Contingent.

CALPENTY'N, a long and narrow peninsula on the west side of Ceylon, in lat. 8° 14′ N., and long. 79° 53′ E. The neck is so low as to be overflowed during the north-east monsoon, so that it is transformed into an island.

CALPU'RNIUS. The Calpurnia gens was, by its own account, one of the oldest plebeian clans in Rome; but it does not figure in history till the time of the first Punic war. The family names, in the time of the Republic, were Bestia, Bibulus, Flamma, and Piso.—MARCUS CALPURNIUS BIBULUS is known as the hostile but incapable colleague of Cæsar (q. v.) in the consulate. He was put up by the aristocratic party, who spent vast sums to carry the election. He finally joined the Pompeian party, had command of the fleet intended to prevent Cæsar's passage to Greece, and died 48 B.C., before the battle of Dyrrhachium. Among the Roman women of this family, two are celebrated—CALPURNIA, the daughter of Calpurnius Piso (consul 58 B.C.), and the last wife of Cæsar, who seems, from the scanty notices of her we possess, to have been a quiet domestic woman, full of love and solicitude for her great husband; and CALPURNIA, the daughter of L. Calpur-

nius Bestia, wife of P. Antistius, who killed herself when her husband was murdered by order of the younger Marius, 82 B.C.

CALABELLO'TA (a Saracenic name = 'the Castle of the Cork-trees'), a town of Sicily, Girgenti, 7 miles north-east of Sciacca, most picturesquely situated around an ancient castle, which crowns a steep rock overhanging a stream (anc. *Crimisus*), of the same name as the town. Of its churches the *Chiesa Matrice* is a beautiful relic of the middle ages, resembling a mosque, with a single row of columns down the middle. C. was captured by the Saracens in 840 A.D. Pop. 6200.

CALTANISE'TTA, a fortified town of Sicily, situated on a fertile plain near the Salso, about 28 miles north-east of Girgenti. It has mineral springs and extensive sulphur-works. Pop. (1881) 30,031.

CALTAVUTU'RO, a town of Sicily, province of Palermo, and 37 miles south-east of the city of that name, on a small river, the Grande. The town is of Saracenic origin. Jasper is found near C. Pop. 5000.

CA'LTHA. See MARSH MARIGOLD.

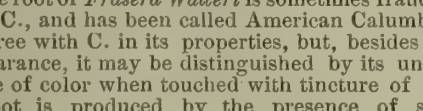
CALTO'NICA, a town of Sicily, about 15 miles north-west of Girgenti. It has pretty extensive sulphur-works and salt-works. Pop. 7000.

CA'LTROP, CA'LTHROP, or CA'LTHORP, in military warfare, is a four-pronged piece of iron, each prong about four inches in length. When it is wished to check the approach of the enemy's cavalry over a plain, or of his besiegers in the ditch of a fortification, caltrops are sometimes thrown down; from their shape, one prong is sure to stand upright, and may work terrible mischief to the enemy's horses or men.

CALUIRE, a town of France, in the department of the Rhone, situated on the left bank of the Saone, about three miles north-north-east of Lyon. It has three annual fairs. Pop. (1876) 7207.

CALU'MBA, or COLO'MBO, very extensively used in medicine, is the root of *Cocculus palmatus*, a herbaceous plant of the natural order *Menispermaceæ* (q. v.). It is said to derive its name from Colombo in Ceylon, although the C. now chiefly in use is the produce of Mozambique. The flowers in this genus have 12 sepals and petals in all, similar in appearance, and disposed in four rows. The male and female flowers are on separate plants. *C. palmatus* has nearly circular leaves with 5—7 lobes, on long hairy footstalks, and solitary axillary racemes of small green flowers, the racemes of the male plants branching. The fruit is a drupe, or 1-seeded berry-like fruit, about the size of a hazel-nut, densely clothed with long hairs. The stem is annual and twining; the root perennial, consisting of clustered spindle-shaped fleshy tubers, with a brown warty epidermis, and internally deep yellow. The plant is not cultivated: The root is collected where it grows wild in dense forests. It is dug up in March, cut into slices, or short cylindrical pieces, and dried in the shade. In this state it appears in commerce, having a greenish-yellow tint, a very bitter taste, and a faint aromatic odor. Its bitterness is ascribed to a somewhat narcotic principle called Calumbine, and to *Berberine*, an alkaloid originally discovered in the Barberry (q. v.), which is also present in it. C. is regarded as one of the most useful stomachics and tonics. It is demulcent, not at all stimulant, and capable of being employed in cases in which almost every other tonic would be rejected by the stomach. It is sometimes given to allay vomiting. It has been found very useful in diarrhœa and dysentery. It is administered in the form of powder, infusion, or tincture. Similar properties seem to reside in the roots of the species of *Cocculus* generally.—The very poisonous seed known by the name of COCCULUS INDICUS (q. v.), belongs to a plant of a different but allied genus.—The root of *Frasera Walteri* is sometimes fraudulently substituted for C., and has been called American Calumba Root. It does not agree with C. in its properties, but, besides its very different appearance, it may be distinguished by its undergoing no such change of color when touched with tincture of iodine, as in true C. Root is produced by the presence of starch. See FRASERA.

CA'LUMET, the 'peace-pipe' of the North American Indians, is a tobacco-pipe having a stem of reed about two feet and a half



Calumet, or Pipe of Peace.

long, decorated with locks of women's hair and feathers, and a large bowl of polished marble. It plays an important part in the conclusion of treaties, of which, indeed, it may be described as the ratifier. After a treaty has been signed, the Indians fill the C. with the best tobacco, and present it to the representatives of the party with whom they have been entering into alliance, themselves smoking out of it afterwards. The presentation of it to strangers is a mark of hospitality, and to refuse it would be considered an act of hostility.

CA'LUMNY. An ancient regulation of the Scotch law obliged litigants to give their *oath of C.*—that is, they swore, either by themselves or by their counsel, that the facts alleged by them were true, although in practice this oath was not usually put unless one of the parties required it of his adversary. In the modern practice, however, of the Court of Session, this oath is confined to actions for divorce, and other consistorial cases—the object being to guard against collusion between the husband and wife. See DIVORCE.

CALUMNY, LAW AS TO. See LIBEL.

CALU'SO, a town of N. Italy, in Piedmont, province of Turin, about 11 miles south of Ivrea, and connected with Turin by railway. Pop. 3500.

CALVADOS, a maritime department in the north-west of France, bounded N. by the English Channel, and E., W., and S. by the departments of Eure, Manche, and Orne. It is formed out of a part of the old province of Normandy. The principal rivers are the Toques, Orne, Dives, Seulle, Dromme, and Vire. The coast, which has few bays or inlets, is partly formed by bold ridges, and partly by sand-downs, cliffs, and reefs. The reef extending between the mouths of the Orne and the Vire, called Calvados, after one of the vessels in the Spanish Armada shipwrecked here, and from which the department takes its name, is very dangerous to navigation. The soil of the department is generally fertile, especially in the valleys, supplying rich pasturage for horned cattle, sheep, horses, and swine, which constitute the principal wealth of Calvados. The climate is healthy, though changeable. Iron, marble, slate, and coal are found. There are various manufactures, and the coast-fisheries are of some importance. C. has an area of 2130 square miles, with a population in 1881 of 437,771, and is divided into six arrondissements. Caen is the capital.

CALVAERT, DIONYS, called also DIONISIO FLAMMINGO, a distinguished painter, especially in landscape, was born at Antwerp in 1555. He settled early at Bologna, where he opened a school, and had among his students the celebrated Domenichino, Guido, and Albani, who were afterwards, however, pupils of the Caracci. Many excellent pictures by him are still preserved at Bologna. He died in 1619.

CA'LVARY, MOUNT, the scene of our Saviour's crucifixion, is an eminence which lay at the north-west, and just on the outside, of the ancient city of Jerusalem. Calvary, or Calvaria, is a translation into Latin of the Hebrew word Golgotha, signifying a 'skull,' either because the mount was a place of public execution, or because it was shaped like a human skull.

CALVARY, in Roman Catholic countries, is a representation of the various scenes of the passion and crucifixion of our Lord, either in a chapel, or external to the church, as at St. Jacques at Antwerp. It consists of three crosses with the figures of Christ and the thieves, usually as large as life, surrounded by a number of figures, representing the various personages who took part in the crucifixion. At Aix-la-Chapelle, the C. is a church on the top of a hill, surrounded by twelve sculptured stones, each marking an event which took place on the journey of the Saviour to Mount Calvary. The approach to the C. is called the *Via Dolorosa*, each of the stones marking what is called a station, at which the pious say a prayer in passing.

CALVE'LLO, a town in the province of Basilicata, Italy, pleasantly situated on a hill-slope about 13 miles south of Potenza. It has two convents. Pop. 5650.

CALVENTU'RA ISLANDS, off the coast of Aracan, in the Bay of Bengal, their center being in lat. 16° 53′ N., and long. 94° 20′ E. The group consists of two divisions—one to the south-east, which is composed of two lofty and well-wooded islets; and another to the north-west, which presents seven bare rocks, chiefly of fantastic shapes.

CA'LVI, a seaport on the island of Corsica, situated on a peninsula in the Gulf of Calvi, about 38 miles west-south-west of Bastia, lat. 42° 35′ N., long. 8° 43′ E. It is strongly fortified, and has a good port, with a high light at its entrance, and a considerable export trade. C. was captured by the English in 1794, after a siege of 51 days. Pop. (1872) 1969.

CA'LVILLE, a kind of apple, of which there are numerous sub-varieties. The calvilles diminish in thickness from the middle towards the calyx, where they form a point; they have regular ribs, and a large open seed-chamber; also a pleasant smell, and are unctuous to the touch. They are never altogether streaked; they have a fine loose flesh, with a flavor somewhat resembling that of the raspberry or strawberry. The White Winter C. is in high repute both as a culinary and desert apple; it is very extensively cultivated on the continent of Europe.

CALVIN, JOHN, one of the most eminent reformers of the 16th c., was born at Noyon, in Picardy, on the 10th of July 1509. His father, Gerard Cauvin or Calvin, was procureur-fiscal of the district of Noyon, and secretary of the diocese. He was one of six children—four sons and two daughters. All the three sons who survived were bred ecclesiastics; and the reformer himself, while still only 12 years of age, was appointed to a chaplaincy in the cathedral church of Noyon. This he held as a means of support during the period of his education, and even for some short time after he had entered on his reforming career. C. was educated in circumstances of ease, and even affluence. The noble family of Mommur, in the neighborhood, invited him to share in the studies of their children; he was in some measure adopted by them; and when the family went to Paris, in his 14th year, he accompanied them, and participated in the benefits of the higher instruction which was there attainable. He was entered as a pupil in the Collége de la Marche, under the regency of Mathurin Cordier, better remembered, perhaps, by his Latin name of Corderius. It was under this distinguished master that C. laid the foundation of his own wonderful mastery of the Latin language. During this early period, he was distinguished by the great activity of his mental powers, and the grave severity of his manners. His companions, it is said, surnamed him the 'Accusative.'

For awhile, his attention was directed to the study of law. His remarkable talents seemed to promise great success in this branch of study, and his father sent him, with the view of prosecuting it, to the university of Orleans, then adorned by Pierre de l'Etoile, one of the most famous jurists of his day, and afterwards president of the Parliament of Paris. At Orleans, he continued the same life of rigorous temperance and earnest studiousness for which he was already noted. Beza says, that after supping moderately, he would spend half the night in study, and devote the morning to meditation on what he had acquired. His undue habits of study seem to have laid thus early the foundation of the ill-health which marked his later years. It was while a law-student in Orleans that he became acquainted with the Scriptures, and received his first impulse to the theological studies which have made his name so distinguished. A relative of his own, Pierre Robert Olivetan, was there engaged in a translation of the Scriptures; and this had the effect of drawing C.'s attention, and awakening within him the religious instinct which was soon to prove the master-principle of his life. We cannot say as yet that his traditionary opinions were unfixed, or that he had embraced with any decision the Protestant opinions that were spreading everywhere; but the seeds of the new faith were now beyond doubt sown in his heart, and from this time, although he still continued for awhile longer to pursue his legal studies, his main interests appear to have been religious and theological. From Orleans he went to Bourges, where he acquired the knowledge of Greek under the tuition of a learned German, Melchior Wolmar, to the influence of whose spiritual instructions he was also greatly indebted. He began here to preach the reformed doctrines, and passed over into the ranks of Protestantism, under the slow but sure growth of his new convictions, rather than under the agitation of any violent feeling. Here, as everywhere, his life presents a marked contrast to that of Luther.

He proceeded to Paris in 1533, which at this date had become a center of the 'new learning,' under the teaching of Lefevre and Farel, and the influence of the queen of Navarre, sister of Francis I. The Sorbonne itself had not escaped the infection. There was a growing religious excitement in the university, in the court, and even among the bishops. This, however, was not to last. The king was soon stirred up to take active measures to quell this rising spirit; and the result was that C. and others were obliged to flee for their lives. The story is that C. narrowly escaped, having descended from his window by means of his sheets, and fled, under the guise of a vine-dresser, a friend of his, in whose clothes he concealed himself. After this he repaired for a short time to his native place, resigned the preferment he held in the Roman Catholic church, and for a year or two led a wandering life, sheltered in various places. We find him at Saintonge; at Nerac, the residence of the queen of Navarre; at Angoulême, with his friend Louis Tillet; then for a brief while at Paris again, strangely enough expecting a meeting with Servetus, who had expressed a desire to see and confer with him. Persecution against the Protestants at this time raged so hotly, that C. was no longer safe in France; and he betook himself to Basel, where he is supposed to have prepared the first edition of the *Institutes of the Christian Religion*, and whence he certainly issued, in the year 1535, the famous preface addressed to Francis I. The concentrated vigor of this address, its intensity of feeling, rising into indignant remonstrance, and at times a pathetic and powerful eloquence, make it one of the most memorable documents in connection with the Reformation. It is throughout a noble defence of the righteous character of the reformed doctrines, and their support alike in Scripture and in history. The energetic decisiveness and moral zeal of the teacher and legislator of Geneva, speak in every page of it. After completing this great service to the cause of Protestantism, he made a short visit to Italy, to Renée, the Duchess of Ferrara. Finally, he revisited his native town; sold the paternal estate, which had devolved to him on the death of his eldest brother; and bidding it adieu, set out in company with his younger brother and sister on his way to Strasburg. The direct road being rendered dangerous by the armies of Charles V., which had penetrated into France, he sought a circuitous route through Savoy and Geneva.

The result of this journey was memorable for the cause of the Reformation. Arrived in Geneva, he met there his friend, Louis Tillet, who communicated the fact of his arrival to Farel, then in the very midst of his struggle to promote the Reformation in the city and neighborhood. Farel hastened to see him, and urge upon him the duty of remaining where he was, and undertaking his share of the work of God, under the burden of which he was like to fail. C. did not at first respond to the call. He was given, he himself says, to his 'own intense thoughts and private studies.' He wished to devote himself to the service of the reformed churches generally, rather than to the care of any particular church. A life of intellectual and theological labor was that which at that time was most congenial to him. By some strange insight, however, Farel penetrated to the higher fitness of the young stranger who stood before him, and he ventured, in the spirit of that daring enthusiasm which characterized him, to lay the curse of God upon him and his studies if he refused his aid to the church of Geneva in her time of need. This seemed to C. a divine menace. 'It was,' he said, 'as if God had seized me by his awful hand from heaven.' He abandoned his intention of pursuing his journey, and joined eagerly with Farel in the work of reformation.

Such was the beginning of C.'s great career in Geneva. Having entered upon his task, he soon infused an energy into it which crowned the struggling efforts of Farel with success. The hierarchical, authority was already overturned before his arrival; the citizens had asserted their independence against the Duke of Savoy, whose alliance with the corrupt episcopate, which was the direct governing influence in the place, had called forth the patriotic as well as the religious feelings of the people. The magistrates and people eagerly joined with the reformers in the first heat of their freedom and zeal. A Protestant Confession of Faith was drawn out, approved of by the Council of Two Hundred, the largest governing board of the city, and then proclaimed in the cathedral church of St. Peter's as binding upon the whole body of the citizens. Great and marvelous changes were wrought in a short time upon the manners of the people; where license and frivolity had reigned, a strict moral severity began to characterize the whole aspect of society. The strain, however, was too sudden and too extreme. A spirit of rebellion to the rule of C. and Farel broke forth; they refused to yield to the wishes of a party animated by a more easy and liberal spirit than themselves, and known in the history of Geneva under the nickname of Libertines; and the consequence was, that they were both expelled from the city after less than two years' residence.

C. retreated to Strasburg, where he had meant to go when arrested in his course at Geneva. Here he settled, and devoted himself to theological study, and especially to his critical labours on the New Testament. Here, also, in October 1539, he married the widow of a converted Anabaptist. The marriage appears to have proved a happy one, although not of long duration.

The Genevans found, after a short time, that they could not well get on without Calvin. His rule might be rigid; but an authority, even such as his, which might gall from its severity, was better than no settled authority at all; and the Libertine party seem to have been unable to construct any efficient and beneficent form of government. Accordingly, they invited C. to return; and after some delay on his part, in order to test the spirit in which they were acting, he acceded to their invitation, and in the autumn of 1541, after three years' absence, once more made his entry into Geneva.

Now, at length, he succeeded in establishing his plan of church-government, in all its forms and details. By his College of Pastors and Doctors, and his Consistorial Court of Discipline, he founded a theocracy, with himself at the head of it, which aimed virtually to direct all the affairs of the city, and to control and modify both the social and individual life of the citizens. Not without a struggle, it may be supposed, did he succeed in his great autocratic scheme. The Libertines, although dishonored by their ineffectual attempts to maintain order in the city, and uphold its rights and dignity, still remained a strong party, which was even augmented, after C.'s return, by men such as Amy Perrin, who had strongly concurred in the invitation to C., but who were afterwards alienated from him by the high and arbitrary hand with which he pursued his designs, as well as by their own schemes of ambition. The struggle with this party lasted with various fortune for no less a period than fifteen years, and was only terminated in 1555, after a somewhat rediculous *émeute* in the streets. Amy Perrin and others, driven from the city, were executed in effigy;

and the reformer's authority from this date confirmed into an absolute supremacy.

During the period of this long struggle with the Libertines, C. had many other disputes, in which he conducted himself with no less heartiness and zeal. The most remarkable of these were his controversies with Sebastian Castellio, Jerome Bolsec, and above all, Michael Servetus.

C. had become acquainted with Castellio at Strasburg. They entertained at first a warm friendship for each other, and C. showed great zeal in assisting Castellio, whose poverty and learning had attracted his sympathy. When he returned to Geneva, he invited Castellio to join him there, and procured for him the title of Regent or Tutor in the gymnasium of the city. There was little similarity, however, in the characters of the two men, and the diversity of their tastes and views soon became apparent. The learning of Castellio was intensely humanitic; a classical spirit and a somewhat arbitrary opinionativeness moulded all his studies; and as soon as he began to apply himself to theology, he came into conflict with Calvin. In a letter to Farel in 1542, we find C. speaking of the freaks of 'our friend Sebastian, which may both raise your bile and your laughter at the same time.' These freaks relate to Castellio's notions of Scriptural translation, and his refusal of C.'s offer to revise the version which he had made of certain parts of Scripture. Then, two years later, when Castellio desired to enter into the ministry, C. dissuaded the council from accepting him, on account of some peculiar opinions which he held. These were certain rationalistic views as to the authenticity and character of the Song of Solomon, the descent of Christ into hell, and also about election. After this, Castellio left Geneva for awhile, but soon returning, he attacked the views of C. openly. After a violent scene in church, which is painted in C.'s letters very strongly, he was forced to leave the city. The two old friends, now declared enemies, did not spare each other henceforth. The fate of Servetus drew forth an anonymous publication, attacking with keen logic and covert and ingenious sarcasm the Genevan doctrines. This publication was attributed by both C. and Beza to Castellio, and they replied to him in no measured terms, stigmatizing him as a 'deceiver and vessel of Satan.' One fact really disgraceful to C. in the controversy deserves not to be passed over. Sunk in great poverty, Castellio was obliged, in his old age, to gather sticks on the banks of the Rhine at Basel, as a means of support. C. did not hesitate to accuse him of stealing the sticks. Such polemical truculence may well make us turn away in disgust and indignation.

The controversy with Bolsec belongs to a later period. Jerome Bolsec was originally a Carmelite monk, but he had thrown aside the habit, and betaken himself to the practice of medicine in Geneva. He was led to attack C.'s doctrine of predestination. As soon as C. heard of this, he led him to understand that he was not at liberty to question the Genevan doctrine. He and the other clergy dealt with him; but after repeated disputations Bolsec was found incorrigible, and was sentenced to banishment from the city. Cast out of the theocratic community, he ultimately rejoined the Roman Catholic Church, and revenged himself in a somewhat mean way against C. by writing his life in a spirit of detraction and slander.

Of all these contests, however, the most memorable is that with Servetus. A melancholy interest encircles the name of this great heretic, which the criminal tragedy of his death keeps always fresh and vivid in the minds of all who hate intolerance, and who love truth rather than dogmatism. The character of Servetus himself has little to do with this interest. He seems to have been more of a vain, restless, and enthusiastic dreamer, than of a calm and patient inquirer. In his very dreams, however, and the vague audacities of his speculation, there is a kind of simplicity and unconscious earnestness that wins sympathy. He had entered into various connections with C., even from the time of his early residence in Paris; particularly, he had sent him various documents containing the views, fully developed in his work subsequently published under the title of *Restitutio Christianismi*. C. never concealed his abhorrence of these views; and in a letter to Farel as early as 1546, he threatens that if Servetus should come to Geneva, he would do what he could to bring him to condign punishment: *Nam si venerit, modo valeat mea authoritas, vivum exire nunquam patiar.* The history of his seizure and condemnation at Vienne by the Catholic authorities, and especially of C.'s share in the correspondence which led to his seizure, is very complicated and obscure. It has been maintained that C. was the instigator, through a creature of his own of the name of Trie, of the whole transaction; it *is certain* that he forwarded to the authorities, through Trie, private documents which Servetus had intrusted to him, with a view to the heretic's identification, and as materials for his condemnation. Servetus was sentenced to be burned, but effected his escape, and, after several month's wandering, he was found at Geneva. It was his intention to proceed to Italy, where he hoped his opinions might meet with some degree of toleration, and he arrived at Geneva on his way. This is the explanation of an event otherwise unaccountable. Having ventured to church, according to the common account, he was recognized, apprehended, and conveyed to prison by C.'s order, just as he was about to leave the city. The particulars of his trial are full of interest, but too lengthened to be detailed here.

It lasted, with various interruptions, for two months. He attacked C. with the most foul epithets, and C. retorted with a virulence and foulness quite equal to his own. At length, on the 26th of October 1553, sentence was passed upon Servetus, condemning him to death by fire. C. used his influence to have the mode of death alleviated, but without success. On the very next morning, the sentence was put into execution. On an extended eminence at some distance from the city, Servitus was fastened to a stake surrounded by heaps of oak-wood and leaves, with his condemned book and the MS. he had sent to C. attached to his girdle; and, amid his agonizing cries, the fire was kindled, and the wretched man expiated his heresy amidst the flames. Whatever apologies may be urged for this memorable crime, it must remain a mournful and scandalous blot on the history of the Reformation. The disgrace of it has particularly attached to C., and with some justice, from the special and unhappy relation which he bore to the whole transaction; but most of the Reformers are no less implicated in it. The wise Bullinger defended it, and even the gentle Melanchthon could only see cause for gratitude in the hideous tragedy.

After the execution of Servetus, and the expulsion of the Libertines, two years later, C.'s power in Geneva was firmly established, and he used it vigorously and beneficently for the defence of Protestantism throughout Europe. By the mediation of Beza, he made his influence felt in France in the great struggle that was there going on between the hierarchical party, with the Guises at its head, and the Protestants led by Condé and Coligny. In 1561, his energies began to fail. He had been long suffering from bad health, but his strength of will and buoyancy of intellect sustained him amid all his bodily weakness. In the year now mentioned, his bad health greatly increased, and although he survived for more than two years, he never regained any vigor. He died on the 27th of May 1564.

Very different estimates, it may be imagined, have been formed of C.'s character, according to the point of view from which it is contemplated. None, however, can dispute his intellectual greatness, or the powerful service which he rendered to the cause of Protestantism. Stern in spirit, and unyielding in will, he is never selfish or petty in his motives. Nowhere amiable, he is everywhere strong. Arbitrary and cruel when it suits him, he is yet heroic in his aims, and beneficent in the scope of his ambition. Earnest from the first, looking upon life as a serious reality, his moral purpose is always clear and definite—to live a life of duty, to shape circumstances to such divine ends as he apprehended, and in whatever sphere he might be placed, to work out the glory of God.

He rendered a double service to Protestantism, which, apart from anything else, would have made his name illustrious: he *systematized its doctrine*, and he *organized its ecclesiastical discipline*. He was at once the great theologian of the Reformation, and the founder of a new church polity, which did more than all other influences to consolidate the scattered forces of the Reformation, and give them an enduring strength. As a religious teacher, as a social legislator, and as a writer, especially of the French language, then in process of formation, his fame is second to none in his age, and must always conspicuously adorn the history of civilization. Among C.'s most important works are: *Christianæ Religionis Institutio* (Basel, 1536); *De Necessitate Reformandæ Ecclesiæ* (1544); *Commentaires sur la Concordance ou Harmonie des Evangélistes* (Gen. 1561); *In Novum Testamentum Commentarii; In Libros Psalmorum Commentarii; In Librum Geneseos Commentarii*. The first edition of C.'s whole works is that of Amsterdam, 1671, in 9 vols. fol. A complete critical edition by Baum, Cunitz, and Reuss began to appear at Brunswick in 1869. By the 'Calvin Translation Society,' in Edinburgh, his works have been collected, translated into English, and issued in 51 vols. 8vo, 1843—1855. Besides the original *Vita* by Beza, there are lives of C. by Bolsec (from the Catholic standpoint, 1577; new ed. 1875), Audin (1840), Bungener, Viguet and Tissot, (1864); and in Germany, by Henry (1844), Stähelin (1863), and Kampschulte (vol. i. 1869).

CA'LVINISM is the system of religious doctrine associated with the name of Calvin, and supposed to distinguish the churches more particularly called the Reformed, in contradistinction to the Lutheran and Anglican churches. Calvin's doctrinal views are laid down at length in his *Institutio Christianæ Religionis*, first published in 1536. It was not till many years later, however, that the name of C. came to be attached to a certain set of doctrinal opinions, and not till the rise of Arminius (q. v.) and the synod of Dort (q. v.) in 1618, that these opinions may be said to have been polemically marked off from others with which they are generaliy contrasted, and to which they are recognized as standing in opposition.

The difference of thought expressed in the Arminian and Calvinistic systems is as old as the history of Christian doctrine. In almost every point, Augustine may be said to have anticipated Calvin; while Pelagius and the eastern divines, such as Chrysostom, represented a type of opinion upon the whole consonant to that which in more modern times has been opposed to Calvinism, In the Roman Catholic Church, since the Reformation, the same opposition of thought has presented itself in the famous contest of Jansenism and Jesuitism.

The main point of distinction in the two systems or modes of Christian opinion, is as to the operation of divine grace in the salvation of sinners. In the one system, this operation is considered as predetermined and absolute; in the other, as merely prescient, and in some sense conditioned. *Predestination* and *Irresistible Grace* are the great key-notes of C.—its two main points. Others were added in opposition to Arminianism—viz., *Original Sin, Particular Redemption*, and the *Perseverance of the Saints;* but the first of these is not peculiarly Calvinistic, and the last two are merely corollaries from the doctrines of Predestination and Grace. Predestination is, in fact, the one distinguishing doctrine of the system, as it was of Augustinianism, of which C. was merely the revival. The divine will, apprehended as decretive and predestinating, is necessarily *irresistible* in its efficacy, *select* in its objects and *persevering* in its results. The characteristic of C., therefore, is that it is a speculative Christian system, springing from a single great principle, carried out rigorously into all its logical consequences.

The Church of England, in its earlier history, was Calvinistic in its creed, although mediæval and Catholic in its ritual. Puritanism was nothing else than a movement to reduce it altogether to a Calvinistic model. In the re-action which followed this movement, the Church of England, while retaining its original articles, nearly parted with its Calvinistic faith; and throughout the 18th c., its chief divines are conspicuously Arminian or latitudinarian. But with the revival of the evangelical party in the end of the century, C. revived; and it still maintains, if not an absolute sway, yet a powerful influence over many minds in the Anglican establishment, while it is the professed creed of a great proportion of the dissenters.

The Church of Scotland, along with the other Presbyterian churches in this country, and the large and numerously increasing bodies of Presbyterians in America, all hold to the Westminster Confession of Faith, the most elaborate and formal expression of Calvinistic doctrine that exists. But while holding to the same Calvinistic standard, these churches show many varieties of actual opinion; and in the history of Presbyterianism, C. has shown a tendency in its logical development to pass into Rationalism or Unitarianism. This is conspicuously the case in the church of Geneva itself, and some of the old Puritan churches of America. It still remains, however, as opposed to Arminian, Socinian, or any cognate forms of the same type of doctrine, the most living and powerful among the creeds of the Reformation.

CA'LW, or KALW, an important manufacturing town in Würtemberg, chief seat of the Würtemberg timber-trade with Holland, and capital of a bailiwick of the same name, in the circle of the Black Forest, lies in the valley of the Nagold, on both sides of the stream, over which are two stone bridges. Cotton and woollen spinning, dyeing turkey-red, manufacturing woollen and cotton fabrics, making leather, stout shoes, cigars, &c., are the principal industries. Though the streets in the old town are irregularly built, there are many large and beautiful houses. Pop. (1871) 5582; (1880) 4662, nearly all Protestants.

CALX is the Latin term for quicklime. As quicklime is produced by burning limestone, the alchemists applied the term C. to the product obtained by burning any ore or other mineral substance; and *calcination* (q. v.) to the process.

CALYCA'NTHUS (Gr. calyx-flower), a genus of plants of the natural order *Calycanthaceæ*, an order allied to *Rosaceæ*, and of which only a few species are known, natives of North America and Japan—shrubs with square stems, which are of remarkable structure, having around the central woody axis four smaller imperfect ones. An aromatic fragrance characterizes this order. In the genus C., the bark and leaves possess it as well as the flowers. The bark of *C. floridus*, a native of Carolina, has been used as a spice and carminative, and has acquired the name of Carolina Allspice, or American Allspice. The flowers are of a chocolate color.

CALYDO'NIAN BOAR. Once upon a time, according to a Greek myth, a certain Œneus, king of Calydon, the ancient capital of Ætolia, omitted a sacrifice to Diana, whereupon the goddess, in her rage, sent into his fields a frightful boar, which committed great devastation. No one had the courage to hunt it except Meleager, the son of Œneus, who, calling to his help the bravest heroes of Greece—Theseus, Jason, Nestor, and others—pursued and slew the monster. Later writers, however, affirm that he found it impossible to destroy the animal, until Atalanta, his mistress, aided him by piercing it with an arrow.

CALY'MENE, a genus of the fossil order Trilobites (q. v.). It differed from the other genera of the order in the individuals having the power of rolling themselves into a ball, so that they are often found coiled up like an oniscus, i. e., hog-house —*vulgo*, a slater. The genus is characteristic of the Silurian formation. The species we figure has been long known as the 'Dudley Locust.' It is remarkable as a very long subsisting species, passing from the Caradoc beds to the Ludlow rocks. Twenty species have been described.

Calymene Blumenbachii.

CALY'PSO, in Grecian legend, was, according to Homer, the daughter of Atlas, and inhabited the solitary wooded isle of Ogygia, far apart from all gods and men. Ulysses being thrown upon her island by shipwreck, she treated him kindly, and promised him immortality if he would marry her. He was fascinated by her charms, but unwilling to desert his wife and his native land; she detained him, however, seven years, and bore him two sons. On his departure, she died of grief.

CALYPTRÆ'A, (Gr. *kalyptra*, a head-dress), a genus of gasteropodous mollusks, of the order *Pectinibranchiata*, the type of a family, *Calyptræidæ*, formerly included in the genus *Patella*, or Limpet, when the mere form of the shell was more regarded in classification than the structure of the animal, and still known as Chambered Limpets, Cup-and-Saucer Limpets, Bonnet Limpets, and Slipper Limpets. The shell is limpet-shaped, but the apex is more or less spiral, and has a calcareous process from its inner surface for the attachment of a principal muscle. The *Calyptræidæ* differ much in shape, some being very flat, and others very conical; some elongated and slipper-like. The species are generally natives of the shores of warm climates. Only two are British.—*Calyptræidæ* are common in the older fossiliferous rocks.

CA'LYX (a term originally Greek), in Botany, the outermost of the circles of modified leaves which surround the parts of fructification, and along with them constitute the flower. Within the C. there is generally at least a second circle of leaves, called the corolla; (see COROLLA and FLOWER); but this is sometimes wanting, and the C. is the only envelope of the parts of fructification. The leaves of which the C. is composed are called *sepals*, when quite separate from each other; but they often grow together into a tube at the base, and the C. is then said to be *monosepalous* or *gamosepalous* (*monos*, one; *gamos*, union). The sepals are generally simple and without stalks; they are generally green, and differ much less widely from ordinary leaves than the petals or leaves of the corolla; sometimes, however, they are *petaloid*, and brightly colored, as in *Fuchsia*. The C. and corolla of many endogenous plants resemble one another almost completely, and the common term *perianth* (q. v.) is then very generally employed. In some plants, the C. passes insensibly into the corolla, and it is not easy to distinguish the innermost sepals from the outermost petals. The C. is in such cases often composed of more circles of leaves than one. The C. occasionally falls off when flowering is over (*deciduous*), as in *Ranunculus;* sometimes even when it commences (*caducous*), as in the poppy; generally it remains till the fruit is ripe (*persistent*), and is then much enlarged and more brightly colored, as in *Physalis*. It often becomes fleshy, and forms the seeming fruit, as in the rose.—The glumes (q. v.) of grasses, &c., used to be regarded as a C., to which, however, they have no proper analogy.

Calyx of Thorn Apple, Pink, and Campanula.

CAM, or GRANTA, a river of England, which, rising in Essex, flows north-east through Cambridge-shire, and after a course of about 40 miles, joins the Ouse 3½ miles above Ely. It gives its name to the town of Cambridge, which stands upon it, and below which it is navigable, and is classic on account of the boat-races on it by Cambridge-students.

CAMA'LDOLITES, a religious order founded in the vale of Camaldoli, near Arezzo, in the Apennines, in 1018, by St. Romuald, a Benedictine monk, and a member of the noble family of the Dukes of Ravenna. From Italy it spread into France, Germany, and Poland. The brethren, who wear a white garment, are, and

have always been, characterized for the excessive rigidity of their monastic rule; but except to show to what lengths in a cruel mortification of natural life man can proceed, they have been practically useless in the world. The order is now almost extinct.

CAMARGUE. See BOUCHES DU RHONE.

CAMARI'LLA, a Spanish word, diminutive of *camara*, literally signifies a little chamber. As *camara* is used to designate, *par excellence*, the chamber of the king of Spain, the royal chamber, so C. is also used to designate his private chamber or cabinet, the place where he receives his most intimate friends, courtiers, sycophants, and all the moral refuse that naturally gathers round a weak throne. Hence, in the political language of modern Europe it has come to signify the influence exercised on the state by secret and unaccredited councillors, in opposition to the opinions of the legitimate ministry, an influence which in Spain particularly is most pernicious. The word first obtained this meaning in the time of Ferdinand VII., who was excessively addicted to the unkingly habit of listening to the insinuations of the companions of his pleasure.

CAMAY'EU AND MO'NOCHROME are terms by which painting in one color is designated. The ancients painted thus both in gray (*en grisaille*) and in red. Pictures of several tints, but where the natural colors of the objects are not copied, are said to be *en camayeu*. As one color generally prevails, we speak of blue, red, yellow, green, camayeu. Polidori Caravaggio, for example, so overlaid his other colors with brown that his works give the impression of monochrome paintings. Drawings in Indian ink, red, and black chalk, pencil, &c., as well as engravings, may be said to be *en camayeu*.

CAMBACÉRÈS, JEAN JACQUES RÉGIS, Duke of Parma, and High Chancellor of the French Empire, under Napoleon, was born at Montpellier, October 18, 1753. In 1791, he was appointed president of the criminal court in his native place. Afterwards, as member of the National Convention, he took a prominent part in sketching the new code of laws, and distinguished himself by his moderation. He denied the right of the Convention to condemn the king, and, when this was done, argued in favor of a reprieve. After the revolution of the 9th Thermidor (July 27, 1794), C. was elected president of the Convention, and, as head of the Committee of Public Safety, was active in procuring peace with Prussia and Spain. His enemies having succeeded in expelling him from office, he engaged himself in legal studies, and laid before the council of Five Hundred the sketch of a civil code which afterwards formed the basis of the *Code Napoleon*. In 1796, C. was for a short time made president of this council. After the changes made in the Directory, he was made Minister of Justice, assisted in the revolution of the 18th Brumaire (November 9, 1799), was made Second Consul, and faithfully attached himself to the interest of Napoleon, by whom he was raised to the office of High Chancellor of the Empire, and in 1808 was made Duke of Parma. He endeavored to dissuade Napoleon from the projected invasion of Russia, but in this instance his advice was vainly given. In 1813, when Napoleon took the field against the allies, C. was left as president of the regency, and in this capacity accompanied the empress to Blois, 1814. From this place he sent to Paris his vote for the abdication of Napoleon. During the Hundred Days, against his own will, he was made Minister of Justice, and President of the Chamber of Peers. After the second restoration, C. lived privately in Paris for some time; but in 1816, was exiled for having taken part in the execution of Louis XVI. In 1818, his civil and political rights were restored, and he returned to Paris, where he lived retired to the time of his death, March 5, 1824. Among the men of the Revolution, C. was one of the few whose activity was peaceable and truly progressive. His services in the establishment of law were great. His nature was mild and candid, and his intellect very acute.

CAMBAY', a city, district, and gulf at the north-west extremity of the peninsula of Hindustan.—1. C., the city, stands at the head of its gulf, and on the right bank of the Myhee, in lat. 22° 18′ N., and long. 72° 39′ E., being 76 miles to the north-north-west of Surat. It contains about 33,700 inhabitants, having been at one time much more populous—ruinous palaces, mosques, and tombs, and an excavated temple of considerable pretensions, attest its former magnificence and extent. The main cause of its decay has been the gradual obstruction of its seaward navigation. It still exports grain, cotton, and ivory, besides its renowned manufactures in bloodstone and carnelian.—2. C., the district contains an area of 350 square miles, strecthing in N. lat. from 22° 9′ to 22° 41′, and in E. long. from 72° 20′ to 73° 5′. It is attached to the presidency of Bombay, though under the government of a nawab of its own. Pop. 85,000.—3. C., the gulf, extends in N. lat. between 21° and 22° 10′, and in E. long. between 71° 50′ and 72° 40′, measuring 80 miles in length, and averaging 25 in breadth. In proportion to its size, it receives a vast quantity of fresh water—on the west, the Gooma, Oolowtee, Gelya, and Setroonjee; on the north, the Saburmuttee and Myhee; and on the east, the Nerbudda and the Taptee. The inundations of so many rivers, and the ebb and flow of tides, which fall and rise 30 feet, conspire not only to elevate the bottom, but to generate movable quicksands.

CA'MBER, in Ship-building, implies a slight arching or convexity upwards. A 'cambered' ship is one in which the floor is higher in midships than at the stem and stern.—The name 'camber' is also given to a small dock in a dockyard, for containing boats, and for loading and unloading timber.

CA'MBERWELL, once a rural village, now a suburb of London, on the south side of the Thames.

CAMBERWELL BEAUTY (*Vanessa Antiopa*), one of the largest and most beautiful British butterflies, rare in Britain, although it has been found in many parts of the country, but common in the central and southern parts of Europe. The wings are of a deep brown color, with a band of black around the brown, and an outer band or margin of pale yellow, the black band containing a row of large blue spots, the yellow margin dappled with black specks, all the colors rich and velvety. The margin of the wings exhibits tooth-like angularities. The antennæ are terminated by a knob. The caterpillar feeds on the willow. It is black, with white dots and a row of large red spots down the back, and is rough with soft spines.—When Camberwell was more rural than now, and abounded in willows, this butterfly was sometimes taken there.

CA'MBIO, CA'MBIST. The former of these two words is the Italian for *exchange;* the latter, for a *money-changer*. Cambist is also used figuratively as the title of a book in which the moneys, weights, measures, &c., of various nations are given in the equivalents of some particular one. For instance, Kelly's *Universal Cambist* gives these in English, and the *Cambista Maltesa* in Italian.

CA'MBIUM (Lat. *cambio*, to change), in Botany, a layer of mucilaginous viscid matter, particularly abundant in spring, interposed between the woody layers and the bark of trees and other stems. Delicate cells (*Cambium cells*) are formed in it, which certainly fulfil important functions in the formation of new wood, although, notwithstanding much investigation by some of the greatest vegetable physiologists of our time, the nature of these functions is still very imperfectly ascertained. The medulary rays are connected with the C. cells, and these cells gradually elongate into the shape which belongs to those of woody tissue. The C. layer is found only in exogenous stems.

CAMBO'DIA, or CAMBO'JA (native name, *Kon-pou-chi*), an extensive country of the Indo-Chinese Peninsula, now a protectorate of France, bounded on the S.W. by the Gulf of Siam, on the S.E. by French Cochin-China, and on the N. by Siam. Area, about 33,000 sq. m.; pop. about 900,000. The surface is mostly flat, and the soil fertile. There are extensive forests, which shelter elephants and deer; there are also wild-cattle and ponies, and the rhinoceros abounds. Among the chief products are rice, betel, areca-nuts, gamboge, spices, sandal-wood, and ivory. Iron occurs. See COCHIN-CHINA.

CAMBO'GE. See GAMBOGE.

CA'MBORNE, a town of Cornwall, 11 m. N.W. of Falmouth. It is surrounded by very productive copper, tin, and lead mines. C. church has a stone inscription of the tenth century. Pop. (1871) 7757.

CAMBRAI, a city of France, in the department of the Nord, about 32 miles south-south-east of Lille. It is situated on the right bank of the Scheldt, is strongly fortified and well built, with tolerably wide, but irregular streets, and many picturesque old houses. The cathedral, archiepiscopal palace, town-house, and theater are among the principal public buildings. The city was greatly injured in 1793, when the revolutionists, among other vandalisms, razed the fine cathedral. They also disentombed the remains of Fénélon, who was archbishop here, and melted his lead coffin into bullets. A monument, however, by David the sculptor was erected (1825) in the new cathedral, in memory of the immortal author of *Télémaque*. The manufactures of the city are important, consisting of cambric—so called from its manufacture here—linen-thread, lace, cotton-yarn, beet-root sugar, soap, starch, leather, &c. It has also a trade in agricultural produce. The population, in 1876, was 16,966.

C. was known to the Romans under the name of *Camaracum*, and it was then one of the chief cities of the Nervii. It was fortified by Charlemagne, and was long governed by its own bishops to whom Charles the Bald ceded it. The celebrated league against the republic of Venice, which comprised the pope, the emperor of Germany, and the kings of France and Spain, was entered into here in 1508, and it takes its name from the city. Here also were concluded treaties between the French king and the German emperor in 1529, and in 1724—1725 between Charles VI. and Philip V. of Spain. During 1815—1818 it was the head-quarters of the British army of occupation.

CA'MBRIA, the ancient name of Wales, the Britannia Secunda of the Romans. The name is derived from that of Cimbri or Cymri, by which the Welsh have always called themselves. See BRETTS AND SCOTS.

CAMBRIAN ROCKS, the name given by Professor Sedgwick to the oldest known fossiliferous rocks, on account of their extensive development in North Wales. Their true limits have been the subject of considerable controversy. When Sedgwick first described them, they were considered inferior to the Silurian measures. Subsequent examination has shown that they are the equivalents of rocks previously described by Murchison as Lower Silurian; and accordingly, geologistis generally, following the classification of the government geological surveyors, confine the term to an extensive series of gritstones, sandstones, and slates, which underlie the Silurian Lingula beds. In Anglesea, these rocks have been metamorphosed in one place into chlorite and mica schists; in another, into gneiss, and all traces of organisms have been destroyed. In North Wales they are less altered, but have as yet proved unfossiliferous. In the Longmynd (Salop), there is an apparent thickness of 26,000 feet, which may be, however, owing to folds in the beds. A few fossils have been noticed here, consisting of a fucoid plant or two, the tracks of annelids, and the fragments of a supposed trilobite, called *Palæopyge Ramsayi*. In Ireland, similar rocks occur, containing two species of a small branched zoophyte, named *Oldhamia*, and numerous tracks and burrows of sea-worms.

CA'MBRIC, a general term applied to the finest and thinnest of linen fabrics. It is said to be derived from Cambrai, where such goods were first made. Some of the finest cambrics of the present day are produced in Switzerland. Scotch C. is really a muslin, being made of cotton with the fibre twisted very hard, to imitate real or linen cambric.

CA'MBRIDGE, the chief town of the county so named, lies 48 miles north-north-east of London. It takes its name from the river Cam, which was anciently called the Granta. By the Saxons, C. appears to have been known as GRANTABRYCGE, which is found with many slight variations of spelling, and probably became abbreviated into CANTBRICGE. It is also supposed that C., and not the adjacent village of Grantchester, was the GRANTACEASTER of the Saxons. There are, however, traces of a camp at Grantchester. In 870, the Danes ravaged the country hereabouts, and are said to have destroyed the town. King John, in the second year of his reign (1200 A.D.), granted a charter to the town, permitting it to have a guild of merchants, and in 1207, confirmed the burgesses in their privileges in perpetuity. In 1225, they paid a fine of 50 marks for having their liberties; and in 1227, Henry III. confirmed their charters. The town has sent two members to parliament from the earliest period. The university sends two members of its own. Pop. in 1871 of municipal borough, 30,078, and of parliamentary borough, 30,996; in 1881, 35,372 and 40,882 respectively. C. has 18 churches belonging to the Church of England, besides chapels belonging to the Baptist, Congregationalist, and other bodies. The most curious church is that of the Holy Sepulchre, which is one of the few in England that have a round tower. The town is not generally pretty or picturesque, but the gardens at the backs of the colleges, by the Cam, are extremely beautiful in the summer months. Its chief architectural features are the college and university buildings.

CAMBRIDGE, UNIVERSITY OF, one of the two ancient institutions of the kind existing in England. Overlooking several fabulous accounts of its origin, its true history may be said to begin at the opening of the 12th century. When Alfred of Beverley was student here in 1129 A. D., there were as yet no public halls or hostels, but each one lived in his own hired lodging.

The first regular society of students was that of Peter-house, founded in 1257. About this time, students began to live together in hostels, under the rule of a principal, at their own charges. These hostels were named after the saints to whom they were dedicated, the churches which they adjoined, or the persons who formerly built or possessed them. In the year 1280, there were as many as 34, and some of them contained from 20 to 40 masters of arts, and a proportionate number of younger students; but all these hostels decayed by degrees when endowed colleges began to appear. Trinity hostel survived all the rest, and continued to 1540. The hostels were the beginning of what may be called the *college system*, which distinguishes the sister-universities of Oxford and Cambridge from those of Edinburgh, London, and the continent. See UNIVERSITIES.

It was between the latter part of the 13th and the close of the 16th century that, with one exception, all these royal and religious foundations were endowed which now constitute the university. Hugh de Balsham was the first benefactor in this way. Michael House was founded by Hervey de Stanton in 1324, and King's Hall by Edward III. in 1332, both of which were absorbed into Trinity College by Henry VIII. in 1546. Clare Hall, as it used to be called, one of the earliest, and still one of the prettiest colleges in Cambridge, was founded by the Countess of Clare in 1326. Henry VI. has left himself an imperishable monument in the splendid foundation of King's College; and his queen, Margaret, commenced the foundation of Queens' College, which was added to by Elizabeth Widville, queen of Edward IV. Lady Margaret, Countess of Richmond and Derby, mother of Henry VII., founded Christ's College and St. John's at the beginning of the 16th c., and also the Divinity Professorship named after her. Henry VIII. appropriated part of the spoils of the monasteries to the foundation of Trinity College, and Queen Mary augmented the endowment. The five Regius Professorships were endowed by Henry VIII. Cambridge was frequently visited by the plague, and university proceedings were suspended by it in 1642 and 1666. In 1643, Cromwell took possession of the town, and the most eminent loyalists were expelled from the university. Almost all the colleges had sent their plate to the king at Nottingham. As might be expected, little was done for the university in this troubled century; indeed no new colleges were added until the founding of Downing College in 1800.

The predominance of the religious element in the college-discipline is to be attributed as much to the circumstances and manners of the times in which the colleges were founded, as to the piety of the founders themselves. There had been, from very early times, 'Religious Houses,' and these were in many cases united with the new collegiate foundations. There were, for example, the Dominicans, or Preaching Friars, whose house is now turned into Emmanuel College. The friars who lived in these convents were capable of degrees, and kept their 'acts,' or exercises for degrees, as other university men. There were, however, frequent quarrels between them and the other students. To the same cause is to be traced the condition of celibacy, upon which, with few exceptions, the fellowships were formerly tenable. These conditions had been considerably relaxed before the abolition of the restrictions as to marriage and (except in the case of offices with clerical functions) holy orders was proposed by the statutes issued in 1881 by the Cambridge Commissioners under the Universities of Oxford and Cambridge Act (1877). These statutes are to take the place of those confirmed by the Queen in Council in 1858.

The governing body of the university is the senate; but, before being submitted to it, all university laws must be approved by the council—a body elected by the resident members of senate. After the chancellor and high-steward, the chief executive power is vested in the vice-chancellor, who is elected annually from among the heads of colleges. The public orator is the voice of the senate upon public occasions. The proctors superintend the discipline and morals of all persons *in statu pupillari;* they are present at all congregations of the senate, read the 'graces,' and take the votes. The registrary is responsible for the graces being offered in due form, and has charge of the university records. There are three terms in this university—the Michaelmas or October term, the Lent term, and the Easter term. To take an ordinary B.A. degree, a student must reside nine terms. The M.A. degree follows, without examination, about four years after. Dissenters are not now excluded from taking degrees, except in divinity.

With respect to the admission of students, their university course, expenses, and proceedings in degrees, the following information may be useful: There are four classes of students—viz., *Fellow Commoners* and *Noblemen*, *Pensioners*, *Sizars* and *Subsizars*, and the more distinguished students who are elected *Scholars* on the foundation of their college. The first class (now almost obsolete) are so called from their dining at the Fellows' table; they wear silk or embroidered gowns, and pay heavier fees. The Pensioners are the great body of students, are not on the foundation, and pay for their own commons, viz., dinners in hall, &c., and for their rooms. The Sizars are poorer students, selected, however, by examination, who receive free commons and certain money payments, are admitted at lower charges than the pensioners, but wear the same dress, and are no longer subject to the performance of menial offices as they once were. Some of the colleges, especially St. John's and Trinity, have very liberal endowments for the sizars, and very considerable pecuniary assistance is given to the more deserving of them. The Scholars are elected, by examination, from the pensioners and sizars; they are on the foundation of the college, from which they receive certain emoluments. The Fellows are subsequently elected from the scholars and the students who have distinguished themselves in the Tripos examinations. Vacancies are, as a rule, filled up by members from the college, but fellowships are sometimes open to the competition of the whole university. The usual age of admission is from 17 to 20. Before a student can be admitted, he must obtain from some master of arts of the university of Cambridge or Oxford a certificate of being qualified for admission; this certificate must be sent to the tutor of the college, along with the caution-money, which, in the case of a pensioner, amounts to £15. At some colleges there

is an entrance examination previous to matriculation in place of the above certificate.

Residence is usually commenced in the October term. The undergraduate in his first year of residence is called a 'Freshman;' in his second year, a 'Junior Soph;' in his third year, a 'Senior Soph.' The ordinary B.A., or Bachelor of Arts degree, may be taken in the ninth term of residence—viz., in the third June after coming up. The examinations required are: 1. The Previous Examination, or 'Little-go' (usually taken in the first or third term of residence), the subjects for which are a gospel in Greek, a Greek classic, a Latin classic, Greek and Latin Grammar, Paley's *Evidences of Christianity;* Euclid, i. ii. iii. vi.; Arithmetic and Elementary Algebra. 2. The General Examination in more advanced Classics and Mathematics. 3. A Special Examination in *one* of the following subjects: Theology, Logic, Political Economy, Law, Modern History, Chemistry, Botany, Zoology, Geology, Applied Science, Music. Candidates for Honors have to pass certain additional mathematical subjects in their 'Little-go,' and then have no further examination till the Tripos. Honors may be taken in any of the following Triposes: Mathematics, Classics, Moral Sciences, Natural Sciences, Theology, Law, History, Semitic Languages, Indian Languages. The Mathematical Tripos has existed since 1747; the Classical, since 1824; the others are of more recent foundation. Previous to 1850, candidates for classical honors must first have obtained a place in the Mathematical Tripos. It was arranged that the following regulations for the Triposes should come into effect in 1882: The Mathematical Tripos is divided into three parts. The first two parts take place in the June at the close of the third year, or ninth term of residence, and the successful candidates will be arranged in three classes called Wranglers, Senior Optimes, and Junior Optimes, the members of each class being also placed in order of merit. Only the Wranglers may proceed to the third part of the examination in the following January. The subjects for this part are divided into four groups, excellence in any one of which entitles to the highest honors. According to their success in this examination, the Wranglers will be re-arranged in three classes, the names in each class being, however, in alphabetical order. The Classical Tripos consists of two parts—the first in general classical scholarship, and taking place at the end either of the second or of the third year of residence; the other at the end either of the third or of the fourth year, and including, besides a further examination in pure classics obligatory on all candidates, a special knowledge of one or two, but not more than two, of the following subjects: Ancient Philosophy, History, Archæology, Philology. The successful candidates in each part will be arranged in three classes. In the first part, the examiners may indicate differences of merit within the classes by the use of brackets; in the second part, the names are to be given in alphabetical order. The Natural and Moral Sciences Triposes have also been divided into two parts, a general and a special. The Mathematical and Classical Triposes are followed by examinations for the Smith's Mathematical Prizes and Chancellor's Classical Medals, the result of which often differs from that of the Triposes.

The university has 35 professors, increased to 40 by the statutes of 1881, in addition to readers, demonstrators, and assistants. Besides having the advantage of the instructions, and being under the discipline of the university, previous to 1869 all students, and since that time the great majority of their number, are in connection with one of the colleges, and subject to its regulations. The tutor of the college is understood to be *in loco parentis* to his pupils; the dean has the oversight of 'religion and morals;' and instruction is given by college lecturers.

The great prizes at the university are the *Fellowships*, of which there are about 400. Their value and conditions of tenure vary greatly at the different colleges; but, under the statutes of 1881, restrictions as to marriage and holy orders are done away with, the stipend (exclusive of certain allowances) limited in most colleges to £250 per annum, and the length of tenure to six years. The last regulation does not apply to Fellows who at the same time occupy a university or college office. There are also stipends attached to the various college offices—those of Dean, Bursar, Lecturer, &c. The office of Tutor is one of great honor and emolument. There are various other university distinctions, both scholarships and prizes, for an account of which the *Cambridge Calendar* should be consulted.

The following is a list of the colleges in the order of their antiquity. A particular notice of each college will be found in its alphabetical place.

Name.	Founded.	Undergraduates in 1881.
St. Peter's College, or Peter-house	1257	66
Clare College	1326	130
Pembroke College	1347	128
Gonville and Caius College	1348	167
Trinity Hall	1350	195
Corpus Christi, or Benedict College	1351	129
King's College	1441	69
Queen's College	1448	49
St. Catherine's College or Hall	1473	56
Jesus College	1496	215
Christ's College	1505	124
St. John's College	1511	337
Magdalene College	1519	64
Trinity College	1546	572
Emmanuel College	1584	81
Sidney Sussex College	1598	37
Downing College	1800	79

About half of these undergraduates have rooms in college; the others reside in lodgings, but under the same rules as to college discipline. Besides these, there were, in 1881, 210 students unconnected with any college, making in all 2688 undergraduate members of the university. Non-collegiate students were first admitted to the university in 1869, and are under a special board presided over by a Censor, who acts as their tutor; 77 of their number are resident at Cavendish College, founded in 1876 for the advantage of younger students, but not incorporated into the university. Selwyn College, in memory of Bishop Selwyn, was opened in 1882.

Few of the colleges present an imposing façade to the streets—King's is, perhaps, the only one of which this may be said—but the quiet and picturesque beauty of the courts in the interiors is very pleasing. Other public buildings are the Senate-house, where examinations are held, degrees conferred, and all public business of the university conducted. The Fitzwilliam Museum is the finest of the modern additions to the university. Viscount Fitzwilliam bequeathed, in 1816, £100,000 South-sea Annuities, the interest of which was to build and support a museum. He left also a very valuable collection of books, paintings, &c., as a nucleus for future contributions. G. Basevi was the architect. The University Library is a fine mass of buildings of different periods, and is said to contain about 500,000 volumes. The Geological Museum contains the original collection of Dr. Woodward, which, out of respect to the founder, has been kept in its original state, unmixed with more recent and vastly more numerous and interesting acquisitions. The university is indebted for many of these geological treasures to the late Professor Sedgwick. The Mineralogical Room contains the valuable collections of the late Sir A. Hume, Charles Brooke, and Henry Warburton. The Pitt Press is a Gothic structure built in honor of Mr. Pitt, who was educated at Cambridge. It contains the university printing-offices, which are very extensive. There is also a good Anatomical Museum. There is a very good hospital, founded under the will of Dr. Addenbrooke in 1753. The Observatory contains some very fine instruments, amongst which there is a large equatorial telescope, presented by the Duke of Northumberland in 1835. The income (including trust-funds) of the university is about £33,000, which by the statutes proposed by the Commissioners under the Act of 1877, is to be largely added to by the colleges, whose aggregate income is about £300,000 per annum.

For the most recent information about the university studies, &c., the *Cambridge Calendar* for the current year should be consulted; see also the *Student's Guide to the University of Cambridge* (5th ed. 1880); for the history, biography, and antiquity, see Fuller's *History of Cambridge;* Dyer; Caius; Le Keux' *Memorials;* Cooper's *Annals* (1842); Cooper's *Athenæ Cantabrigienses; Graduati Cantabrigienses;* Cooper's *Memorials of Cambridge* (1860); Ackermann's *History of the University of Cambridge* (1815); Huber's *English Universities* (transl. F. W. Newman, 1843); H. Gunning's *Reminiscenses of Cambridge from the Year* 1780 (2 vols. 1854); C. Wordsworth's *Social Life at the English Universities in the Eighteenth Century* (1874), and *Scholæ Academicæ* (1877); J. Bass Mullinger's *The University of Cambridge till* 1535 (1873). Girton (q. v.) and Newnham Colleges for ladies are at C.

CAMBRIDGE, a town of the state of Massachusetts, on the Charles River, now practically a suburb of Boston (q. v.). Here, in 1638, within eighteen years after the landing of the Pilgrim Fathers, was founded Harvard University (q. v.). The population consists largely of business men from Boston, retired merchants, and literary or scientific persons. There is little manufacturing or commercial industry in C. The town is rapidly advancing in population, the census in 1830, 1840, and 1850 respectively having been 6072, 8409, and 15,215; in 1870, 39,634; and in 1880, 52,740.

CA'MBRIDGESHIRE, an inland county of England, in lat. 52° 1′—52° 45′ N., long. 0° 31′ E., and 0° 16′ W. Its greatest length is about 50 miles, and its breadth 30 miles, with an area of 820 sq. miles. Pop. (1871) 186,906; (1881) 185,475. About three-fourths of the country consists of arable land, meadow, and pasture, the rest being fens. The surface of C., except in the south, which is somewhat elevated and on the chalk formations, is marshy and flat, thinly wooded, and with villages and churches here and there on slight elevations, called 'eyes' or islands. The upper

greensand, which in some places near Cambridge comes to the surface, yields in rich abundance the curious fossils miscalled Coprolites (q. v.), which are of great value as an artificial manure. Their value is in some places equal to that of the land itself. The northern part of C. forms part of the Bedford Level. The chief rivers are the Ouse, which crosses the middle of the county from west to east, with its tributary the Cam; the Nene, which borders the county on the north; and the Lark. These are all navigable to a certain extent. C. is an agricultural county. In the higher parts, the land produces fine crops of beans and wheat. Many cattle and sheep are now supported on the thin chalky soils. The black spongy soil of the fens consists of mud mixed with decayed vegetable matter, and when drained and burned, produces, in dry years, heavy crops of cole-seed, wheat, oats, barley, hay, potatoes, hemp, and flax. Horses, cattle, sheep, and pigeons are also reared in the fens. The Isle of Ely, part of the fen-tract, and within the Bedford Level, is famed for garden vegetables; and the meadows of the Cam yield fine butter and cream-cheese. The chief towns of C. are Cambridge, the county town; Ely, Wisbeach, March, Thorney, Linton, Soham, Newmarket, and Royston. The manufactures of C. are mostly such as belong to an agricultural county. There are paper and parchment mills, and coarse earthenware is manufactured.

Needle-making is also carried on to some extent. C. returns 3 members to parliament. This county was anciently the seat of a powerful tribe—the Iceni. It was crossed by several British and Roman roads, in some parts now covered by several feet of peat-soil. Remains of Roman camps, sea-embankments, and villas, occur, and Roman antiquities, as coins and urns have been found. There are some ancient—supposed pre-Roman—ditches miles in length. One of these, the Devil's Ditch, with an elevated vallum, having a slope of 52 feet on one side and 26 on the other, is about 100 feet broad. In the 9th and 10th centuries, C. was the scene of severe contests between the Danes and Saxons. The Isle of Ely and its monks withstood William the Conqueror for 8 years. C., and especially the Isle of Ely, suffered much in the civil wars of Stephen, John, Henry III., and Charles I. There formerly existed 36 religious houses in Cambridgeshire. Since Charles I.'s time, much fen-land has been reclaimed by embanking rivers and cutting new channels.

CAMBUSLANG, a parish and mining village in Lanarkshire, celebrated in the revivals of 1741. See WHITEFIELD.

CAMBY'SES, second king of the Medes and Persians, was the son of Cyrus and Cassandane, and succeeded his father in the monarchy, 529 B.C. C. is the Greek form of his name, the ancient Persian name is Kabujiya. In 525 B.C., C. invaded Egypt, defeated Psammenitus, the king of Egypt, at Pelusium, and in six months made himself master of the whole country. He meditated further conquests, but was not permitted to carry his designs into effect; the Tyrians, upon whom his maritime power depended, refused to serve him against the Carthaginians; an army which he sent to take possession of the temple of Jupiter Ammon, perished in the desert; and one which he led in person against the Ethiopians, was compelled to return from want of provisions. C. now addicted himself to excessive intoxication, and perpetrated horrid cruelties in Egypt; the accounts of which however, depending upon his enemies the Egyptian priests, are doubtless exaggerated. It is probable, however, that his tendency to epileptic fits, along with the arbitrary disposition induced by success and power, caused him to indulge in violent and capricious acts of tyranny. The Egyptians believed him to be mad. A pretender to the Persian throne having appeared, C. marched against him, but died on the way in Syria, 521 B.C.

CAMDEN, CHARLES PRATT, EARL OF, a younger son of Sir John Pratt, Chief Justice of the Court of King's Bench in the reign of George I., was born in 1714. Educated at Eton and Cambridge, he studied for the law, and was called to the bar in 1738. Not until 1752, however, when he defended a bookseller successfully against a government prosecution for libel on the House of Commons, did C.'s prospects appear very promising; from this time his success was certain. In 1757, he was appointed Attorney-general, and four years afterwards, accepted a seat on the bench in the Court of Common Pleas. Judge in the trial of Wilkes, he declared his opinion emphatically that the action of government in this case, by general warrants, was altogether illegal—an opinion which, chiming in with public sentiment at the time, made him the most popular of judges. In 1765, he was created Baron C. of Camden Place, Kent, by the Rockingham administration; to whose American policy, and to their treatment of Wilkes, notwithstanding, he offered constant opposition. The following year, when he was made Lord Chancellor, he did not abandon his principles; and four years after—the Duke of Grafton being then prime minister—he supported an amendment made by Chatham on the government address, and resigned his place. His judicial career ended here; henceforth, he was entirely a political character, and for more than 20 years took an active part against the ill-advised American policy pursued by Lord North, and in discussions on the law of libel, in which he maintained the popular view. As a judge, he is held in high estimation, though his manner was somewhat undignified. He filled the office of President of the Council in the Rockingham administration in 1782, and also from the following year until his death, under Pitt. He died April 1794.

CAMDEN, WILLIAM, one of the most distinguished scholars and historians, and the most laborious and painstaking antiquary of the 16th c., was born in London, where his father was a paper-stainer, in May 1551. His education, commenced at Christ's Hospital, was completed at St. Paul's School, and at Oxford. In 1575, he was appointed second master of Westminster School; and it was while discharging the duties of this office that he undertook the work which has made his name famous, his *Britannia*, giving an account of the British Isles from the earliest ages, which, written in elegant Latin, was first published in 1586. It at once brought him into communication with the learned men of his time. Before 1607, the work had passed through six editions, being greatly enlarged and improved by the indefatigable industry of the author.

The book, at first but a comparatively small single volume, has received much additional matter from other writers. The best known edition of C.'s *Britannia*, is that of Edmund Gibson, in English, 2 vols. fol. Of this great work of C., Bishop Nicolson said it was 'the common sun whereat our modern writers have all lighted their little torches.' In 1593, C. was appointed headmaster of Westminster School; and four years later, he was made Clarencieux King-at-arms, an appointment which gave him more time for the pursuit of his favorite studies. His other most important works are—*Annals of the Reign of Elizabeth; A Collection of Ancient English Historians; An Account of the Monuments and Inscriptions in Westminster Abbey;* and a *Narrative of the Gunpowder Plot.* He died in 1623, at the age of 72, and was buried in Westminster Abbey. He endowed a professorship of history at Oxford. The 'Camden Society,' for the publication of early historical remains, is named in his honor.

CA'MDEN, a city of New Jersey, U. S., on the left bank of the Delaware River, opposite Philadelphia, with which it is connected by 4 steam-ferries. It is the terminus of the Camden and Amboy, Camden and Atlantic, and West Jersey Railways. It has a court-house, 2 banks, 2 railway dépôts, 15 churches, ship-yards, iron-works, foundries, manufactories. Pop. (1870) 20,045; (1880) 41,658.

CA'MEL (*Camelus*), a genus of quadrupeds of the order *Ruminantia*, of which only two species exist, both of great use to mankind. This genus is the type of the family *Camelidæ*, to which there belongs only one other genus, *Auchenia* (q. v.), including the llama, alpaca, &c. The whole number of species of *Camelidæ* is, therefore, very small, and they seem to belong originally to limited regions, both in the Old World and in the New. To the peculiarities of these regions, they exhibit a wonderful completeness of adaptation. The family is regarded as forming a sort of link between the orders *Ruminantia* and *Pachydermata*. The dentition differs from that of all other ruminating animals, particularly in the presence of incisors or cutting teeth in the upper jaw; camels having also canine teeth in both jaws, and the llama and its congeners in the lower jaw of both sexes; and differences equally important appear in the feet, which have not the cloven hoof common to all the rest of the order—two short toes with separate hoofs adapted to one another—but two elongated toes, each tipped with a small nail-like hoof, the feet resting not upon the hoofs, but upon elastic pads or cushions under the toes.—In the camels, the toes are united by a common sole, thus resting upon one extended pad, instead of having each a separate one, as in the genus *Auchenia;* the broader expanse of the foot enabling the animals of the one genus more easily to traverse the loose sand of the desert, whilst the separation of the toes in the other is suited to the uneven surface of rocky heights.

Bactrian Camel.

The camels are also distinguished by the females having four teats,

whilst those of the other genus have only two; and by a hump or humps upon the back, of which the llama and its congeners exhibit no trace. The long neck, small head, prominent eyes, and tumid and cleft upper lip, with considerable prehensile power, are common to both genera; but with much similarity of form, as well as of particular characters, the *Camelidæ* of the Andes exhibit a gracefulness of outline which strongly contrasts with the gaunt angularity of those of the eastern deserts. Camels are indeed animals of uncouth appearance. Of the two species, that known as the Arabian C. (*C. Dromedarius*) has only one hump on the back, whilst the Bactrian C. (*C. Bactrianus*) has two. Some confusion has arisen from the occasional employment of the name Dromedary as a designation of the former species, it being, however, more properly limited to a particular variety of that species, more slender and graceful than the ordinary variety, and of much greater fleetness. Buffon's notion, that the hump is a badge of servitude, and the consequence of harsh treatment throughout many generations, is singularly at variance with what we know of its uses. The hump on the C.'s back is a wonderful provision of nature, to adapt the animal to the endurance of long abstinence from food, or subsistence on very scanty supplies, to which it is often subjected in the desert, and without a capacity for which it would be comparatively of little value to man; and the wide deserts across which he journeys and transports his merchandise by its aid, would be altogether unpassable. The hump, is, in fact, a store of fat, from which the animal draws as the wants of its system require; and the Arab is very careful to see that the hump is in good condition before the commencement of a journey. After it has been much exhausted, three or four months of repose and abundant food are necessary to restore it.

The backbone of the C. is as straight as that of other quadrupeds.—Another very interesting adaptation to the desert is to be noticed in the thick sole which protects the feet of the C. from the burning sand, and in callosities of similar use on the chest and on the joints of the legs, upon which the C. rests when it lies down to repose, or kneels, as it does for various purposes, and is taught to do that it may be loaded, or that its rider may mount upon its back.—The wedge-shaped cutting-teeth of the lower jaw are also particularly fitted for browsing on shrubby plants, such as the desert produces—the camel's thorn, tamarisk, &c., which form a large part of the food of the C.; the eyes are furnished with long eyelashes, to protect them from the glare and from the drifting sand; whilst the exclusion of the sand from the nostrils is also provided for by a power of closing their oblique openings at will. But most interesting of all is the provision made for the C.'s endurance of long drought, by the lining of the inside of the second stomach, or honey-comb bag, and of a portion of the first stomach or paunch, with great masses of cells, in which water is stored up and long retained. This store of water is well known to the Arabs, who, when sore pressed by thirst, sometimes avail themselves of it by killing some of the camels of the caravan.—The first stomach of the *Camelidæ* is divided into two compartments by a muscular band—one of the points of difference between them and the other ruminants. Muscular bands, proceeding from this principal one, and intersected by other muscular bands, nearly at right angles, form the cells for containing water. It may be added here, that the senses both of sight and smell are extremely acute in the C., and that it is capable of discerning water at a great distance.

Inside of a Camel's Foot: A, is the cushion on which the animal treads, shown as lifted out of its bed.

The Arabian C. carries twice the load of a mule. The Bactrian C. is sometimes loaded with 1000 or even 1500 lbs. weight, although not generally with so much. The East India Company had at one time a corps of camels, each mounted by two men, armed with musketoons. The use of the C. for the conveyance both of travelers and merchandise has won it the name of the *ship of the desert*. A caravan sometimes contains 1000, sometimes even 4000 or 5000 camels.

The supply of food carried with the caravan for the use of the camels is very scanty: a few beans, dates, carob-pods, or the like, are all that they receive after a long day's march, when there is no herbage on which they may browse. The pace of the loaded C. is steady and uniform, but slow: it proceeds, however, from day to day, accomplishing journeys of hundreds of miles at a rate of about 2½ miles per hour. Some of the slight dromedaries, however, can carry a rider more than 100 miles in a day. The motion of the C. is peculiar, jolting the rider in a manner extremely disagreeable to those who are unaccustomed to it; both the feet on the same side being successively raised, so that one side is thrown forward, and then the other.

The C. produces only one young one at a time, or rarely two. It lives 30 or 40 years.

The patience of the C. has been celebrated by some authors; and the cries by which it expresses its sense of injury when a heavy load is placed upon its back have been pathetically described. With all its general submissiveness, however, the C. is resentful of injury, and during the rutting season it becomes particularly vicious.

The flesh and the milk of the C. are much valued by the Arabs as articles of food. The dung is used for fuel, and it was from the soot of this dung that the sal-ammoniac, formerly imported from Egypt, was obtained by sublimation, whilst the sources from which that substance is now procured were unknown. The hair is used for the manufacture of cloth, some kinds of which are coarse, and others comparatively soft and fine. C.'s hair is also imported into Europe for the manufacture of the pencils or small brushes used by painters. The C. can now scarcely be said to exist anywhere in a wild state. It has lately been introduced into Australia.

A fossil species of C. (*C. Sivalensis*), larger than either of the existing species, has been discovered in the tertiary deposits of the Sewalik Hills, in Hindustan.

CA'MELFORD, a town in the north-west of Cornwall, near the source of the Camel (crooked brook), 14 miles west of Launceston. It lies in a high and hilly tract near the moors. Pop. about 1600. C. is said to have been the scene of a battle, in 542, between King Arthur and Mordred, his nephew, when both were slain. The West Saxons, under Egbert, had a battle with the Britons here in 823. The ruins of King Arthur's Castle, Tintagel, stands on the high rocky coast, 4 miles north-west of Camelford. Two miles north of C. are the celebrated slate-quarries of Delabole, employing a large number of men. Macpherson, the author or translator of Ossian, was member of parliament for C. in 1791, but the Reform Act of 1832 disfranchised the borough.

CAME'LLIA, a genus of plants of the natural order *Ternstræmiaceæ* (q. v.), natives of China, Japan, and the north of India—some of which are now among the most common and admired green-house shrubs in Britain and other countries too cold for their cultivation in the open air, receiving the same sort of attention which is bestowed on other florists' flowers, and with the same result, of an endless multiplication of beautiful hybrids and varieties. The best known and most esteemed is *C. Japonica*. Its leaves are ovate-elliptical, almost acuminate and serrate, shining; the flowers without stalks, mostly solitary, large and rose-like. It is a native of Japan; and there and in China it has been carefully cultivated from time immemorial. In its wild state, it has red flowers; and the red single C. is much used by gardeners as a stock on which to graft the fine varieties, the flowers of which are generally double, and in many cases most completely so. Many of them are of Chinese or Japanese origin; many have been raised by cultivators in Britain, continental Europe, and America. Their colors are very various; and the varieties also differ much in the form and position of the petals. It adds to the value of the C. that its flowering time is in autumn, winter, and spring. By those who can afford the expense, entire houses are often devoted to the culture of camellias. Some cultivators are careful to protect them from direct sunshine, others recommend an opposite treatment in this particular; it is agreed by all that free access of air is of great importance, and that water must be given very liberally, yet with such caution that the soil may never remain soaked after the immediate wants of the plant are supplied. The cultivation of camellias in the windows of houses is often attended with disappointment, from the buds dropping off when almost ready to expand, which is generally owing either to a neglect or an excess of watering; an apparently slight mistake, either of the one kind or of the other, being very speedily productive of this evil. Too much heat at this time is also apt to cause the flower-buds to fall off. The C. flowers well, when the temperature is kept not very much above the freezing-point, but frost it cannot bear. In the south of England, some of the varieties are occasionally trained to walls in the open air, receiving a little protection in winter. The proper soil for camellias is a loose black mould; a little sand and a little peat are often advantageously mixed with loam to form it. Camellias are often propagated by cuttings, often by layers; but the finest varieties very generally by grafting or by inarching. The single C. is also propogated by seed, and in this way the best stocks for grafting are procured.—Of the other species of C., the most hardy, and one of the most beautiful, is *C. reticulata*, from which not a few of the varieties now in cultivation are partly derived.—*C. oleifera* is extensively cultivated in China—not, however, in the more northerly parts—for its seeds, from which an oil is expressed after boiling, very similar to olive oil, and much in use as an article of food and otherwise in the domestic economy of the Chinese.

The seeds of almost all the species, however, yield this oil.—*C. Sasanqua* bears the name of SASANQUA TEA. It is cultivated

in China for the sake of its flowers, which are said to be used for flavoring certain kinds of tea.

CAMELOPA'RDALIS. See GIRAFFE.

CAMEL'S THORN (*Alhági*), a genus of plants of the natural order *Leguminosæ* (q. v.), sub-order *Papilionaceæ*, containing a number of herbaceous or half-shrubby species, natives chiefly of the deserts of the east, having simple leaves, minute stipules, racemes of red flowers, and jointed pods with one seed in each joint. These plants are of great importance on account of the food which they afford for camels, where other vegetation is far from being abundant; and camels are particularly fond of them. *A. camelorum*, a herbaceous species, yields a kind of Manna (q. v.), which appears in the form of drops, as of honey, on the leaves, and gradually hardens. A similar exudation is yielded by *A. Nipalensis*, another herbaceous species; but it is not certain that the manna of Persia and Bokhara is produced, as has been alleged, by *A. Maurorum*, a shrubby species two or three feet in height, which certainly does not yield it in India or Egypt; the supposition that this exudation results from some peculiarity in the climate of Persia and Bokhara, being perhaps less probable than that of a mistake concerning species not very dissimilar.

CA'MEO (Ital. *camei*). Gems cut in relief are called cameos, in opposition to those that are hollowed out so as to yield a raised impression, which are called *Intaglios*. The term C., however, is applied more especially to those diminutive pieces of sculpture which are prepared from precious stones having two strata or layers of different colors, the undermost of which is left to form the background, the object to be represented being cut in the upper one. The stone generally used for this purpose by the ancients was the variegated onyx.

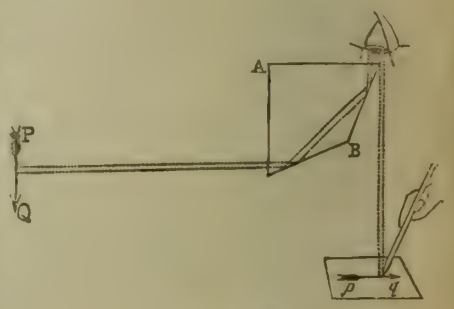
The art of C.-cutting is of great antiquity. It is believed to have been of Asiatic origin, and to have been practised by the Babylonians, from whom the Phœnicians carried it into Egypt. From the Egyptians, it was transmitted to the Greeks, who brought it to great perfection; and latterly it was practised very extensively, and more successfully than perhaps any other art, in Rome. To what extent the gems, commonly called Etruscan, are in reality early Greek, is a subject of dispute amongst the learned. It was not till a comparatively late period—the age following Praxiteles—that C.-cutting became popular in Greece; and it was in the courts of the successors of Alexander that it was chiefly patronized.

At this period, cameos were very extensively used, not only as personal ornaments, but in cups, vases, candelabra, and other objects of domestic luxury. Pateræ and other vessels were frequently worked out of a single stone, upon which were exhibited a whole series of figures of the most exquisite workmanship. Many of the antique cameos which have been preserved are wonderfully beautiful both in design and execution. The finest specimen in existence is said to be the Gonzaga C., formerly at Malmaison, now at St. Petersburg. It represents the head of a prince and his wife, probably Ptolemy I. and Eurydice. Winckelmann mentions a C. representing Perseus and Andromeda, in such high relief, that almost the whole contour of the figures, which are of the most delicate white, is detached from the ground. It belonged to the painter Mengs, and at his death was purchased by the Empress Catharine of Russia. The only other gem which Winckelmann is disposed to rank with that just mentioned, is 'the Judgment of Paris' in the cabinet of the Prince Piombino at Rome. Of cameos of the Roman time, many fine specimens are to be found in the continental museums. The most celebrated C. in England is the 'Cupid and Psyche,' in the Marlborough Collection, by Tryphon, who is supposed to have lived in Macedon under the immediate successors of Alexander. The stones on which many of these cameos are cut are of surprising, and, in modern times, unequalled size and perfection. They are supposed to have been procured by the ancients through their oriental and African commerce. Cameos do not seem to have been made in medieval times; but the art revived in Italy, under the auspices of the Medici; and the production of cameos, both in *pietra dura* and in shell, has there become a branch of art-manufacture of considerable importance. Impressions from antique comeos in glass, sulphur, porcelain, and other materials, are produced in many places; and for artistic purposes, possess all the value of the originals.

Glass Cameos.—The manufacture of cameos from artificial substances was not unknown to the ancients. One of the most beautiful specimens of an imitation of C. in glass is the famous Barberini or Portland Vase, now in the British Museum. The ground is blue, the figures, which are in low relief, being of a delicate, half-transparent white. See PORTLAND VASE. Many fragments of the same kind of manufacture exist in other cabinets, but that which we are fortunate enough to possess is believed to be the only perfect example.

Shell Cameos.—The art of imitating cameos in shell, which has now attained to such perfection as to rival the delicacy and finish even of antique workmanship, and which is a process quite as artistical as their production from gems, is of modern invention. The shells, like the stones, chosen for this purpose, are such as possess layers of different colors. The most useful are the *Bull's Mouth*, the under layer of which is red, resembling the sardonyx; the *Black Helmet*, which has a dark onyx ground; and the *Queen's Conch*, of which the ground is of a pinkish hue. These shells have three strata, the undermost of which forms the ground, the figure being sculptured in the second, and the third serving to mark the hair, wreaths, armor, and other more prominent objects. The portion of shell having been prepared of the requisite size, form, and thickness by various mechanical means, it is fixed by some adhesive substance—usually rosin—to a small block of wood, of such form and thickness as to be conveniently grasped by the artist in his left hand. The outline of the object or objects to be represented is then sketched with a pencil, and, in the case of portraits is usually copied from a previous pencil-sketch on paper. The pencil-marking on the shell is then followed with a scratch-point, and the surrounding white substance is removed by means of files and gravers. This latter process, which is more mechanical than the rest, is usually performed by an assistant. The artist then proceeds slowly and carefully to work out his subject by the use of smaller tools; those used at last for deepening the finer lines being scarcely larger than ordinary darning-needles. The manufacture of shell-cameos in Rome commenced about 1805, and is said to have been of Sicilian origin. The art was at first confined to Italy; but during the last 35 years, it has been carried on in Paris to a greater extent than even in Rome, though not with equal success. A large proportion of the whole cameos manufactured in France are imported into England, and many of them are mounted as brooches, and exported to the United States and the British colonies. Saolini and Giovanni Dies have long been celebrated as artists in shell-cameo in Rome, whilst Girometti has enjoyed a similar reputation for his works in *pietra dura*.

CA'MERA LU'CIDA, an optical instrument constructed of various forms, and for various purposes. Dr. Wollaston's C. L., intending to facilitate the perspective delineation of objects, consists of a small quadrilateral prism of glass, of which AB in the annexed figure is the perpendicular section, held in a brass frame, which is attached to an upright rod, having at its lower end a screw-clamp, to fix it to the edge of a table. The prism being at the height of about a foot from the table, has its upper face horizontal. Two of its faces, as in the figure, are at a right angle, at A; the contiguous faces make respectively with them angles of 67½°; so that the remaining obtuse angle at B contains 135°. Rays coming from an object PQ, and falling nearly perpendicularly on the first service, enter the prism, and undergo total reflection at the contiguous surface (see DIOPTRICS); they then fall at the same angle on the next surface, and are totally reflected again; finally, they emerge nearly perpendicularly to the remaining surface. An eye, as in the figure, then receives the emergent pencil through one part of the pupil, so that an image, *pq*, of the object is seen projected upon a sheet of paper upon the table. The rays from the drawing-pencil passing the edge of the prism, enter the other part of the pupil; and the pencil and image being seen together upon the paper, a sketch of the latter can be taken. There is, however, a practical difficulty—the image, and the drawing-pencil are at distances sensibly different from the eye, and so cannot be seen together distinctly at the same time. To obviate this, a plate of metal, with a small aperture as an eye-hole, is placed at the edge under the eye, so that the rays through the prism, and those from the drawing-pencil, which both pass through the eye-hole, form only very small pencils. By this, the difficulty is greatly diminished. It is still, however, difficult to use the instrument satisfactorily, and though many acquire great readiness in its use, others have never been able to attain the same facility. The instrument is remarkable for its small bulk and portability. A good one will pack in a box 8 inches by 2, and half an inch deep. Besides this form of the C. L., which is the most common, there are others. Its simplest form is merely a piece of smooth glass fixed at an angle of 45° to the horizon. An image from a horizontal object falling on this glass will be perfectly reflected, and that in the vertical, so that the eye looking vertically down will see the image, and owing to the transparency of the glass, the artist will be able to trace



Camera Lucida.

it out upon paper below. In this case, however, (see CATOPTRICS), the image will be inverted.

CA'MERA OBSCU'RA, (literally, a dark chamber), an instrument invented by Baptista Porta in the 16th century. It is known in its simplest form as a familiar toy, consisting of a rectangular box, furnished at one end with a lens whose focal length is equal to the length and depth of the box; at the opposite end of which a plane reflector is placed at an angle of 45°, which throws the image of any objects to which the lens may be directed on a piece of ground-glass on the top of the box in a non-inverted position, so that they may be viewed or sketched from as in nature.

The C. O. being now an indispensable article in the practice of photography, has received a number of recent improvements, which make it rank as a scientific instrument. The principle, however, involved in the simplest and most refined forms is the same, and may be illustrated and made intelligible by the following experiment: Let a small hole be bored in a window-shutter, and the room be darkened. If, now, the beam of light entering the room by this hole be intercepted by a sheet of white paper, held at a small distance from the hole, an inverted image of objects without will be seen upon the paper. By placing a small convex lens over the hole, this image is rendered much more distinct, or *sharp*, in photographic language. Moreover, it will be found that, at a certain distance from the hole, the image attains a maximum degree of sharpness; and that if the paper be removed from this point to any position either nearer to the hole or further from it, the image becomes indistinct and confused. At the point of greatest distinctness, the image is said to be *focused*. Such being the principle of the camera, it is evident that in practice the instrument may assume many forms, provided always that it consists of a darkened box or chamber having a hole at one end for the insertion of a lens or combination of lenses, and at the other a screen, generally made of ground-glass, on which to receive the image. Fig. 1 will at once give an idea of a very common and simple form of camera. C. is the body of the instrument, made of any opaque substance; L, the tube or tubes, generally formed of brass, and containing one or more lenses; G, the obscured or ground-glass, upon which the image is thrown for the purpose of adjusting the focus; R, the rack behind, by means of which, and the double sides of the camera, the body of the instrument may be lengthened or shortened till the image on the ground-screen is accurately focused.

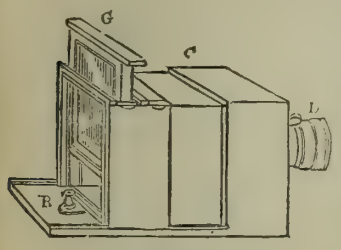


Fig. 1.

This rack is most frequently placed upon the tubes carrying the lenses. The interior of the whole apparatus is blackened, to prevent reflection of the rays falling on their sides, and to impart greater distinctness to the picture. S, in fig. 2, represents the *camera-slide*. This is a thin dark box, and is used for conveying a sensitive plate from the operating-room to the camera, and back again after exposure. It consists of a rectangular frame, made to fit exactly into the back of the camera when the focusing-screen is removed. At the back is a hinged door, by means of which the plate is introduced into the slide; and in front is a shutter, which is pulled up when the plate is to be exposed, and shut down after the time requisite for the action of the light upon the plate has expired. It must be constructed so that, when substituted for the focusing-screen G (fig. 1), the surface of the prepared plate, which is intended to receive the image, shall correspond exactly in distance from the lens with the ground-surface of the focusing-screen. The plate rests upon projections of silver wire in the corners of the slide; and the same slide may be used for plates of different sizes, by introducing into it thin frames of suitable dimensions also furnished with silver-wire corners.

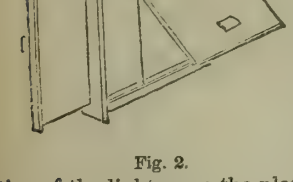


Fig. 2.

Photographic cameras are generally required for one of three purposes—viz., portraits, landscapes, or copying; and for each of these it is necessary to make suitable modifications in the construction of the instrument. A camera has, however, been recently contrived which combines within itself the conditions necessary for all contingencies. It is called Martin's Universal Portrait, Landscape, and Copying Camera, and consists, primarily, of a base-board, 30 inches long and 11 inches wide, divided into three pieces, and hinged together by means of broad brass hinges, so as to diffuse the bearing as much as possible, and bolted together when in use by sliding panels of mahogany, extending across the entire width of the base-board. This base-board being grooved on its outer edges, allows the sliding portions of the camera to be moved from one end to the other, so as to alter the relation between object, lens, and image *ad infinitum*.

What may be regarded as the body of the camera, is of the same construction as an ordinary expanding camera (fig. 1), except that it is furnished with additional apertures for camera slides, and the front (C) and the back are united by means of an accordion or bellows body of suitable length to extend from one end of the base-board to the other.

CAMERA'RIUS, JOACHIM—originally, *Liebhard*, which name he changed into C., because his forefathers had been *Kämmerer* (chamberlains) at the court of the bishop of Bamberg—was born at Bamberg, April 12, 1500, and died at Leipsic, after a life devoted to literature, April 17, 1574. He was by nature earnest and taciturn; but the extent of his knowledge, his sobriety of opinion, strength of character, and, when he pleased, overpowering eloquence, won for him the esteem of all his contemporaries. His works, of which several still remain valuable, include an excellent biography of Melanchthon, and a collection of letters by this reformer; also annotations on Cicero's *Quæstiones Tusculanæ* (1525), *Elements of Rhetoric, Commentarii Linguæ Græcæ et Latinæ* (1551), and *Epistolæ Familiares* (1583—1595), giving interesting notices of his times.—His son, JOACHIM C. (b. 1534, d. 1598), was one of the most learned physicians and botanists of his age.

CAMERI'NO (ancient *Camerinum*), a town of Central Italy, in the province of Macerata, situated on a hill at the foot of the Apennines, 41 miles south-west of Ancona. It has a cathedral, occupying the site of a temple to Jupiter, a university, and some manufactures of silk. Its bishopric dates from the 3d c.; and it was made an archiepiscopal see in 1787. Pop. 5500.

CA'MERON, JOHN, a famous scholar and divine, was born at Glasgow about the year 1580, and educated at the university of that city, where in his 20th year, he held an appointment as reader in Greek. In 1600, he set out to travel in France, where his ability and erudition secured for him a philosophical professorship in the university of Sedan. He afterwards acted as a Protestant clergyman at Bordeaux, and, on the death of Gomarus, was appointed to the divinity chair in the university of Saumur, an appointment he held until 1620. Returning to Britain, he was appointed professor of divinity at Glasgow; but in less than a year he returned to Saumur; thence to Montauban, where he received a divinity professorship. Here his opposition to the party who advocated a civil war made him many enemies, by one of whom he was stabbed in the street; and he died from the effects of the wound in 1625. He was considered one of the best scholars of his time; in biblical criticism, he was inclined to be perverse; where there was a difficulty, he usually chose the opposite view of that held by other divines, especially Beza. His theological opinions were of a somewhat lax character, his works being said to be the foundation of Amyraut's doctrine of universal grace.

CAMERON, RICHARD, a Scottish Presbyterian preacher in the 17th c., who suffered death for the cause he espoused, and from whom the religious sect ordinarily called Cameronians (q. v.) has been named. C. belonged to the extreme party, who held by the perpetually binding obligations of the Solemn League and Covenant (see COVENANTS), which were set aside at the restoration of Charles II. Along with some others, he strenuously resisted those measures that reinstated the Episcopal Church in Scotland, and that proscribed the meetings for public worship of unauthorized religious bodies. Contrary to law, he persisted in preaching in the fields, and became obnoxious to government, to which, indeed, he finally assumed an attitude of defiance. In June 1680, he, in company with about twenty persons of equal zeal, well armed, entered the town of Sanquhar; and in the market-place they formally renounced their allegiance to Charles II., who had so grossly abused his power, and declared war against him and all his adherents. After this act, they retired to the hills between Nithsdale and Ayreshire, where they succeeded in evading capture for a month, though a price of 5000 merks had been set upon C.'s head by government, and 3000 upon the heads of the others. On the 20th July 1680, however, they were surprised by a vastly superior force in Aird's Moss, and after a brave fight, C. was killed. His hands and head were cut off, and fixed upon the Netherbow Port, Edinburgh. C. ranks as a martyr, and has an honorable place in the history of *Scots Worthies*.

CAMERON, VERNEY LOVETT, the African traveler, son of the Rev. J. H. L. Cameron, vicar of Shoreham, Kent, was born in 1844. He entered the navy in 1857, and served some time on the east coast of Africa. In 1873 he took charge of an expedition to relieve Livingstone, his orders being to join him by the nearest route. He started from Bagamoyo in March, and in August, at Unyanyembe, met Livingstone's followers bearing his remains to

the coast. After making arrangements for their safe arrival, he proceeded to Ujiji, where he found some of Livingstone's papers and a map, which he forwarded to Zanzibar. He then made a survey of Lake Tanganyika, which he found to be disconnected with the Nile system. In the belief that the Lualaba was the upper waters of the Congo, he resolved to follow its course to the west coast; but owing to the hostile interposition of the native chiefs was prevented from verifying a conviction, the correctness of which was soon afterwards demonstrated by Stanley. Taking a more southerly route, he reached the Portuguese settlement of Benguela, on the west coast, in October 1875, whence he returned to England. An account of his travels, which contains a vast number of valuable scientific observations, was published in 1877 in 2 vols., under the title of *Across Africa*. C. was made a Companion of the Bath, and raised to the naval rank of Commander.

CAMERON HIGHLANDERS (the Queen's Own Cameron Highlanders), the designation given to the 79th Regiment of infantry in the British service, in consequence of the corps having been raised by Allan Cameron of Erroch in 1793. Originally, it consisted of 1000 men, but a second battalion was added in 1804. This gallant regiment, which wears the Highland garb, performed distinguished services in the Peninsula and at Waterloo, and in the chief warlike struggles of more recent times.

CAMERONIAN REGIMENT, now Cameronians (Scottish Rifles), long the 26th infantry Regiment, had its origin in a body of Cameronians (q. v.) during the Revolution of 1688. Taking advantage of their zeal and courage, the Convention which sat at Edinburgh induced a number of them to assist in the Revolution, which it was imagined by some was to re-establish the reign of the Covenants. They were induced to enlist on the understanding that the special object of the corps was 'to recover and establish the work of Reformation in Scotland, in opposition to popery, prelacy, and arbitrary power, in all the branches and steps thereof, till the government in church and state be brought to that lustre and integrity which it had in the best of times.' (See Burton's *History of Scotland*, vol. i. p. 49.) Thus was formed the celebrated C. R., with the youthful Lord Angus as colonel, and William Cleland as lieutenant-colonel and actual commander. Under Cleland, not yet in his 30th year, the regiment was sent northwards to quell the insurrection, after the fall of Viscount Dundee. Surrounded by from 4000 to 5000 Highlanders, the Cameronians, only 800 strong, gallantly defended themselves during a whole day in Dunkeld, August 21, 1689. In this terrific struggle, the brave Cleland was killed. Considering the issue of the Revolution, they had been entrapped into military service, and their employment on foreign service afterwards greatly scandalized the Cameronian sect. The regiment has ever done credit to its origin; being distinguished alike for gallantry and for good conduct.

CAMERO'NIANS, the religious sect in Scotland popularly named after Richard Cameron (q. v.). Its official designation, however, is that of Reformed Presbyterians. No doubt the principles of the body are those for which Cameron contended and died; but not till after 1688 did the small body of Presbyterians, who insisted upon the restoration of the civil and ecclesiastical polity of 1638 to 1649 in opposition to the Revolution settlement, assume a distinct form. According to the Solemn League and Covenant, ratified by the parliaments of England and Scotland, and also by the Assembly of Divines at Westminster in 1643, Presbyterianism was to be maintained in the kingdoms of England, Scotland, and Ireland, and popery, prelacy, superstition, heresy, schism, &c., were to be extirpated.

As a measure of pacification, Presbyterianism was established in Scotland by act of parliament, 1690; but it was of a modified kind, rendering the church a creature of the state, more particularly as regards the calling of General Assemblies. Equally to the disgust of the extreme party referred to, prelacy was confirmed in England and Ireland, and there was a general toleration of heresy —i. e., dissent. In sentiment, if not in form, therefore, this party repudiated the government of William III. and his successors, and maintained the perpetually binding obligations of the Covenants. Unquestionably, these C. acted under strong convictions, and only desired to carry out to a legitimate issue theoretical principles of the Church of Scotland, which, for prudential considerations, have been practically in abeyance; and it is in the standards of this sect that we find a true embodiment of the tenets held by the great body of English and Scotch Presbyterians of 1643. Although thus an elder sister of the existing Church of Scotland and all its Secessions, it was with some difficulty that, after the Revolution, it organized a communion with ordained ministers. The steadfastness of members was put to a severe trial by the defection of their ministers; but in 1706, after their faith and patience had been tried for 16 years, they were joined by the Rev. John M'Millan, from the Established Church; and shortly afterwards, by the Rev. John M'Neil, a licentiate of the same Church. To confirm the faith of members, and give a public testimony of their principles, the covenants were solemnly renewed on Auchensauch Hill, near Douglas, in Lanarkshire, in 1712. The subsequent accession of the Rev. Mr. Nairne enabled the C. to constitute a presbytery at Braehead, in the parish of Carnwath, on the 1st of August 1743, under the appellation of the Reformed Presbytery. Other preachers afterwards attached themselves to the sect, which continued to flourish obscurely in the west of Scotland and north of Ireland. For their history and tenets, we refer to the *Testimony of the Reformed Presbyterian Church* (Glasgow, John Keith, 1842). Holding strictly to the Covenants, and in theory rejecting the Revolution settlement, the political position of the C. is very peculiar, as they refuse to recognize any laws or institutions which they conceive to be inimical to those of the kingdom of Christ; from which cause many of them formerly isolated themselves from general society, and refused several of the responsibilities and privileges of citizens. In 1860, there was an attempt on the part of some of the kirk-sessions to prevent the members becoming volunteers, on account of the oath of allegiance which required to be taken. On the question coming before the synod, it was decided (1863) that excommunication for taking the oath should cease. In consequence of this decision, 10 or 12 congregations seceded. In 1876, the larger body of the Reformed Presbyterians, consisting of about 45 congregations, was formally united to the Free Church of Scotland, so that the distinctive features of the Cameronians are now represented by the few congregations which seceded in 1863.

CAMEROO'NS, a river of Upper Guinea, Africa, which enters the Bight of Biafra from a north-east direction, in about lat. 4° N., long. 9° 40′ E., by an estuary some 20 miles in breadth. Its length is not certainly known, but for 40 miles upwards its breadth averages nearly a quarter of a mile, its depth varying in the dry season from 2 to 20 feet. The left bank of the river is steep and high, the right for many miles low and swampy, and covered with mangroves. There are several populous and thriving villages on its banks, whose inhabitants carry on an extensive trade in palm-oil, and ivory, obtained in great quantity from dead elephants, which have perished in search of water in a great morass inland.—C. is also the name of a cape on one of the islands of the estuary.—C. Peak is the name of the culminating-point in the C. Mountains, which in lat. 4° 13′ N., and long. 9° 10′ E., has an elevation estimated at 13,000 feet.

CAME'TA, a town of Brazil, on the Tocantins, which joins the estuary of the Amazon from the south. It has a fertile district attached to it, which is estimated to contain 20,000 inhabitants.

CAMILLUS, Marcus Furius, a celebrated Roman patrician who first makes his appearance as consular tribune, 403 B.C. His military career was a series of unbroken successes, according to the accounts which have come down to us; but these accounts have been shown by Niebuhr to possess a considerable admixture of mythological or poetic fiction. In 396, C. was made dictator during the Veientine war, in which he mined and captured the city of Veii; but the proud splendor of his subsequent triumph offended the Roman populace, who were still further displeased when C. demanded a tithe of the spoils of Veii, in order to fulfil a vow made to Apollo, on condition of victory. In 394, C. was again elected consular tribune, and besieged the Falerii, who after bravely defending themselves, were led by a magnanimous act of C. to yield unconditionally. Afterwards, C., being accused of peculation, and foreseeing certain condemnation, banished himself from Rome, 391, and lived in retirement at Ardea, until Brennus, at the head of his wild Gauls, had swept through Etruria, and captured and destroyed the whole of Rome except the Capitol. C. was now recalled, and appointed dictator a second time. He achieved a decisive victory over the invaders, rebuilt Rome, and obtained new victories over the Volsci, and others. In 386 B.C., he was elected dictator for the third time, but refused the office. In 381 B.C., C. was victorious in the war of Rome against Præneste and other Latin towns; and in 368 B.C., he was elected to his fourth dictatorship, but abdicated during the same year. In 367 B.C., when war broke out with the Gauls, C., though 80 years old, accepted the dictatorship for the fifth time, defeated the barbarians near Alba, and made peace between patricians and plebeians. After this, he elected near the Capitol a temple to Concord, and, having retired from public life, died 365 B.C., of the plague, lamented by the whole Roman people.

CAMISARDS. See Cevennes.

CA'MLET, (from Arab. *chamal*, fine) is properly a fabric made from the hair of the Angora-goat (q. v.). The camlets made in Britain are either wholly of wool, or of wool mixed with cotton or linen.

CAMOENS, Luis de (the modern spelling of the name is *Camoes*), the epic poet of Portugal, was born about 1524, at Lisbon, and studied the ancient classics at Coimbra. On his return to Lisbon, he fell in love with a lady of honor, Catharina d'Atayada. This affair was the beginning of all the poet's misfortunes. Hav-

ing been banished by royal authority to Santarem, C. joined the expedition of John III. against Marocco, and lost his right eye in a naval engagement with the Moors in the Strait of Gibraltar. On his return to Lisbon, his bravery as a soldier was no more honored than his genius as a poet. Disappointed in all his hopes, he determined to leave for ever his native land, and sailed for India, 1553. Offended by certain abuses of the Portuguese authorities in India, C. ventured to expose them in a satire, entitled *Disparatus na India*, 'Follies in India,' in which he treated even the viceroy with ridicule. For this offence, the poet was banished, 1556, to Macao, where he lived several years, and was engaged in writing *Os Lusiadas*. Here C. held the unpoetical but probably lucrative post of administrator of the effects of deceased persons; and having saved, as he thought, a competency for his future life, was recalled from his banishment, 1561. Unhappily, in returning to Goa, he suffered shipwreck, and lost all his property, excepting his epic poem. After other wanderings and misfortunes, C. took ship for Lisbon, where he arrived in 1569, with no other wealth but his epic. He dedicated *The Lusiad* to the young king, Sebastian, who was very gracious; but, nevertheless, all the real patronage bestowed on C. consisted of a very small pension (about £4), and permission to remain at the court of Lisbon. Even this small pittance was taken away after the death of Sebastian, and C. was left in such poverty, that a faithful Indian servant begged in the streets of Lisbon for the support of the great epic poet of Portugal. C.'s lyric poems, written during this time of destitution, contain many pathetic lamentations. He died obscurely in the hospital at Lisbon, 1579; and sixteen years afterwards, when it was proposed to erect a splendid monument to his memory, there was some difficulty in finding his burial-place.

The Lusiad (*Os Lusiadas*, 'the Lusitanians') celebrates the chief events in the history of Portugal, and is remarkable as the only modern epic poem which is pervaded by anything like the true national and popular spirit of ancient epic poems. It is a gallery of epic pictures, in which all the great achievements of Portuguese heroism are represented. Among the most famous passages are the tragical story of Inez de Castro, and the apparition of the giant Adamastor, who appears as the Spirit of the Storm to Vasco da Gama, when crossing the Cape. The versification of *The Lusiad* is extremely charming. Patriotic sentiments pervade the whole work. Besides his epic poem, C. wrote sonnets, odes, elegies, eclogues, epigrams, satires, epistles, and three comedies—*Os Amphitryoes* (after Plautus), *King Seleucus*, and *Filodemo*. There have been many editions of his works, one of the fullest being that by the Viscount de Juromenha, which also has a good biography (6 vols., Lisb. 1869). Translations of the *Lusiad* have been made into almost all European languages. Mickle's English translation was published in 1776; Captain Burton's excellent one (1881) was the ninth English rendering.

CAMO'GLIA, a town of N. Italy, on the Gulf of Genoa, about 13 m. E.S.E. of the city of that name. Its inhabitants, amounting in 1872 to 6345, are chiefly engaged in fishing.

CA'MOMILE. See CHAMOMILE.

CAMO'RRA, the name of a secret society, existing throughout all parts of the former kingdom of Naples, the members of which are called *Camorristi*, and have exercised lawless force to a great extent over the humbler classes of society. Under the Bourbons, they openly presented themselves at markets, hackney-coach stations, public spectacles, and all occasions of popular amusement; assumed the right of deciding disputes; extorted a portion of whatever money passed from hand to hand for purchases, rents, wages, and the like, or in games; undertook also the transport of smuggled goods, and contracted for the commission of serious crimes. Their readiness for violence and murder, and their close association among themselves, made them so much dreaded, that even Camorristi who had been thrown into prison, succeeded in exacting money from their fellow-prisoners, and from the jailer himself. The society has a central rendezvous in every large provincial town, and twelve such in the city of Naples. Those who belong to each of these sections of the society are under the absolute government of a chief elected by themselves, with whom is associated a treasurer. The latter has the charge of the common fund into which all the Camorristi of that section pay their whole gains, for equal distribution among all their associates. Candidates for membership must show that they have neither been guilty of espionage nor theft; also that neither their wives nor their sisters are prostitutes; and must swear upon an iron crucifix a fearful oath of fidelity and secrecy. The candidate remains for a year, with the designation of *Picciotto d'onore*, as a pupil under an old Camorrista; and having completed this probation, and given proof of his courage and obedience in circumstances involving danger of life, he is advanced to the rank of a *Picciotto di sgarro*.

Finally, after a longer period, and when he has given proof of his fitness on a number of occasions, he is admitted to full membership of the society as a *Camorrista*. Each Camorrista carries about with him two knives of peculiar form, by which the members of the society recognize each other. They are held under the strictest discipline. Disobedience is punished by flogging, suspension from employment, or expulsion; treachery, even on the part of a member who has been expelled, is punished with death. If two Camorristi quarrel, their chief decides the question between them; but in difficult cases, a duel with daggers is the mode of decision. Under King Ferdinand II. the Camorra was tolerated for political reasons. The government of Francis II. endeavored to put down the society, and the police received instructions to seize and transport all known members of it. Those who remained entered into alliance with the Garibaldi committee, and rendered essential service in the expulsion of the Bourbons. An attempt was now made to employ them in the police service, but completely failed. The Camorra having fallen out with the new government, the members of the society now chiefly live by robbery in South Italy.—See Monnier, *La Camorra, Notizie Storiche* (Flor. 1863).

CA'MOUFLET, in Military Pyrotechny, is a stinking composition enclosed in paper-cases. It is used in siege-works, to blow into the faces of the sappers, and miners when hostile parties come within reach of each other, and thus to confuse them.

CAMP (Fr., from Lat. *campus*, a plain, or level field). The signification of this word in English is rather that which belonged to the Latin *castrum*, an encampment, or *castra*, a collection of tents, huts, and other structures, for the accommodation and protection of troops, than that which its etymology would more directly indicate. The regular system of encampment ultimately adopted by the Romans, was forced upon them by degrees. The most complete account of it is furnished to us by Polybius. A plan will be found in Dr. Smith's *Dictionary of Greek and Roman Antiquities*, constructed for the purpose of illustrating his description. When a Roman army was about to encamp, a tribune and several centurions were sent on before, to select a suitable site for the purpose. As soon as the locality was determined on, they chose the spot for the prætorium or general's tent, and marked it with a white flag. Around the prætorium, as a sort of center or heart to the whole system, the rest of the C. was laid out. It was generally placed on an elevated position, in order that the general might have the rest of the encampment under his eye, and be able to transmit his orders with greater facility. Polybius himself tells us, that the best conception which can be formed of a Roman C. of the more permanent kind is by regarding it as a military town, resembling in many respects no doubt that which has recently grown up at Aldershot (q. v.). The streets were broader than those usually to be found in towns, the wider ones measuring 100, and the narrower 50 feet; and the *forum*, as its name indicates, was a sort of public market-place.

A space of 200 feet was left vacant all round between the tents and the ramparts, partly to afford space for the arrangements of the army, and for stowing away any booty that might be captured, but chiefly to protect the soldiers' huts from incendiary attempts from without. In form, the Roman C. was square, except in the case in which it was intended to embrace within its ramparts four legions, or two consular armies, when it became an oblong rectangle. The C. was surrounded by a fosse or trench (*fossa*), which was generally 9 feet deep and 12 broad. On the top of the rampart, which was of earth, there were stakes. The labor of constructing the rampart and the fosse was divided between the allies and the Roman legions, the former making the sides along which they were stationed, and the legions the rest. The task of superintending the construction of the C. amongst the Romans was intrusted to the tribunes; amongst the allies, to the præfects. Before the arrival of the troops, the different parts of the C. were so distinctly marked out and measured off, that they at once proceeded to their respective stations, as if they had entered a well-known city, and were marching to their quarters. The discipline of the C. was of the strictest kind. The tribunes administered an oath against theft both to freemen and slaves, and two maniples were chosen to keep the *via principalis*, which was a place of general resort, clean and in good repair. The other occupations connected with the C., too numerous to be mentioned here, were portioned out in like manner; and the superintendence of the whole was intrusted to two tribunes chosen by lot from each legion, and appointed to serve for two months. The præfects of the allies possessed a similar authority, which, however, seems to have been limited to their own troops. Every morning at daybreak, the centurions and horsemen presented themselves to the tribunes, and these, in their turn, received their orders from the consul. The watchword for the night, marked on a four-cornered piece of wood, was given out with much formality. The night was divided into four watches, each of three hours' length; and there was a curious arrangement for ascertaining that guard was kept with vigilance. The soldiers of the watch companies received from the tribune a number of small tablets, with certain marks upon them, and these tablets were collected during the night by the horsemen whose

duty it was to visit the posts, from such of the guards as they found on duty.

Where these inspectors found the guards asleep or absent, they called upon the bystanders to witness the fact, and then passed on to the next. In the morning, the inspectors appeared before the tribunes, and gave up the tablets they had received, when the guards whose tablets were not produced were required to account for them. A regular scale of rewards and punishments was established in the camp. In comparing the encampment of the Romans with those of his own countrymen, Polybius tells us that the Greeks trusted mainly to a judicious selection of their ground, and regarded the natural advantages which they thus secured as supplying in a great measure the place of artificial means of defence. The Greeks, consequently, had no regular form C., and no fixed places were assigned to the different divisions of the army. When the practice of drawing up the army according to cohorts, introduced by Marius and Cæsar, was adopted, the internal arrangements of the C. experienced a corresponding change. Latterly, even the square form was abandoned, and the C. was made to suit the nature of the ground. It was always held to be of importance, however, that the C. occupied a defensible position; that it could not be overlooked; and that it had a command of water.

When stationary camps (*castra stativa*) came into more general use, we hear of several parts which are not mentioned by Polybius, for example, the infirmary (*valetudinarium*), the farriery (*veterinarium*), the forge (*fabrica*), &c.; and as a great variety of troops then came to be employed, they must, of course, have had new stations appointed to them in the camp. Many of the stationary camps ultimately became towns, and to this is ascribed the origin of the most of the towns in England the names of which end in *cester* or *chester*. Amongst the most perfect of those which retained the form of the simple encampment, is that at Ardoch in Strathearn, Perthshire, in the grass-covered mounds and ridges of which most of the divisions of the C. have been distinctly traced by antiquaries. For further information on this subject, the reader is referred to General Roy's *Military Antiquities in Great Britain*, and the *Caledonia Romana* of the late Mr. Robert Stuart. In these works will be found ample accounts of some of the more remarkable Roman camps in Britain; those described by Roy being rendered intelligible by large engravings.

It is believed that, during the middle ages, the plan adopted by the Romans in their camps was more or less adhered to, seeing that the weapons employed, which mainly determined the character of the troops, were nearly the same. In Britain, before the arrival of the Romans, and also during the Saxon and Danish periods, the camps, usually circular in form, appear to have been somewhat rude in character, with the cavalry grouped round the standard in the center, and the infantry placed near the front.

The principles of castrametation, or camp-formation, underwent much change after the invention of gunpowder, owing to the necessity for defending the C. from artillery. Modern camps, of different kinds, will be found described under ENCAMPMENT.

CAMP E'QUIPAGE is a general name for all the tents, furniture, fittings, and utensils carried with an army, applicable to the domestic rather than the warlike wants of the soldier. In the days when armor was worn, the C. E. was enormously heavy and complicated. In the present day, a certain amount of C. E. is provided for a given number of troops. See ENCAMPMENT, TENT, &c.

CAMP FOLLOWERS are the sutlers and dealers in small-wares who follow an army. In India, owing to the peculiar habits and custom of the Hindus, and the large number of servants retained by English officers, the C. F. are in immense number; comprising servants, sutlers, cantiniers, hostlers, water-carriers, snake-charmers, dancers, conjurors, and women. In February, 1839, when a Bengal army of 15,000 men left Shikarpoor for Afghanistan, it was accompanied by no fewer than 85,000 C. F.: the commander took with him six weeks food for the whole 100,000. All English commanders in India find this regulation a very burdensome one. Even in European armies, however, C. F. are regarded as necessary; they are under the control of the commanding officer, and are subject to the Articles of War—not, however, in cantonments, only in the field. French armies are accompanied by women much more largely than English.

CAMPA'GNA, a town of Italy, in the province of Salerno, is situated between high mountains, about 20 miles east of Salermo. It has a fine cathedral, several convents, and a large annual fair. Pop. (1872) 9813.

CAMPAGNA DI ROMA, an undulating, uncultivated, and unhealthy plain of Italy surrounding Rome, including the greatest part of ancient *Latium*, and forming the late papal delegation of Frosinone and a great part of the Comarca di Roma. Its length is variously stated, arising from the fact that different authorities measure it from different points. But supposing the name to apply to the district extending from Cape Linaro, south of Civita Vecchia, to Terracina, beyond the Pontine Marshes, its length is about 90 miles; and its breadth inland, to the Alban and Sabine hills, is stated at from 27 to 40 miles. A broad strip of sandy plain skirts the Mediterranean. The ground, which never rises above 200 feet above the sea, is almost entirely volcanic, and the lakes are formed by craters of extinct volcanoes. The vapors rising from this district, and especially from the Solfatara (q. v.), produce the pestilential atmosphere styled *Aria Cattiva*. The number of inhabitants is very small, and in summer they are driven from the C. by its pestilent air, and seek shelter in Rome and other neighboring places. In autumn, herdsmen descend from the Apennines to the C. with their herds, the pasturage in some parts being rich and abundant.

This district was not always uncultivated and depopulated as we now find it, for Domitian and Hadrian built here their splendid villas. Wars and devastations, the 'black-death' (q. v.) in the 14th c., which greatly thinned the population, and inundations from the Tiber, have been the main causes of the present state of the C.; but, according to Livy, it was always an unhealthy district, even when well cultivated. Some of the popes, especially Pius VI., have endeavored to drain the Pontine Marshes, and, during the dominion of the French in Italy, General Miollis made great improvements in drainage, timber-planting, and cultivation in the Campagna.

CAMPAI'GN generally means a connected series of military operations, forming a distinct stage or step in a war. Under the old system of warfare, when armies kept the field only during the summer months, a C. was understood to include all that was done by an army from the time it took the field till it went again into winter-quarters. Now that winter is no longer allowed to arrest military operations, it is more difficult to say where one C. ends and another begins. Some writers make a C. include all the steps taken to accomplish some one immediate object.

CAMPAN, JEANNE LOUISE HENRIETTE, reader to the daughters of Louis XV., was born in Paris, October 6, 1752. She was favored by Marie Antoinette, and gave her royal patroness numerous proofs of her fidelity. When the unfortunate queen was conveyed to the Temple, she wished to share her captivity, but was refused entrance by Petion. During the Reign of Terror, she remained concealed at Combertin. After the fall of Robespierre, she opened a boarding-school at St. Germain-en-Laye, which was patronized by Josephine Beauharnais, who sent her daughter Hortense to it. In 1806, Napoleon appointed her lady-superintendent of the Institution at Ecouen for the education of the daughters of the officers of the Legion of Honor. After the Restoration, this institution was suppressed, and Madame C. retired to Mantes, where she died, May 16, 1822. She is chiefly remembered on account of her interesting works—*Mémoires sur la Vie Privée de la Reine Marie Antoinette* (4 vols., 5th ed., Par. 1824), *Journal Anecdotique* (Par. 1824), and *Correspondance Inédite avec la Reine Hortense* (2 vols., Par. 1835)—giving recollections of the court of Louis XV., of Marie Antoinette, the Revolution, and some traits from the private character of Napoleon.

CAMPA'NA, LA, a town of Andalusia, Spain, situated on the Madre-Viega, a tributary of the Guadalquiver, about 37 miles east-north-east of Seville. The inhabitants, numbering 4380, are engaged chiefly in agricultural pursuits, and in weaving and brick-making.

CAMPANA'RIO, a town of Estremadura, Spain, about 62 miles east-south-east of Badajos. It is an ill-built place, with narrow, uncared-for streets. It has manufactures of linens and ropes, and a trade in the agricultural produce of the neighborhood. Pop. 6400.

CAMPANELLA, TOMMA'SO, a Dominican monk celebrated for his philosophical ability, was born in 1568 at Stilo in Calabria, and studied at Naples and Cosenza. The writings of Telesius first awakened his doubts respecting that pile of artificial dogmas styled the 'scholastic philosophy.' The results of his studies were given in his *Philosophia Sensibus Demonstrata*, &c. (Naples, 1591), which contained a defence of Telesius. His superiority in disputations exposed him to the hatred and false accusations of the orthodox monks and schoolmen. He was in consequence compelled to flee from Naples to Rome, and thence to Florence, Venice, and Bologna. Afterwards he returned to Calabria, but having involved himself in a political conspiracy, he was seized and confined in a Neapolitan dungeon for 27 years; tried five times, and tortured seven; accused of heresy; and declared the author of a book which had been published thirty years before he was born. In 1626, Pope Urban VIII. had him brought to the prison of the Inquisition at Rome, but immediately liberated him, and treated him in a very generous manner. After being again persecuted by the Spanish government, C., who had formed the friendship of the French ambassador at Rome, the Duc de Noailles, obtained a letter of introduction to Cardinal Richelieu, and secretly left for France, where he was graciously received. He died in the Dominican monastery of St. Honoré, near Paris, 1639. Most of his works—*De Gentilismo*

non Retinendo (Paris 1636), *Astrologicorum Libri VII.* (Lyon, 1629), *Prodromus Philosophiæ Instaurandæ* (Frankfort, 1617), *Exordium Metaphysicæ Novæ, De Sensu Rerum et Magia* (Frankfort, 1620)—were written during his imprisonment. His philosophical views give expression to that confused fermentation of new ideas which was characteristic of the close of the 16th and opening of the 17th c.—bold and clear opinions strangely mingled with commonplaces and with astrological dreams and fancies. It may seem strange that C. should have been patronized by the pope; but this favor was gained, not by his speculative works, but by several writings in defence of the Roman Catholic Church. His *De Monarchia Hispanica Discursus* is a work of great power and value, comprising a sketch of the political world of C.'s time, with special reference to Spain. It was translated into English during Cromwell's Protectorate.

CAMPA'NHA, a town of Brazil, about 150 miles north-west of Rio de Janeiro, surrounded by bare hills, much cut up by gold mines. The houses are built chiefly of earth, and surrounded by gardens. C. has several churches, a Latin school, an hospital, theater, &c. Pop. 6000.

CAMPA'NIA, anciently a province of Central Italy, having Capua as its capital (now subdivided into the provinces of Benevento, Naples, Salerno, Avellino, and Caserta), was bounded on the S. by Lucania, E. by Samnium, N. by Latium, and W. by the Tyrrhenian Sea. It was one of the most productive plains in the world, producing an extraordinary abundance of corn, wine, and oil; and both by Greek and Roman writers is celebrated for its soft and genial climate, its landscapes, and its harbors. It was the *regio felix* of the Romans, who built here many of their most splendid villas, &c. Through it passed the Appian Way, the greatest high-road of Italy. The promontory Misenum, Mount Vesuvius, the river Vulturnus, the towns Baiæ, Cumæ, Linternum, Puteoli, Naples, Herculaneum, Pompeii, Nola, Salernum, Capua, &c., belonged to Campania. It was the oldest Greek settlement in Italy, having been colonized, according to the later chronologers, about 1050 B.C.; but this is in all probability too early a date. It was next conquered by the Etruscans, and several of the towns above mentioned, such as Capua and Nola, were founded by that people. The Etruscans then succumbed to the more warlike and hardy Samnites, who, in their turn, yielded to the irresistible valor of Rome (340 B.C.). Through all these vicissitudes of conquest, the substratum of the people remained as at the beginning. The mass of the Campanians were essentially of Oscan race, and Oscan they remained. Indeed, it is mainly from them that our knowledge of the Oscan language is derived, and one of their towns—Atella, between Capua and Naples—had the honor of introducing upon the early Roman stage a species of popular drama or comedy, which was greatly relished for its quaint and vigorous humor. See ATELLANÆ.

CA'MPANILE (Ital., from Mid. Lat. *campana*, a bell), a name adopted from the Italian to signify a bell-tower of the larger kind, and usually applied to only such as are detached from the church. Scarcely any of the existing bell-towers of England answer to the Italian conception of the C., but it is said that there was a very fine one at Salisbury, 200 feet in height, which was destroyed by Wyatt. In Italy, they are found everywhere—at Bologna, Padua, Ravenna, Cremona, Venice. Perhaps the most remarkable are the so-called 'leaning tower' of Pisa, and the C. of Florence. The former, which is circular in form, is decorated with columns and arcades to the summit of its eight stories, and presents a very imposing appearance, reminding the traveler of the Coliseum at Rome, from which, and the now destroyed Septizonium, the idea of it is said to have been taken by the architects Bonano of Pisa, and Wilhelm of Innspruck. But though less curious, the famous C. of Giotto is perhaps even more worthy of the traveler's attention. It was erected in 1334, with the express object of surpassing both in height and richness of workmanship, any of the remains of antiquity.

In form, it is a parallelopiped, and is of the same dimensions from bottom to top. Though it is very loftly—267 feet—it consists of only four stories, of which the tallest are the uppermost and undermost; and the windows in the upper story are rather larger than those in the two beneath, the object being to counteract the diminution to the eye occasioned by the greater distance. The effect of this arrangement has been much praised by architects; but there seems ground for scepticism as to its advantages. The style is the real Italian Gothic, which unites simplicity with great richness of ornamentation. The original design of Giotto was that a spire of 100 braccia in height should have surmounted the present structure, and on the summit may be seen the four great piers from which it was intended that it should have risen. The splendid C. of Florence, in its present condition, must thus be regarded only as a fragment. There is a fine C. at Seville, 350 feet in height, which was built by Guever the Moor in 1568. It is called La Giralda, from a brazen figure, which, though it weighs a ton and a half, turns with the wind.

CAMPA'NULA (Lat., a little bell), a genus of plants of the natural order *Campanulaceæ* (q. v.), distinguished by a bell-shaped corolla with five broad short segments, filaments dilated at the base, a 2—5-cleft stigma, and a top-shaped capsule with 2—5 cells, opening by lateral clefts below the calyx segments. The species are very numerous, chiefly but not exclusively abounding in the northern parts of the world, and the more elevated districts of the temperate zones. They are mostly herbaceous, some of them annual. The name BELL-FLOWER is common to many of them, and is often extended to all. The flowers are in general beautiful, and many of the species are therefore frequent ornaments of flower-borders. Of the native British species, the most common, and one of the most beautiful, is the HAREBELL (q. v.) or BLUEBELL (*C. rotundifolia*). The CANTERBURY BELL (*C. medium*) is a very beautiful annual, which has long been so generally sown in flower-borders in Britain, that it is almost as familiar to every one as the most common field-flowers. It is a native of the central parts of Europe.—Medicinal virtues were formerly ascribed to some species, particularly in affections of the throat, wherefore *C. Trechelium*, frequent in woods in England, has received the name of Throatwort; but they are now regarded as inert.—The roots of some are reckoned among esculents, as those of the RAMPION (q. v), (*C. Rapunculus*), occasionally cultivated in Britain, and much more generally in some parts of continental Europe.

Harebell (*Campanula rotundifolia*).

CAMPANULA'CEÆ, a natural order of exogenous plants, herbaceous or half shrubby, with a bitter milky juice; leaves without stipules, and generally alternate; the calyx usually 5-lobed, its tube adhering to the ovary; the corolla monopetalous, inserted into the top of the calyx, usually 5-lobed and regular; the stamens inserted into the calyx, and alternate with the lobes of the corolla; the fruit with two or more many-seeded cells, crowned with the withered calyx and corolla, and opening by division of the cells (*loculicidally*); the seeds fixed to the axis, and having fleshy albumen. About 500 species are known, natives chiefly of the temperate and colder climates of the northern hemisphere, where their blue or white flowers are among the finest ornaments of fields and woods. The roots and young leaves of some species are eatable, as in the half-fleshy fruit of *Canarina Campanula*, a native of the Canary Islands.

CA'MPBELL, the family name of the Lords of Argyle. The origin of the family has not been satisfactorily ascertained. One theory makes it of Anglo-Norman origin; another traces its descent through a long line of Celtic chiefs to King Arthur. It first appears in record towards the end of the 13th c., when it held lands in Ayrshire and Argyle. The chiefs of the family having taken a prominent part in public affairs, the most distinguished are noticed under the head ARGYLE.

CAMPBELL, SIR COLIN, LORD CLYDE, one of the bravest soldiers and most distinguished generals of modern times, was born in Glasgow, in 1792. His father was a cabinet-maker, named John Macliver, but Colin assumed the name of Campbell, to gratify an uncle on the mother's side. He entered the army as an ensign in 1808; fought through the war in the Spanish peninsula with distinction, and took part in the expedition to the United States in 1814. In 1842, he attained the rank of colonel, and in the same year he was present at the attack on Chusan, in China, and for his services there received honorable mention in the *Gazette*. He next served in the Punjab, commanding the left at the battle of Chillianwallah. For his conduct in this battle, Lord Gough awarded him the highest praise in his dispatch to the governor-general of India. He next commanded in the Peshawur district with uniform success against the hill-tribes. On the breaking out of the Crimean war in 1854, he was appointed to the command of the Highland Brigade, and took a prominent part at the battle of the Alma; and afterwards at Balaklava, where, with the 93d Highlanders, which he did not even form into square, he beat back the Russian cavalry, who were swooping down on the port, with its accumulation of shipping and stores.

His services in this war were rewarded with promotion to the rank of major-general, and he was also created a Knight Grand Cross of the Order of the Bath, and received the Cross of the French Legion of Honor. He was appointed Inspector-general of Infantry, and in 1857, commander of the forces in India, then engaged in quelling the Indian mutiny, which by his energy and

judgment was soon utterly subdued. One of the most notable characteristics of C.'s generalship, was the care he took of the lives of his men, all his victories being won with a minimum expenditure of the blood of his soldiers. In 1858, C. was created a peer, with the title of Baron Clyde, and appointed a general, the East India Company granting him an annuity of £2000. C. arrived in Britain from India in 1860, and died August 1863. See his *Life* by Shadwell (1881).

CAMPBELL, George, D.D., an eminent theological writer, was born at Aberdeen in 1719. He was educated for the law, but abandoned that profession for the study of divinity. In 1746, he was ordained minister of Banchory Ternan, a parish lying some miles south-west of Aberdeen; and in 1759, he was appointed Principal of Marischal College. His first work was his famous *Treatise on Miracles*, in answer to Hume. The dispute concerning miracles has assumed a new form in the present century, and C.'s arguments would not meet all the objections which the modern school of rationalists urge; but the work in its own day was greatly admired, and characterized as 'one of the most acute and convincing treatises that has ever appeared on the subject.' It was speedily translated into French, Dutch, and German. In 1771, C. was elected Professor of Divinity in Marischal College. In 1776, he published his *Philosophy of Rhetoric*, which is still a standard work on the subject. His last work was a *Translation of the Gospels, with Preliminary Dissertations and Notes*. He died April 6, 1796. After his death appeared his *Lectures on Ecclesiastical History*.

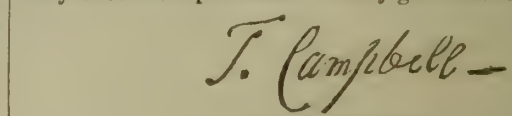
CAMPBELL, John (Campbell), Lord, High Chancellor of England, son of a minister of Cupar, in the County of Fife, Scotland, was born in 1779. He was at first destined to follow his father's profession, and was sent while still a mere boy, to the neighboring university of St. Andrews. C. himself had no inclination for a clerical life, and when he had completed his studies in the Faculty of Arts, he left for London being then about 19 years of age. He obtained employment on the staff of the *Morning Chroniole*, where, in due time, he was intrusted with the care of the theatrical criticism and the reports in the House of Commons. He was called to the bar in 1806. His sound sense, and unpretending activity and devotion to business, were awarded with an extensive common-law practice, and, after a time, with professional promotion. The silk-gown of a king's counsel was conferred upon him in 1827.

Three years afterwards, he entered parliament, actuated, he tells us in the preface to one of his works, by a desire to obtain for England the benefits of a national registry of titles to land. The effort, at the time, was unavailing, as the landlords, whom it was destined more immediately to benefit, completely misunderstood the purport of the project. C. was promoted by the Whig party, to which he had attached himself, to the Solicitor-generalship in 1832, and to the Attorney-generalship in 1834. In the same year, he was chosen the representative in parliament for Edinburgh. He continued to represent Edinburgh down to 1841, and remained in the office of Attorney-general during that period, with the exception of the short time in 1835, when the Conservatives were in power. In 1841, he was made Chancellor of Ireland and a peer of the United Kingdom; but held the office of Chancellor only a few months, when the Melbourne cabinet left office, necessitating C. also to resign. For the first time since boyhood, he found himself without regular daily labor, and at the mature age of 60, set to work to win the literary fame which he professes always to have secretly coveted. His first publication was a collection of his speeches at the bar and in the House of Commons. For three or four years after the publication of his speeches, C. was engaged in the preparation of the *Lives of the Chancellors*, the first series of which appeared in 1845. In 1846, he joined the Russell cabinet in the capacity of Chancellor of the Duchy of Lancaster. His ministerial duties were not sufficiently arduous to interrupt his literary labors, and he proceeded to complete the *Lives of the Chancellors*, and to publish a supplemental series of *Lives of the Chief-justices of England*. Both works have enjoyed great popularity, but leave no doubt that the author was more fitted for a practical lawyer than for a man of letters. C. was appointed Chief-justice in 1850. He held the office for nine years, at the end of which time he received the highest honor of his profession, being made Chancellor. He died June 1861. See his *Life* (with autobiography and letters), edited by his daughter (1881).

CAMPBELL, Thomas, a distinguished English poet, was born in the city of Glasgow, 27th July 1777. His father was a merchant, and the poet was the youngest of ten children. He was sent to the university of his native city, and remained there six years. During his collegiate course, he received several prizes, and was particularly distinguished for his knowledge of Greek literature. On leaving the university, C. went to reside as a tutor for a year in the island of Mull. The scenery of the West Highlands made a deep impression on his mind, and to his abode in these grand and desolate regions we are indebted for many of the touches of sublimity which occur in his verses.

Returning from Argyleshire, C. meditated the study of law, and repaired to Edinburgh; but he could not shake off his recollections. In his eyes, the mists were folded on the hills of Morven, the roar of Corrievrekin was in his ears, and instead of prosecuting the study of jurisprudence, he wrote *The Pleasures of Hope*. The poem was published in 1799, and went through four editions in a twelvemonth. After its publication, C. went to the continent; and on December 3, 1800, witnessed from a Bavarian monastery the battle of Hohenlinden, fought between the French and Austrians. In 1801, he returned to England, with *The Exile of Erin* and *Ye Mariners of England* in his portmanteau; and shortly after took up his abode in Edinburgh, where *Lochiel's Warning* was composed. In 1803, C. proceeded to London, and adopted literature as a profession. He contributed articles to *The Edinburgh Encyclopædia*, and compiled *The Annals of Great Britain from the Accession of George II. to the Piece of Amiens*, in 3 vols. In 1806, through the influence of Mr. Fox, C. received a pension of £200 per annum from the government. In 1809, he published *Gertrude of Wyoming*, which bears the same relation to *The Pleasures of Hope* that *The Castle of Indolence* bears to *The Seasons*—a less brilliant and striking, but more mature and finished performance. In 1818, C. was again in Germany, and on his return, he published his *Specimens of the British Poets*, in 7 vols. In 1820, he delivered a course of lectures on poetry at the Surrey Institution. From this date to 1830, C. edited *The New Monthly Magazine*, and contributed thereto several poems, one of which, *The Last Man*, is in some respects the loftiest of all his performances. In 1824, he published *Theodoric and other Poems*. In 1827, he was elected Lord Rector of the university of Glasgow, and received the unusual honor of re-election the two following years. He published *The Pilgrim of Glencoe and other Poems* in 1842. His later publications did not add to his fame. He died at Boulogne in 1844, and was buried in Westminster Abbey, Macaulay, Dean Milman, and other celebrated persons bearing the pall.

C. is an established English classic. With the young, *The Pleasures of Hope* will ever be a chief favorite; while readers of maturer years will linger with delight over the silvan scenery and tender domestic scenes of *Gertrude*. It is in his lyrics, however, that C. has ascended highest into the heavens of song—*Hohenlinden*, *Ye Mariners of England*, and *The Battle of the Baltic*, cannot be paralleled in the language. Than these lyrics, nothing can be more simple and spirited. Once read, they cannot be forgotten. They will fan the patriotism of many generations.



Campbell's Autograph.

CAMPBELL ISLAND, a lonely spot on the South Pacific, in lat. 52° 33′ S., and long. 169° 9′ E. Though it is mountainous, and measures only 36 miles round, it is yet valuable on account of its harbors. It is also scientifically interesting, being volcanic, and displaying a rich and rare flora.

CA'MPBELTON, a royal burgh and seaport, on the east coast, near the south end of the peninsula of Cantire, Argylshire, and the most important town in that county, is 65 miles west-south-west of Glasgow, on a fine harbor or sea-loch, 2 miles long, and 1 mile broad. It is noted for the number—between 20 and 30—of its whisky distilleries. It unites with Ayr, Inverary, Irvine, and Oban to return one member to parliament. A sculptured granite cross stands in the principal street, and is supposed to have been brought from Iona. Pop. (1871) 6680; (1881) 7693. The chief exports are whisky, herrings, and Highland cattle and sheep. In 1880, 937 vessels, of 86,390 tons, entered, and 920, of 85,748 tons, cleared the port.

CAMPEA'CHY, a seaport on the west side of the peninsula of Yucatan, which divides the Caribbean Sea from the Gulf of Mexico. It is in lat. 19° 50′ N., and long. 90° 33′ W. Though it has a shallow haven, yet it is the center of the trade in logwood; it exports likewise cotton and wax. It is a handsome city of 15,000 inhabitants, containing churches, convents, a cemetery, a theater, a college, and ship-building docks. *Campeche* is the Spanish spelling.

CAMPER, Peter, one of the most learned and acute physicians and anatomists of the 18th c., was born at Leyden, 11th May 1722, and studied medicine there. In 1750, he became professor of medicine at Franeker; in 1755, at Amsterdam; and in 1765, at Groningen. In 1773, he resigned his post, resided some time at Franeker, and then traveled. On being elected a member of the state council in 1787, he removed to the Hague, where he died, 7th April 1789. C. was distinguished not only for the services he rendered to anatomy, surgery, obstetrics, and medical jurispru-

dence, but also as a promoter of the fine arts. He was remarkably skilful in pen-and-ink drawing, painted in oil, embossed, and even acquired considerable experience as a sculptor. For his observations on the facial angle, see article ANGLE. His work on the connection of anatomy with the art of drawing was an important contribution to the theory of art. Another work, *Description Anatomique d'un Eléphant Mâle*, edited by his son, G. A. Camper, and published at Paris in 1802, is also worthy of notice. C.'s collected writings, with plates, appeared under the title, *Œuvres qui ont pour Objet l'Histoire Naturelle, la Physiologie et l'Anatomie comparée*, 3 vols. (Par. 1803).

CAMPERDOW'N, a broad tract of low downs which separates the small hamlet of Camp, in North Holland, from the German Ocean, about 30 miles north from Haarlem. It is known on account of the victory obtained, off that part of the coast by Admiral Duncan over the Dutch fleet, Oct. 11, 1797. The Dutch fleet under Admiral van Winter had stolen out of the Texel, with the view of joining the French fleet at Brest, when it was intercepted by Admiral Duncan, and after an obstinate battle, attended with great loss on both sides, the Dutch admiral was compelled to yield, leaving 8 sail of the line and several smaller vessels in the hands of the English, himself becoming a prisoner.

CA'MPHENE, or CA'MPHILENE, is an artificial variety of camphor obtained from turpentine, by acting thereon with the dry vapor of hydrochloric acid, and keeping the whole at a low temperature by immersing the vessel in a freezing mixture. A solid substance is produced, which separates in white crystalline prisms, and has the taste and agreeable aromatic smell of common natural camphor. As prepared, it is strictly a hydrochlorate of C.; but the latter can be obtained free from hydrochlorate acid, by passing the vapor of the compound substance over dry heated quicklime, when the acid is held by the lime, and pure C. passes over. It is not so similar to ordinary camphor when thus freed from the hydrochloric acid.

CA'MPHINE is the name applied to a variety of spirit of turpentine obtained from the *Pinus australis* of the Southern States of America, and rather extensively sold and used in Britain for burning in out-of-door lamps. It is very volatile, and burns very freely, giving off a pure white brilliant light; and when the vapor diffuses itself through air, and is set fire to, it forms a dangerous and violently explosive mixture.

CA'MPHOR is a solid essential oil which is found in many plants, and may be separated from many essential oils. It particularly abounds in certain species of the natural order *Lauraceæ* (q. v.). Almost all the C. of commerce is the produce of the C. Laurel or C. tree (*Camphora officinarum*, formerly known as *Laurus Camphora*), a native of China, Japan, Formosa, and Cochin-China, and which has been introduced into Java and the West Indies. The genus *Camphora* differs from *Cinnamomum* (see CINNAMON) chiefly in having a thin instead of a leathery calyx. The C. Laurel is a tree of considerable height, much branched, with lanceolate, evergreen leaves on short stalks, and small yellowish-white flowers in axillary and terminal panicles. The fruit is in size and appearance not unlike an imperfectly ripened black currant. Every part of the tree, but especially the flower, smells strongly of camphor. The wood is light and durable, not liable to be injured by insects, and much valued for carpenter's work. In the extraction of C. from the *C. Laural*, the wood of the stem and branches is chopped up into fragments, and introduced into a still with water, and heat applied, when the steam generated carries off the C. in vapor. These vapors rise, and in passing through rice-straw, with which the head of the still is filled, the C. solidifies, and is deposited round the straw in minute grains or particles, somewhat about the size of raw sugar or coarse sand. These grains of impure C. are detached, and being introduced into a large globular glass vessel in quantities of about 10 lbs., are reheated, when first the water rises in steam, and is allowed to escape at a small aperture; and thereafter, this aperture being closed, the C. sublimes and resolidifies in the interior upper part of the flask, as a semi-transparent cake, leaving all the impurities behind. The flasks are then cooled and broken by throwing cold water on them, and the C. taken out, and sent into market. The glass globes employed are called by an Italian name, *bomboloes*, the sublimation of C. having been first practised in Venice.—C. was unknown to the Greeks and Romans, and was first brought to Europe by the Arabs. It is a white tough solid, slightly lighter than water, and floats thereon. It is very sparingly soluble in water, but freely soluble in alcohol, ether, acetic acid, and the essential oils. It fuses at 347°, and boils at 399°, and when set fire to, is very inflammable, and burns with a white smoky flame. Thrown upon the water, it floats, and may be set fire to, when the currents generated alike from the solution in water and the irregular burning of the pieces, cause a curious rotatory motion. It has a peculiar hot aromatic taste, and an agreeable characteristic odor.

C. is used in medicine, both internally and externally, as a temporary stimulant. It is frequently employed in gout and rheumatism. In small doses, it acts as an anodyne and antispasmodic; in very large doses, it is an irritant poison. It is generally reckoned an anaphrodisiac. Its alcoholic solution and liniments in which it is the principal ingredient, are much used for external application in sprains and bruises, chilblains, chronic rheumatism, and paralysis.—The effluvia of C. are very noxious to insects, and it is therefore much used for preserving specimens in natural history.

The BORNEO C. or SUMATRA C. of commerce, sometimes called HARD C., is the produce of *Dryobalanops aromatica*, a large tree of the natural order *Dipteraceæ* (q. v.). The C. is obtained by cutting down the tree, and splitting it into small pieces; being found in crystalline masses in natural cavities of the wood. To this substance, the Chinese ascribe extraordinary medicinal virtues, so that it is sold among them at more than fifty times the price of common camphor. It is seldom brought to Europe as an article of commerce.—The *Dryobalanops aromatica* yields also a pale-yellowish limpid fluid, which gushes out when deep incisions are made in the tree with an axe, and which is generally called LIQUID C. or C. OIL. It is sometimes imported into Europe. It has a smell somewhat resembling that of C., but more aromatic, like oil of cajeput. It is supposed to be from this fluid that the crystalline Hard C. is deposited. See BORNEENE.

CAMPI, a family of artists, who founded at Cremona, in the middle and near the close of the 16th c., an eclectic school of painting, parallel with that founded by the family Caracci (q. v.). GIULIO C. (1500—1572) was the head of the school. He studied painting, sculpture, and architecture under Giulio Romano. He also imitated the works of Titian (at least in coloring) and Pordenone with such success that his pictures have sometimes been ascribed to both of these artists. His female heads, like those of his brothers, are remarkably beautiful.—ANTONIO C. studied, under his brother, both painting and architecture. His knowledge of the latter was very serviceable in several of his paintings; for example, that of the sacristy of St. Peter. He was also a plastic artist, an engraver, and the historian of his native place.—VINCENZO C. (b. before 1532, d. 1591) seems to have followed the guidance of Antonio rather than that of Giulio, and excelled more in small figures than in large pictures. His paintings of fruits are highly valued. —BERNARDINO C., (b. 1522, d. about 1590), a kinsman of the three brothers C., was the most famous of the whole. Lanzi terms him 'the Annibale Caracci' of the school. He studied first under Giulio C., but soon excelled his master. Afterwards, he chose Giulio Romano, Titian, and Correggio as models, but chiefly followed Raphael, yet without servile imitation. Many of his works are found in Milan and Cremona. In the latter place, the cupola of the choir in the church San-Gismondo is Bernardino's masterpiece. He was distinguished as a portrait-painter and engraver. The lady-painter, Sophonisba Anguissola, was a distinguished pupil of Bernardino.

CAMPI'NAS, or SAN CARLOS, a town of Brazil, in the province, and 70 miles north of the city, of Sao Paulo, is situated in a fertile and picturesque district, on a small river, the Piraticaba, a feeder of the Parana. There are large coffee and sugar plantations in the surrounding district, and large quantities of sugar are exported. Many of the houses are built of mud or clay, and the immense church, whose walls are five feet thick, is composed of beaten earth. Pop. 6000.

CA'MPION. See LYCHNIS, and SILENE.

CAMPOBA'SSO, a fortified town of South Italy, in the province of the same name, about 53 miles north-north-east of the city of Naples. The town stands on the slope of the Monte Verde, in a cool, airy, and healthy region. It has a fine cathedral, a ruined castle, some convents, and palaces belonging to resident nobles. It has manufactures of cutlery, which enjoys a considerable reputation for excellence. Its situation, though far from inviting as regards scenery, is favorable for trade, which is facilitated by good roads. Pop. 14,500.

CAMPOBE'LLO, an island of New Brunswick, situated at the mouth of the Passamaquoddy Bay, in lat. 44° 57′ N., and long. 66° 55′ W. It is small, being 9 miles long, and from 1 to 3 miles broad; but it is decidedly valuable, possessing some good harbors, and, at its north end, a light-house of 60 feet in height.

CAMPO' DE CRIPTA'NA, a town of Spain, in the province of, and about 50 miles north-east of the city of Ciudad-Real. It has manufactures of coarse cloths, and some trade in corn and fruits. Pop. 6250.

CAMPO-FO'RMIO, a village in the province of Udine, Northern Italy, about 7 miles south-west of the city of Udine, is celebrated for the treaty of peace here concluded, October 17, 1797, between Austria and the French Republic. After subjugating Italy (1796), the French army had crossed the Noric Alps, and threatened Vienna. Austria, therefore, hastened to arrange pre-

liminaries of peace. In the treaty which was concluded by Bonaparte with the Count of Coblenz, 17th October 1797, Austria ceded the Netherlands, Milan, and Mantua, and received as compensation the districts Istria, Dalmatio, and the left bank of the Adige in the Venetian states, and the capital, Venice; while France took the remaining territory of Venice, its possessions in Albania, and the Ionian Islands. In the secret articles of the treaty, Austria, in ceding the left bank of the Rhine, was to receive as compensation Salzburg and the Bavarian district on the Inn, and promises were held out to the Duke of Modena, and other Italian houses, that their concessions should be compensated at the cost of Germany.

CAMPOMA'NÉS, PEDRO RODRIGUEZ, COUNT OF, Spanish minister and director of the Royal Academy of History at Madrid, founded by Philip V. in 1738, was born in Asturias in 1723. His talents and learning were devoted to the advancement of his native country. By his enlightened views of state policy, as well as by his writings, which ranked him among the most eminent Spanish authors, he obtained a great reputation throughout Europe. He gave effectual assistance to Count Aranda in his difficult enterprise of driving the Jesuits out of Spain. He died Feb. 3, 1802. C's chief works are—*Antiguedad Maritima de la Republica de Cartago con el Périplo de su general Hannon, traducido del Griego y ilustrado* (Madrid, 1756); *Discurso sobre el fomento de la Industria popular* (1771); *Discurso sobre la Educacion popular de los Artisanos y su fomento* (1775); *Apéndice a la Educacion popular* (1775—1777). These writings contained his opinions on politics, taxation, agriculture, manufactures, and commerce. The best known of his financial productions is *Tratado de la Regalia de Amortizacion* (Madrid, 1765).

CA'MPO SA'NTO (Holy Field) is now the Italian designation for a cemetery or burying-ground, but more especially for an enclosed place of interment, surrounded internally by an arcade, and destined to receive the remains of persons of distinction. The most famous C. S., and that from which the others derived the name is that of Pisa—in the neighborhood of the Dome, and consecrated to the memory of men who had deserved well of the republic. It was founded by Archbishop Ubaldo, towards the end of the 12th century. The archbishop, having been driven out of Palestine by Saladin, brought his fifty-three vessels, which had been destined for the conquest, laden with the earth of the Holy Land. This he deposited on the spot which was thence called the Holy Field, and which, as we have said, gave its name as a generic term to the burying-grounds of Italy. The architect of the existing building was Giovanni Pisano, under whose superintendence it was completed in 1283. It contains an area of 400 feet in length, and 118 in breadth; and is surrounded by a lofty wall, on the inner side of which a wide arcade runs round the whole enclosure, giving to it the character of one magnificent cloister. At the smaller eastern side, there is a large chapel, and two chapels of smaller size on the northern side. The lofty circular arches of the arcade are filled with the richest Gothic tracery, which belongs, however, to a later date—the latter half of the 15th c.—and consequently formed no part of the original design. The walls are adorned with frescoes, which are of great interest and value, both absolutely and with reference to the history of art. The oldest of those which have been preserved adorn one side of the eastern wall: they represent the passion of Christ, his resurrection, and other sacred subjects. These remarkable paintings are supposed to date before the middle of the 14th c., and are ascribed to Buffalmaco. But the most marvelous productions are those of Giotto (q. v.), of Simone Memmi, the friend of Petrarch, and of Andrea and Bernardo Orcagna. As a museum of classical antiquities, the C. S. is perhaps even more remarkable than in any other point of view. Alters, sarcophagi, bas-reliefs, statues, inscriptions, everything that is interesting or curious which has come into the possession of the Pisans for centuries, they have accumulated within its walls.

CAMPVE'RE, now called VERE, VEERE, or TER-VERE, a small fortified town on the north-east of the island of Walcheren, in the Netherlands province of Zealand, four miles north-north-east of Middelburg. It has a port on the Veersche Gat, which runs from the Sloe to the Roompot, separating Walcheren from North Beveland. The town has fallen into decay; but its former prosperity is indicated by the town-house of white freestone, with elegant tower, and the front ornamented by statues of several lords and ladies of the house of Borssele; and by the large and beautiful cathedral church which is no longer used. Population, about 1500. C. owed its name to the ferry (Dutch, *veer*) existing from thence to the village of Campen, in North Beveland, the site of the present hamlet of Kamperland.

From a historical point of view, C. is a town of great interest. In 1304, it was the scene of a battle between William, Governor of Holland and Zealand, and Guy, Count of Flanders, who was victorious. In 1572, the Spaniards were driven away; and a century later, C. was the first town which proclaimed William III., the Prince of Orange, General Stadtholder. It is chiefly interesting as the seat of a Scottish factory for three and a half centuries. Wolfaard van Borssele, Lord of Campvere, having, in 1444, married a princess of the Stuart line, an impulse was given to the Scottish trade. A factory of merchants was formed, and by contract between the royal burghs of Scotland and the United Provinces, C. became the only staple port. The goods could not be transferred to any other place until sold, merchants resorting thither to do business. The factors obtained many privileges, such as freedom from several duties and the right of being governed by the law of Scotland, having a Lord Conservator who was supreme judge in all matters. No factor might settle at C. without the written authority of the commissioners of royal burghs of Scotland, who took security for his honorable behavior. In 1795, the Batavian Republic withdrew the privileges, and the factory was broken up, but the conservatorship was held as a sinecure long after the necessity for the office had ceased, the name of Sir Alexander Ferrier appearing in the *Edinburgh Almanac* as 'Conservator at Campvere' so lately as 1847. The magistrates of C. were bound to provide a church for the factory, 'to the end that the people of the Scottish nation be not frustrate of the Word of God and exercise of the reformed religion in their own proper language.' The ministers were appointed by the commissioners of royal burghs, from 1613 to 1790, when the last appointment was made.

CAMTOO'S, or GAMTOO'S, a river of the east division of the Cape Colony, of 200 miles in length. It rises in the Niewveld mountains, near lat. 32° S., and, flowing through the inland district of Beaufort, and the maritime one of Uitenhage, falls into that inlet of the sea which is immediately to the west of Algoa Bay. It is valuable as an aid to irrigation. For instance, Hankey, a station of the London Missionary Society on its banks, is thoroughly watered by means of a splendid tunnel carried through solid rock at the expense of the association just mentioned.

CAMUCCI'NI, VINCENZO, one of the most distinguished modern historical painters in Italy, was born in Rome 1775. The school of which he became the head was founded on the theatrical antique style of the French painter David. The first important works by C. were the 'Assassination of Cæsar' and the 'Death of Virginia;' both painted for Lord Bristol at the commencement of the present century. His picture of 'Unbelieving Thomas' was copied in mosaic for St. Peter's Church. For the church of San Giovanni in Piacenza he executed a 'Presentation in the Temple,' which was greatly admired. These works were followed by many scenes from Roman history; among them, the pictures of 'Horatius Cocles,' and 'Romulus and Remus' as children. C. who, as a man and an artist, was highly honored during his career, died at Rome, September 2, 1844.

CAMUS, ARMAND GASTON, a prominent character in the French Revolution, was born in Paris, April 2, 1740. On account of his superior knowledge of ecclesiastical law, he was elected Advocate-general of the French clergy. He was a zealous and ascetic Jansenist, and possessed of extraordinary firmness of character. He hailed the movements of 1789 with joy, and was elected member of the States-general by the people of Paris. In this position he appeared as the resolute foe of the ancient regime. He gained possession of, and published, the so-called *Red Book*, giving accounts of court expenditure, which was highly disadvantageous to the court and its ministers. After the flight of Louis XVI., C., with Montmorin, Lafayette, and Bailly, accused the king of treason and conspiracy, and insisted on the suppression of all orders and corporations based on hereditary rights. As conservator of the national archives, he rendered an important service by preserving from destruction the old documents of the abolished corporations and institutions. He was absent in Belgium during the king's trial, but sent his vote for death. In March 1793, when he was commissioned to make prisoners of Dumouriez and other generals suspected of treason, C. himself and his four colleagues were taken prisoners and delivered over to the Austrians (April 3); but, after an imprisonment of two and a half years, he was exchanged for the daughter of Louis XVI. On his return to Paris, he was made member of the Council of Five Hundred, of which he became president, January 23, 1796, but resigned 20th May, 1797, and devoted his time to literature. Remaining, however, true to his principles, he voted July 10, 1802, against Napoleon's proposed consulship during life. C. died of apoplexy, November 2, 1804.

CA'MWOOD, or BA'RWOOD, a dyewood which yields a brilliant but not permanent red color, and is used along with sulphate of iron to produce the red color in English Bandanna handkerchiefs. It is the wood of *Baphia nitida*, a tree of the natural order *Leguminosæ*, sub-order *Cæsalpiniæ*, a native of Angola. It is preferred to Brazil Wood (q. v.), as producing a finer and richer red.

CANADA
British Miles
20 0 40 80 120
RUPERTS LAND
ONTARIO
QUEBEC
NEW BRUNSWICK
NOVA SCOTIA
PRINCE EDWARD IS'D
CAPE BRETON ISLAND
NEWFOUNDLAND
On a reduced Scale
British Miles
0 40 80
LAKE SUPERIOR
LAKE HURON
LAKE ONTARIO
LAKE ERIE
LAKE MICHIGAN
GULF OF ST. LAWRENCE
ATLANTIC OCEAN
MAINE
VERMONT
NEW HAMPSHIRE
MASSACHUSETTS
CONNECTICUT
RHODE ISLAND
NEW YORK
PENNSYLVANIA
NEW JERSEY
OHIO
MARYLAND
Longitude West of Greenwich
Reference to Smaller Counties in Ontario or Upper Canada
1 Essex
2 Bothwell
3 Lambton
4 Middlesex
5 Elgin
6 Norfolk
7 Oxford
8 Perth
9 Waterloo
10 Brant
11 Haldimand
12 Welland
13 Monck
14 Wentworth
15 Halton
16 Peel
17 Cardwell
18 Durham
19 Northumberland
20 Pr. Edward
21 Lennox
22 Frontenac
23 Grenville
24 Dundas
25 Russell
26 Stormont
27 Prescott
28 Glengary
Reference to Smaller Counties in Quebec or Lower Canada
1 Argenteuil
2 Two Mountains
3 Terrebonne
4 L'Assomption
5 Vandreuil
6 Soulange
7 Huntingdon
8 Beauharnois
9 Chateauguay
10 Napierville
11 La Prairie
12 Chambly
13 Vercheres
14 Richelieu
15 S. Hyacinthe
16 Rouville
17 Iberville
18 St. John
19 Misisquoi
20 Brome
21 Shefford
22 Bagot
23 Drummond
24 Yamaska
25 Nicolet
26 Arthabasca
27 Wolfe
28 Richmond.
29 Sherbrooke
30 Stanstead
31 Compton
32 Beauce
33 Megantic
34 Lotbiniere
35 Levi
36 Dorchester
37 Bellechasse
38 Montmagny

CANA OF GA'LILEE, celebrated in Scripture as the scene of our Lord's first miracle, was situated about 13 miles west of the Sea of Galilee. Two modern villages claim to represent the sacred site, and good authorities are divided as to the identification. The one village, now called Kefr Kenna, is about 3 miles north-east of Nazareth; the other, Kana el Jelil, is about 8 miles north of Nazareth. Robinson supports the claim of the latter. Stanley holds the claims to be about equally well made out.

CA'NAAN. See PALESTINE.

CANADA (corrupted from the Iroquois *Kannatha*, 'a village'), as a geographical designation, has had in history a variety of meanings. Originally, it comprised an extensive range of country reaching, under the French, as far even as the Mississippi, away beyond the boundary lakes. It was subsequently limited to a region chiefly in the basin of the St. Lawrence—including in that term both the lakes and the river. This district was divided in 1791 into two provinces, Ontario and Quebec, or Upper and Lower Canada; but these two sections were re-united in 1840, and became separate members of the Confederation—the Dominion of Canada—in 1867. Nova Scotia and New Brunswick were the first to join the two provinces; in 1870, the vast territory then known as the Hudson's Bay Territory, lying between Ontario and the Rocky Mountains, was admitted, and divided into two sections—the province of Manitoba, and the North-west Territory; in 1871, British Columbia, and in 1873, Prince Edward Island, added themselves to the list; so that the term Canada is now practically co-extensive with British North America, Newfoundland alone, of all the British possessions on the North American continent, not being included within the Confederation. The boundaries of the Dominion are: on the east, the Atlantic Ocean, Labrador, Davis Strait, and Baffin's Bay; on the west, the Pacific Ocean and Alaska; on the north, the Arctic Ocean and Alaska; and on the south, south-east, and south-west, the United States.

History.—In 1535, Jacques Cartier, a French navigator (born at St. Malo in 1494), entering the St. Lawrence on the festival of the saint of that title, took nominal possession of North America in the name of his king, Francis I. In 1608, Quebec was founded by De Champlain; and here, fifteen years later, he built Fort St. Louis, from which stronghold France ruled for 150 years a vast region extending eastward to Acadia (now Nova Scotia), westward to Lake Superior, and ultimately down the Mississippi as far as Florida and Louisiana. The Recollet and Jesuit missionaries traversed the country in all directions, and underwent incredible hardships in their zeal for the conversion of the Indians. These fearless priests were the pioneers of civilization in the Far West, and to one of the most intrepid—Lasalle—is due the discovery of the Mississippi Valley. In 1670, Charles II. granted to Prince Rupert and his company, known ever since as the Hudson's Bay Company, the perpetual exclusive right of trading in the territory watered by all the streams flowing into Hudson Bay.

Garrisoned forts were now raised at suitable points, and the bitter enmity between the French and the English traders frequently led to bloody struggles, in which sometimes the Indians also took part. The most warlike native tribe was that of the Iroquois, who were persistent enemies to the French, while the peaceful Hurons were steady allies. In 1663, one of the most remarkable earthquakes on record occurred in C. Meanwhile, the wars on the American continent followed the course of the wars in Europe, until the long struggle between France and England for supremacy in America, came to a close on the 'Plains of Abraham' in 1759, when General Wolfe defeated Montcalm. This victory opened the gates of Quebec. The capitulation of Montreal next year, brought to the final close the era of French dominion in C. The people of the conquered country were secured, by the terms agreed to, in the free exercise of their religion; and peace was concluded between Britain and France in 1763, when C. was formally ceded to England, and Louisiana to Spain. In the same year, a small portion of the recently acquired territory was organized by royal proclamation under English laws. In 1774, the new province was extended by parliamentary enactment, and that under French laws, down the Ohio to its confluence with the Mississippi, and up the latter stream to its source. Finally, C. receded to its present limits in 1783, giving up to the American republic the sites of six sovereign states—Minnesota, Wisconsin, Michigan, Ohio, Indiana, and Illinois. In 1791, it was divided, under separate legislatures, into two sections—the eastern retaining French institutions, and the western receiving those of England; and these sections, again, after political discontentment had in each ripened into armed insurrection, were re-united for legislative purposes in 1840. In 1763, the French population amounted to about 65,000, occupying the immediate banks of the lower St. Lawrence and its tributaries. Excepting within the cities of Montreal and Quebec, the immigrants of a different origin, whether from the old colonies or from the mother-country, scarcely attempted to establish themselves among the ancient settlers; thus producing a kind of reciprocal isolation, which, even down to the present day, has not been materially disturbed. Generally speaking, therefore, the two grand elements of the provincial population are locally distinguished from each other—a relative position which has happily excluded, as between them, nearly every difficulty as to education and religion. The settlers of French origin, almost entirely confined to Lower C., occupy the banks of the St. Lawrence and of the lower courses of its tributary streams; all the rest of Lower C. and the whole of Upper C., so far as they are reclaimed at all, belong to colonists of English race.

Physical Aspect.—The most striking physical features of C. are the Rocky Mountains, the Laurentian range, and the chain of immense fresh-water lakes. Much of the surface is hilly, though there are comparatively few great mountains. Hills of no great height skirt the coasts of Nova Scotia, Cape Breton, and Labrador; and the southern bank of the St. Lawrence is fringed by a long range, called the Notre Dame Mountains, a spur of the Alleghanies, which reaches its greatest height of 4000 feet at its commencement in the Gaspé peninsula, on the Gulf of St. Lawrence. The Laurentian range lies north of the St. Lawrence, and extends parallel with that river from the border of Labrador, then skirts the north side of the Ottawa River, and stretches away towards the Arctic Ocean. The total length of the range is about 3500 miles. It forms the water-shed between the affluents of the St. Lawrence and of Hudson's Bay, and its height varies from 2000 feet, near Lake Superior, to its greatest height of 3000 feet, between Quebec and Lake St. John. Westward of Lake Superior extends a broad fertile plain almost to the base of the Rocky Mountains. These stretch in a triple chain parallel with the Pacific coast-line to the Northern Ocean. The most easterly of the three chains is the highest, and reaches in Mount Brown and Mount Hooker a height of more than 15,000 feet. Minor chains between this range and the Pacific are the Selkirk Mountains and the Cascade Mountains, with peaks 7000 feet in height. Much of the surface of C. has a terraced character, and to this are due the numerous falls and rapids which obstruct the navigation of the principal rivers. The system of the St. Lawrence alone, with the great Lakes Superior, Huron, Michigan, St. Clair, Erie, and Ontario, occupies 330,000 square miles. These lakes, with their outlet, form the greatest fresh-water way in the world. A continuous chain of great fresh-water lakes extends through Ontario and the North-west Territory, in a north-westerly direction towards the Northern Ocean, the principal being Nipissing, Sincoe, Nipigon, Lake of the Woods, Manitoba, Winnipeg, Athabasca, Great Bear, and Great Slave Lakes. Next to the St. Lawrence, the chief rivers are: the Saskatchewan and the Winnipeg, flowing into Lake Winnipeg, and the Nelson, flowing from it into Hudson's Bay; the Assiniboine and the Red River, which join their waters to flow into Lake Winnipeg; the Albany and the Churchill, emptying into Hudson's Bay; the Athabasca and the Peace Rivers, flowing into Lake Athabasca, and the Slave River, from it into Great Slave Lake; the Mackenzie, fed from both the Great Slave and the Great Bear Lakes, and emptying into the Arctic Ocean; the Frazer and Thompson, in British Columbia, emptying into the Pacific; and in the eastern provinces, the Ottawa, chief tributary of the St. Lawrence, itself fed by the Gatineau and Matawan; the Saguenay, emptying Lake St. John into the St. Lawrence; and the St. John, which flows into the Bay of Fundy, after a course of 500 miles in New Brunswick, which it partly separates from the State of Maine. The principal islands of the Dominion are: on the east, Cape Breton, Prince Edward and Magdalen Islands, and Anticosti, in the Gulf of St. Lawrence; and on the west coast, Vancouver Island, and Queen Charlotte Island. Lying along the north, in the great Arctic Archipelago, are Baffin Land, including Cumberland and Cockburn Land, Prince Albert and Victoria Land, Banks Land, Prince of Wales Land, North Somerset, North Devon, and Parry Islands.

Climate, Agriculture, Products.—The variations in the climate of C. are less than might have been expected from its immense extent. The heat in summer and the cold in winter, however, are greater than in corresponding European latitudes. But the test of the thermometer gives a very exaggerated impression of the severity of a Canadian winter. Throughout the greater part of the winter the sky is bright and clear, and the air dry and bracing. In Quebec, snow begins to lie early in November; in Ontario, not till a month later; and it usually disappears in the former province about the middle of April, in Ontario a month earlier. The mean temperature for the year is, at Quebec, 42°·6; Ontario, 43°·8; in Manitoba, 32°·6; and at Halifax, 43°·1. Winnipeg has the extremes of 96° in summer and 38° below zero in winter. The annual rainfall in inches at Quebec is 19·26; at Toronto, 29·42; at Halfax, 43·08; and at Winnipeg, 16·83. The total fall of snow in inches in the year is, in Ontario, 95·9; in Quebec, 115; in Manitoba, 62·5; and in British Columbia, 33·5. Agriculture is the chief interest and industry of C., about half of the whole population belonging to the farming class. The annual yield of wheat at present is 40,000,000 bushels; and the total of all crops, 170,000,000 bushels. Of late years, an active trade in beef and

cattle has sprung up with England, and this may be expected to make a huge increase, as soon as railway communication is established with the western provinces. The total agricultural export of the Dominion for 1878-79 amounted to 26 millions of dollars. Fruits and vegetables grow in much greater profusion than in England. Fully one-half of the surface is still covered with forests, and the annual value of the timber exported is about 15,000,000 dollars. The chief forest trees are the white and the red pine, the elm, beech, ash, maple, walnut, cedar, birch, and tamarac. The chief wild animals are deer, bears, wolves, foxes, beavers, and squirrels. Herds of buffalo are met with in the more remote regions; beyond them the moose, wapiti, reindeer, the white arctic fox, and the polar bear. Fur-bearing animals abound in the tracts round Hudson's Bay, westward to the Rocky Mountains, and northward to the Arctic Ocean. The rivers, the lakes, and the sea-shores are plentifully stocked with fish.

Dominion Statistics.—Since the confederation in 1867, and the subsequent admission of all the continental provinces, the prosperity of the Dominion has been great. New railways have been projected, including one across the entire continent to the Pacific, and fresh avenues of native and foreign trade have been opened up. The constitution of the Dominion is similar to that of the mother-country. Ottawa is the political capital.

The territory of the Hudson's Bay Company (q. v.) was transferred to the imperial government for £300,000 in 1869, and was received into the Dominion the following year. The portion of that territory known as Red River Settlement (q. v.), Selkirk Settlement, or Assiniboia, was in 1870 erected into the province of Manitoba. The district to the north and east of Manitoba has been known since 1876 as Keewatin. The region towards the north-west was organized as a territory in 1875, under the name of the North-west Territory. Under this comprehensive term is included all the land area of the Dominion north of the St. Lawrence Valley, and not already embraced within the provinces of Quebec, Ontario, Manitoba, British Columbia, and the district of Keewatin. It thus includes all the unorganized land surface of the Dominion; and in 1881 it was subdivided into four districts, Assiniboia Saskatchewan, Alberta, and Athabasca. While the seven settled provinces occupy about 700,000 square miles, the North-west Territories cover an area of nearly 2½ million square miles.

The total area of the Dominion, even if we exclude Labrador, Newfoundland, and the islands of the Arctic Ocean, is little behind the United States (3,602,990), and Europe (3,826,000). Much of the northernmost area is of course uninhabitable; but in 1881, the tour through Manitoba and the North-west Territories by the Governor-general, the Marquis of Lorne, directed public attention to the boundless agricultural resources of the enormous area south of 60°, and stimulated emigration to what is probably the finest wheat-growing country in the world. The population of the Dominion (excluding Newfoundland, which, in 1869, had a pop. of 146,536) at the census of 1871 was 3,686,016; at that of 1881 it was 4,324,810.

Provinces.	Area in sq. Miles.	Pop. 1881.
Ontario	107,780	1,923,228
Quebec	193,355	1,359,027
New Brunswick	27,322	321,233
Nova Scotia	21,731	440,572
Manitoba	150,000	65,954
Prince Edward Island	2,173	108,891
British Columbia	355,999	49,459
N. W. Territories	2,346,983	56,446
Dominion of Canada	3,205,343	4,324,810

The Indian population of the Dominion in 1877 was 99,650. In 1871, the number of immigrants into the Dominion was 37,949; in 1873, they numbered no less than 99,059; and in 1874, 80,022. Of these a fair proportion become actual settlers; thus, of a total of 48,000 immigrants in 1881, 28,600 settled in the North-west. Of late there has been some immigration from the United States. In 1879 there were upwards of 6000 Chinese residents in British Columbia.

Church and Education.—There is no state church in C. In 1881 there were 1,792,000 Roman Catholics in the Dominion, the mass of the inhabitants of Quebec Province being French Catholics. The Presbyterians numbered 676,000; the Methodists, 743,000; Baptists 225,000; and the Episcopal Church, 575,000. Lutherans, Congregationalists, Mennonites (21,000), and many other sects are also represented. The Episcopal Church is governed by nine bishops, and the Roman Catholic Church by four archbishops and fourteen bishops.

Education is carefully fostered in the Dominion. The province of Ontario has some 5000 educational establishments, including nearly 20 called colleges. Quebec has 3 universities, one being Catholic, and above 20 classical and industrial colleges. Nova Scotia has a university at Halifax; and Manitoba has already a university at Winnipeg. Over 500 newspapers and periodicals are published in C., mostly in Ontario.

Revenue.—The total ordinary revenue of the year ending June 1880, was $23,307,407; but with loans, &c., amounted to $53,177,629. The ordinary expenditure was $24,850,634; but with payments on account of funding the debt, &c., it was $50,879,271. In 1882–83 the revenue was calculated at $30,600,000, and the expenditure at $27,600,000. The debt of the Dominion, incurred chiefly on account of public works, the interest of which forms the largest part of the expenditure, amounted in 1880, to $156,900,000; and of this capital four-fifths represented debt payable in London.

Commerce.—The trade of the Dominion is chiefly with Great Britain and the United States. Of a total exportation of $94,000,000 in 1880–81, 54 millions went to Great Britain, 33 millions to the United States; while of a total importation of $92,000,000, 43 millions came from Great Britain, but 36 millions from the United States. The staple articles of export are wood and bread-stuffs; also fish, furs, cotton, &c., and minerals. The chief imports from the United Kingdom are iron, wrought and unwrought, woollen manufactures, and cotton goods. The protective system lately in vogue is held to promote Canadian manufactures. In 1882 there were 11 cotton-mills at work, and 9 building.

Shipping.—The merchant shipping of C. is important, and considering its population, remarkably extensive. At the end of 1880 there were 7377 vessels on the regular books of the Dominion, measuring 1,311,218 tons of register tonnage. C. is accordingly, the fifth in rank of the ship-owning states of the world, following, for extent of shipping, Britain, the United States, Norway, and Italy; but taking precedence of Germany, France, and all other maritime powers.

Fisheries.—The total produce of the Canadian fisheries in 1880 was valued at £2,400,000. In that year, fish to the value of £1,400,140 were exported. This includes the fisheries of British Columbia, but of course excludes those of Newfoundland. In 1879 there were seven establishments in C. for artificial fish-culture, from which, in the preceding year, 13,500,000 young fish (salmon, speckled trout, and white fish) were sent forth into the waters of the Dominion.

Mines.—In the years 1870—1880, Canadian mines gave produce (including coal, gold, gypsum, manganese, mineral oil, copper, iron, lead, silver, salt, slate, and stone) to the value of over £700,000 a year.

Canals and Railways.—In the matter of communication C. is unrivalled. The St. Lawrence, with its lakes, puts great part of it in connection at once with the most commercial section of the United States and with the open Ocean. The navigation of this great water system has been greatly assisted by art; numerous and extensive canals, of which the Rideau and the Welland are the most important supplement to the main artery. The revenue of the canals in 1877 amounted to £74,790. C. is also not deficient in roads of every description, at least in the settled regions; and it already possesses an immense and steadily increasing network of railways. In 1882, there were in operation over 8000 miles of railway, while nearly 3000 miles were in the course of construction. The Grand Trunk Railway, 1388 miles in length, and giving unbroken communication between Portland and Detroit, is the longest line in the world owned by one company and under the same management. The Victoria Bridge, by which the railway crosses the St. Lawrence at Montreal, is one of the wonders of the world. Progress is being made with a railway through British territory to the Pacific shores, New Westminster in British Columbia being the terminus. The company (formerly a syndicate) has a capital of 25 million dollars and has secured large grants of land along the line (the British government having guaranteed a loan). It has undertaken to complete this gigantic undertaking within ten years after 1881. There is weekly communication between Liverpool and Glasgow and Montreal and Quebec.

Army and Naval Force.—The number of imperial troops in C. was in 1871 reduced to 2000 men, who form the garrison of the fortress of Halifax—still accounted an 'imperial station,' as it also is the headquarters of the British fleet in these waters. C. has besides a large volunteer force, and a recently organized militia, consisting of all male British subjects in C. between the ages of 18 and 60. The active militia consisted in 1879 of 43,729 officers and men, and the reserve comprised 665,000 men. C. is divided into 11 military districts; there is a Royal Military College at Kingston, and several centers of military instruction. The naval armament of C. consisted in 1877 of 8 armed screw-steamers, of a total tonnage of 2014 tons, besides two other fast steamers available as gun-boats. These are provided partly by the imperial government, partly by the Dominion, and are kept on the great lakes and on the St. Lawrence.

Money, Weights, and Measures.—The decimal system of currency was introduced in 1871, the unit of account being the dollar (at the average rate of exchange equal to 4*s*.). The English imperial yard, pound avoirdupois, and gallon are standards for C.; but in

1759 the hundredweight of 112 lbs. and the ton of 2240 lbs. were abolished, a hundredweight of 100 lbs. and a ton of 2000 lbs. being substituted.

CANADA has recently acquired a more enlarged signification. An act of the imperial parliament (called shortly the *British North America* Act) was passed 29th March 1867, and came into force 1st June of the same year, uniting federally the former separate provinces of Canada, Nova Scotia, and New Brunswick into one *Dominion*, under the name of *Canada*. The upper and lower divisions of the former Canada (q. v.), which had been politically united since 1840, are again dissociated, so that the federation consisted, in 1867, of four members or provinces, as under:

	English Square Miles.
Quebec (formerly *Lower Canada*, or *Canada East*)	210,020
Ontario (formerly *Upper Canada*, or *Canada West*)	121,260
New Brunswick	27,105
Nova Scotia	18,660

Pop. of these 4 provinces in 1867, about 3,200,000. Pop. of the whole Dominion (8 provinces; see below) in 1881, 4,352,080.

The constitution of the Dominion is after the model of the mother-country. The parliament consists of the Queen, an Upper House styled the Senate, and a House of Commons. The Queen is represented by a Governor-general (with a salary of £10,000), who exercises his authority with the aid and advice of a council, styled the Queen's Privy Council for Canada, chosen from time to time by the governor. The Senate, in 1867, consisted of not more than 72 members, 24 for each of the provinces of Ontario and Quebec, and 12 each for the maritime provinces. The senators are chosen by the governor-general, and hold the appointment for life. Among other qualifications, a senator must have real property to the value of 4000 dollars, and must be a resident in the province for which he is appointed.

The Speaker of the Senate is nominated by the governor-general. The House of Commons consisted at the same date of 181 members—82 for Ontario, 65 for Quebec, 19 for Nova Scotia, and 15 for New Brunswick. The duration of a House of Commons is five years. Until the parliament of Canada otherwise provides, the franchise and other regulations are to be the same as those hitherto in force in returning members to the House of Assembly in the several provinces. The House of Commons elects its own Speaker. Any bill passed by the houses of parliament, even though assented to by the governor-general in the Queen's name, may afterwards be disallowed by the Queen in Council. Each province has an executive and a legislature of its own, presided over by a lieutenant-governor, and constituted in the meantime pretty much as before the union. The lieutenant-governors are appointed by the governor-general. The provincial parliaments may, under the provisions of the act, amend from time to time their own constitutions.

In the distribution of legislative power between the general and the provincial parliaments, certain classes of subjects of a local nature are assigned exclusively to the legislatures of the provinces, while subjects of more general concern are assumed by the parliament of Canada. Among the subjects enumerated in the act as coming under the latter description are: the public debt and property; taxation (for federal purposes), postal service, military and naval defence, the salaries of the civil officers of the general government; the census; navigation; money, weights, and measures; copy-rights; marriage and divorce; criminal law. The provincial legislatures, again, have the power of taxing themselves for provincial purposes, and of borrowing money on the sole credit of the province; of regulating and paying provincial officers; of establishing asylums, &c. Education is also left to the provincial legislatures, with certain provisions against encroachment on the rights of religious minorities.

The debts of the several provinces, at the union, are assumed (with certain limitations) by the federal government; and, on the other hand, certain duties and revenues, and certain public works and properties belonging to the several provinces before the union, are taken possession of, to form a consolidated revenue fund for defraying the interest of these debts, and for the other expenditure of the federal government.

Provision is made for the introduction of uniformity of laws, which, however, must be with consent of the legislatures of the several provinces.

The union of the various British American provinces had been long and eagerly discussed, public opinion in Canada being generally in its favor, but in the other provinces, strongly opposed to it, from the natural apprehension, that the immense preponderance of C. in population, wealth, and general importance would utterly swamp the others. However, after much and careful consideration, the great advantages which it was shown the scheme would confer, overcame the provincial jealousies, the pro-federalists in Nova Scotia and New Brunswick came to preponderate, and these two provinces were in 1867 united with Quebec and Ontario to form the Dominion of Canada. In British Columbia and the Hudson's Bay Territories the feeling in favor of annexation was strong, and in 1869 the latter, and 1871 the former, was transferred to the imperial government. The Hudson's Bay Company received an indemnity of £300,000. In 1871 the Red River Settlement was formed into a province under the name Manitoba. In 1873 Prince Edward Island was annexed. The only part of British North America which stands aloof is Newfoundland, but provision has been made for its admittance in the Act of Union, and its accession cannot be long deferred. The area of the vast dominion is about 3,500,000 sq. m., almost equal to that of the U. S., and but little inferior to Europe.

The number of members of parliament given above has, of course, been increased by the representatives of the new provinces—viz., 2 senators and 4 members of the House of Commons for Manitoba, 3 senators and 6 members for British Columbia, and 4 senators and 6 members for Prince Edward Island. The total (with a few additional members in the old provinces) was, in 1881, 77 senators, and 206 members of the House of Commons.

CANADA BALSAM is a kind of turpentine (q. v.) obtained from the Balm of Gilead Fir (*Abies* or *Picea balsamea*), a native of Canada and the northern parts of the United States. See FIR. It exists in the tree in vesicles between the bark and the wood, and is obtained by making incisions, and attaching bottles for it to flow into. It is a transparent liquid, almost colorless, and with an agreeable odor and acrid taste. It pours readily out of a vessel or bottle, and shortly dries up, and becomes solid. When fresh, it is of the consistence of thin honey, but becomes viscid, and at last solid by age. It consists mainly of a resin dissolved in an essential oil, and its composition is as follows:

Essential Oil	18·6
Resin, soluble in Alcohol	40·0
Resin, sparingly soluble	33·4
Elastic Resin	4·0
Bitter Extractive and Salts	4·0
	100·0

It is the finest kind of turpentine obtained from any of the *Coniferæ*, and is much employed for medicinal purposes, particularly as a stimulant for the cure of mucous discharges, and as a detergent application to ulcers. It is also used for a variety of purposes in the arts—as an ingredient in varnishes, in mounting objects for the microscope, in photography (q. v.), and by opticians as a cement, particularly for connecting the parts of achromatic lenses to the exclusion of moisture and dust. Its value for optical purposes is very great, and depends not only on its perfect transparency, but on its possessing a refractive power nearly equal to that of glass.

CANADA GOOSE. See GOOSE.

CANA'L, an artificial channel for water, formed for purposes of drainage, irrigation, or navigation, but now usually employed to designate only such cuts as are intended for the passage of vessels.*

Canals date from a period long anterior to the Christian era, and were employed as a means of irrigation and communication by Assyrians, Egyptians, and Hindus; also by the Chinese, whose works of this kind are said to be unrivalled in extent; one of them, the Imperial C., having a length of about 1000 miles. For the most part, however, these early canals were of one uniform level, and hence exhibit no great skill or ingenuity; and the moderns were content to follow the rudimentary efforts of the ancients in this way until the 15th c., when the invention of the Lock (q. v.)—showing how canals might be generally and advantageously used for inland navigation, in countries whose surface was irregular—gave a great impulse to this branch of engineering. The Italians and Dutch, for both of which nations the invention of the lock has been claimed, were the first to develop this kind of engineering in Europe. In France, the first C., that of De Briare, to form a communication between the Loire and the Seine, was opened in 1642. In 1681 was completed the greatest undertaking of the kind on the continent, the C. of Languedoc, or the C. du Midi, to connect the Atlantic with the Mediterranean. The length of this C. is 148 miles, it has more than 100 locks, and about 50 aqueducts, and in its highest part it is no less than 600 feet above the sea. It is navigable for vessels of upwards of 100 tons.

It was not until nearly a century later that C. navigation assumed importance in England, through the sagacity, energy, and liberality of the Duke of Bridgewater (q. v.), and his cele-

* In the fen-districts of the east coast of England, however, the large channels required for drainage are made subservient to purposes of inland navigation by sluices at the mouth—one to keep out the tide at high water, and another acting in the opposite direction, to retain water of depth sufficient in the channel to float such boats as make use of it. These combinations of drain and canal are commonly called *navigations*; hence the workmen employed in their construction were called *navigators*, which, contracted into *navvy*, is now applied indiscriminately to persons engaged in any kind of earth-works.

brated engineer, James Brindley (q. v.). The success of these works stimulated other public persons to engage in similar undertakings. Speculation in C. shares became a mania similar to that which overtook the people in connection with railways at a more recent period, and a crash ensued on the prospect of war in 1792. It would be an endless task to pursue the history of canal development in Britain, which speedily became intersected with these watery highways to an extent unequalled in any European country save Holland. In the space at our disposal, we shall briefly consider the several kinds of canal. See SUEZ CANAL.

Canals may be divided into three general heads—viz., 1. Canals proper, i. e., entirely artificial channels, having no water running through them beyond what is necessary for their own purpose; 2. Tidal, i.e., affected by the rise and fall of the tides; and 3. Rivers rendered navigable by weirs built across them to increase their depth, and having a lock at one end for the ascent or descent of vessels; and occasionally, when there is much fall, or any formidable obstruction in the river, by lateral cuts, with locks for part of their course.

Another division may be made (1) of ship-canals for the transit of sea-going vessels generally, from sea to sea; these are necessarily of large dimensions, and must be crossed by swing or draw bridges; and (2) of canals for the passage of mere boats or barges, generally without masts, so that they may be crossed by stone or other solid bridges. The largest ship C. in Europe is the Great North Holland C., completed in 1825, which has a breadth of 125 feet at the water-surface, and of 31 feet at the bottom, with a depth of 20 feet. It extends from Amsterdam to the Helder, a distance of 51 miles; it thus enables ships of as much as 1400 tons burden to avoid the shoals of the Zuyder Zee. The surface of the water in this C. is below the high-water level of the German Ocean, from which it is protected by embankments faced with wicker-work. The locks on this C. are 297 feet long, 51 feet broad, and 20 feet deep. There is a similar C. from near Rotterdam to Helvoetsluis, to avoid the shallows of the Brill at the mouth of the Maas. Another great ship C. is the Caledonian C. (q. v.). The Forth and Clyde C. is also one on a smaller scale for the passage of sea-going vessels. Its length is 35 miles; its medium width is 56 feet at the surface, and 27 feet at the bottom, and its depth 9 feet. It has 39 locks, each 75 feet long, and 20 feet wide, and a rise of 155 feet. In constructing ship-canals, it is important to secure a sheltered entrance, one not likely to become silted up, and of sufficient depth to admit vessels at all times of the tide; and towing-paths on both sides are desirable.

Among the principal canals in England for the passage of barges, some of which run to very great elevation, are the—

	Length. Miles.	Rise. Feet.
Grand Junction	128	....
Leeds and Liverpool	128	433
Trent and Mersey	93	326
Kennet and Avon	57	402

The C. of the Loire is one of those aiding the navigation of a river. It has a width on the water-line of 33 feet, and a depth of 5½ feet, the locks being 17 feet broad, and 100 feet long. The river Lea and the Mersey and Irwell Navigations in England, and the Welland C. in Canada, formed to connect Lake Erie with Lake Ontario, and avoid the Falls of Niagara, are also among the most noteworthy works of this class; the river Thames, above the first lock at Twickenham, partakes also of the nature of a canal.

Many canals pass through long tunnels, some very low and without towing-paths, in which case the mode of propulsion is by the boatmen lying on their backs and pushing with their feet against the roof of the tunnel.

The great expenditure of water and time in 'locking' have led to the trial of various other plans for overcoming differences in level. On the Great Western C., boats are raised and lowered by means of machinery, called a perpendicular lift On the Morris C. (United States), boats are conveyed on a carriage up a railway inclined plane, from one reach to another; on the Chard C., Somersetshire, and on the Monkland C. near Glasgow, they are taken afloat in a caisson, or water-tight vessel, up or down an inclined plane—in the latter case, empty boats of 60 tons burden are raised or lowered 96 feet.

Other matters engineers have to consider are an ample supply of water, by means of feeders and reservoirs, to the summit-level; stop-gates at convenient distances, to shut off the water in case of damage to any part of the C.; means of drainage when repairs are necessary; and provision against leakage through the banks, by puddling or otherwise. The floor-line or bottom of a C. is usually made twice the width of the largest boat likely to enter the C., with an addition of 6 or 8 inches for play at each side, and the depth 12 or 18 inches more than the draught of the boat.

The introduction of railways has materially interfered with C. traffic, and some canals have been altogether abandoned. Many, however, still continue to prosper, as, for instance, the Grand Junction, the Lea Navigation, and the Trent and Mersey. It is estimated that the inland boat navigation constructed in Great Britain exceeds 4700 miles. In the United States there are upwards of 4000 miles of C., of which 1300 miles are in New York State. The C. system has also been very extensively carried out in France, which has a large mileage of artificial inland water navigation. A new canal, which shortens the distance from Amsterdam to the North Sea to 15 miles, has recently been completed. The harbor is near Wyk-aan-Zee, and the minimum width is to be 80 yards. This canal was constructed mainly by British capital and engineers.

In 1883, a canal across the Isthmus of Corinth was begun; and M. Lesseps' great canal across the Isthmus of Panama was in progress.

Laws Regarding Canals.—Canal companies are mainly regulated by acts of 1845 and 1854. The word *canal* is declared to include any navigation whereon tolls are levied by authority of parliament, and also the wharves and landing-places used by such canal or navigation; and *traffic* is defined as including not only passengers and their luggage, but also goods, animals, trucks, boats, and vehicles of every description. All tolls and charges in respect of the traffic are to be charged equally to all persons. It is declared to be the duty of canal companies to make arrangements for the receiving and forwarding of traffic without unreasonable delay, and without partiality; and facilities are given for a remedy to parties complaining of want of attention in these respects.

According to section 7 of the 17 and 18 Vict. c. 31, companies are liable for neglect or default in the carriage of animals or goods, although they may have given notice to the contrary. Where the effect of such neglect or default occasions the loss of or injury to animals, the act provides that no greater damages shall be recovered than as follows: for any horse, £50; for any neat cattle, per head, £15; for any sheep or pigs, per head £2, unless at the time of delivery for transit, the animals were declared to have been of higher value. No special contract between the company and parties employing the canal shall be binding on the latter unless signed by them. The Canal-boats Act of 1877 provides for sanitary arrangements, and the education of children.

Injury to canals, with intent to obstruct the navigation, is punishable with penal servitude for not more than seven, or less than three years; or imprisonment for two years, with the addition of hard labor, solitary confinement, and whipping, at the discretion of the court. See CARRIERS.

CANALE'TTO, or CANA'LE, the name of two Venetian painters, who have acquired a reputation for their landscapes and views of towns. The elder ANTONIO C., born 1697, was the son and pupil of a theatrical decorator in Venice. He studied at Rome. He painted a numerous series of excellent views in Venice, among which that of the great canal are especially admirable for their fresh coloring, faithfulness, and the invention displayed in accessory objects. He came to England by the advice of Amiconai. He died in 1768, after having acquired both wealth and fame by his representations of English scenes, several of which are in Buckingham House, and are highly admired.

BERNARDO BELLOTTO, surnamed CANALETTO, nephew and pupil of Antonio, was born at Venice, 1724, and attained high excellence as a painter, and also as an engraver on copper. He practised his art in his native place, and afterwards in Rome, Verona, Brescia, Milan and Dresden. Correct perspective, powerful effects of light and shade, and beautiful sky-tints, are the most prominent characteristics of his works. C. visited England, where, among several other excellent works, he painted a masterly interior view of King's College Chapel, Cambridge. He died in Warsaw, 1780.

CANAMI'NA, a town of Dahomey, Africa, about 12 miles south of the capital, Abomey. It is situated in the midst of a cultivated plain, and has a house for the accommodation of white men, set apart by the king. Pop. 10,000.

CANANDAI'GUA, a beautiful village in New York, U.S., at the north of the lake of the same name, on the Rochester and Syracuse Railway. Pop. (1870) 4862 ; (1880) 5726.

CANANO'RE, a seaport and military station of the district of Malabar, in the presidency of Madras. It is in lat. 11° 52′ N., and long. 75° 26′ E., being about 50 miles to the north of Calicut. The town stands at the head of a bay, which, opening from the south, forms its harbor, while the fort and cantonments occupy the bluff headland, which shelters the inlet on the side of the Arabian Sea. Besides pepper, grain, and timber, the neighborhood produces immense quantities of cocoa-nuts, which are largely exported to the northward, where they are said to be scarce. C. has been a British possession since 1791, having in that year been taken from Tippoo Sultan. Pop. (1871) 31,070.

CA'NARA, a region on the west coast of the Indian peninsula, comprising two British collectorates. NORTH C., also called *Honawar*, the most southerly portion of the Bombay province, is like the other districts in the coast southwards, exceedingly fertile. The area of the district is 4235 square miles, and the population

was 398,406 in 1872. SOUTH C., a narrow strip of hilly and very fertile country, lies in the Malabar like the preceding, but is comprised for administrative purposes in the province of Madras. It is sometimes called *Mangalore*, from its chief town. Area, 3902 square miles; pop. in 1871, 918,362.

CA'NARAC, a town on the Orisso coast, at the north-west angle of the Bay of Bengal, in lat. 19° 54′ N., and long. 86° 10′ E., being 235 miles to the south-west of Calcutta. It is remarkable chiefly for the remains in its vicinity of a colossal pagoda. The entire area, a square of about 13 acres, is said to have been surrounded by walls 150 cubits high and 19 broad; and the principal materials appear to have been red granite and black basalt, some of the blocks measuring 15 or 16 feet in length, by 6 or 8 in width, and 2 or 3 in thickness. Most of the sculptured embellishments have been removed to the temple of Juggernaut, which is in the same district of Pooree as C. itself.

CANA'RIES, or CANA'RY ISLANDS, a group of islands belonging to Spain in the Atlantic Ocean, off the north-west coast of Africa, in lat. 27° 40′—29° 25′ N., and long. 13° 25′—18° 16′ W., forming a Spanish province. The group consists of seven large and several small islets, with a joint area of about 3800 sq. m., and a pop. of (1877) 280,388. The principal islands proceeding from east to west, are Lanzarote, Fuerteventura, Gran Canaria, Tenerife, Gomera, Palma, and Hierro or Ferro. The coasts are steep and rocky, and the surface is diversified with lofty mountains (the greatest elevation being attained in the *Pico de Teyde*, in the island of Tenerife, which has a height of 12,182 feet), narrow gorges, and fertile valleys. All the islands are of volcanic origin. On the summits of the highest elevations, depressions, like those left by fallen cones of volcanoes, are almost everywhere found; and the steep declivities are marked by deep fissures, of which, usually, only one penetrates the depressed summit, and exposes to view the several strata of the volcanic rock. There are numerous torrents, but no rivers, and fresh water is very scarce in the southern parts of the islands, and especially in Hierro.

The researches of Humboldt and Von Buch led to the division of the botanical geography of Tenerife into five distinct regions. The first, or region of African forms of vegetation, extends to about 1300 feet above the sea, and is marked by the growth of the date palm, sugar-cane, dragon's-blood tree, &c. The second region extends to the height of 2800 feet, and produces vines, corn, maize, olives, chestnuts, &c., in luxuriance. This zone represents the vegetation of Southern Europe. In the third region, rising 1200 feet or so higher, we have laurels and evergreens. In the fourth, extending to above 6000 feet, we find vegetation nipped by cold and excessive dryness, snow falling several months of the year, and only the *Pinus Canariensis* and other coniferæ flourishing. The fifth region attains an elevation of nearly 11,000 feet. Here are found a kind of *Spartium* (Broom) peculiar to this zone, with cedrine junipers, and one Alpine plant, *Arabis alpina*.

The barren mountain-peaks are just below the limit of perpetual snow, although in a cavern at the height of 11,000 feet above the sea, snow is said to be preserved througout the year. All the rest of the islands are similar in character, with the exception of Fuerteventura and Lanzarote, which are less elevated, more abundantly wooded, and more luxuriant in vegetation generally.

Minerals are few, and of little importance. Near the sea, the general temperature ranges from 60°—66° F., in January, to 78°—87° F., in October. The rainy season lasts from November to February; from April to October, the weather is uniformly fine. The islands, however, suffer much from the E. and S.E. winds, which, blowing over the hot deserts of Africa, burn up vegetation, and generate disease. Very little wine is now produced, the grape-disease having destroyed almost all the vines. Cactus plants, on which the cochineal insect feeds, now mainly occupy the desolated vineyards, and the value of cochineal exported in 1874 was £435,000 out of a total value for exports of £596,244. Other products are cereals, tobacco, potatoes, barilla, oil, and fruits. The chief foreign trade is with the United States, England, and Hamburg. There is little manufacturing.

TENERIFE, the largest island of the group, has an area of 877 miles, with a population of 95,000*. In the north-west of this island, which is the principal seat of the cochineal cultivation, is situated the famous Pico de Teyde, or Peak of Tenerife (q. v.). The chief town and port is Santa-Cruz de Santiago (q. v.), on the north-east coast.

GRAN CANARIA, which is next in importance, has an area of 758 square miles, with a population of 69,000. Its culminating peak is El Cumbre, with a height of 6648 feet. The capital, Las Palmas (q. v.), on the east-coast, is the largest town of the archipelago.

PALMA has an area of 718 square miles, and a population of 33,000. Its highest peak, Pico de los Muchachos, has an elevation of more than 7600 feet. Capital, Santa-Cruz des las Palmas (q. v.), on the east coast.

The area and population of the other islands are as follows: LANZAROTE is 323 square miles, pop. 17,400; FUERTEVENTURA, 326 square miles, pop. 13,800; GOMERA, 169 square miles, pop. 11,700; HIERRO, 82 square miles, pop. 4400. The chief towns of these islands are small.

The C. are supposed to have been the Fortunate Islands of the ancients. The Carthaginians are said to have visited them, and Juba II., king of the two Mauritanias, wrote an account of them that has been transmitted to us by Pliny. In modern times, the first account of them was furnished in the first half of the 14th c., by the crew of a vessel that had been driven among them by stress of weather. A Spanish gentleman obtained a grant of them from the pope; but when an attempt at settlement was made, the Spaniards were driven off by the natives. In the beginning of the 15th c., the Spaniards succeeded in obtaining a footing in the islands; but a difference having arisen with Portugal concerning them, it was not until 1493 that the authority of Spain was finally established. Since that time, they have remained attached to the Spanish crown. The Guanches, who were the aborigines of the islands, have long ceased to exist as a separate people, the population being now quite Spanish. They were a brave and intelligent race.

CANA'RIUM, a genus of trees of the natural order *Amyridaceæ*, natives of the south-eastern parts of Asia, the Malayan Archipelago, &c. The fruit is a drupe. The kernel of the fruit of *C. commune* is eaten both raw and roasted; and in Amboyna, bread is made of it, which is generally in the form of rolls about a yard long and an inch thick. An oil is expressed from it, which is used both for the table and for lamps. The tree is about 50 feet high. *C. sylvestre* also produces eatable kernels. *C. commune* is supposed to be one of the trees which yield ELEMI (q. v.), and *C. microcarpum* yields an oil very like copaiva, known in ship-building yards as DAMAR (q. v.).

CANARY, or CANARY BIRD, a beautiful little bird, very common as a cage-bird, and much esteemed for its musical powers. It is one of the numerous family of finches (*Fringillidæ*), and is *Fringilla Canaria* of Linnæus. Some modern ornithologists place it in the genus *Carduelis*, others in *Linota;* it is indeed intermediate between these genera, the goldfinches and the linnets. Some make it the type of a genus or sub-genus, *Canaria*. It is found in Madeira, the Canary Isles, and the Cape Verd Isles; frequents the neighborhood of human habitations; builds its nest of moss, feathers, hair, &c., in thick, bushy, high shrubs or trees; and produces four, five, or even six broods in a season. In its wild state, its plumage is greenish, or greenish-yellow, sometimes tinged with brown, and exhibits less variety and beauty than in domestication. It was brought to Europe in the beginning of the 16th century.

It breeds readily in confinement, and seems thoroughly reconciled to its cage-life; but although canaries of long domesticated races sometimes excel in imitative powers and acquired strains, yet they are surpassed in loudness and clearness of note by some of the wild birds, which, when caught and imported, are occasionally sold for extraordinary prices. Even in confinement, the C. often breeds four or five times a year, laying from four to six eggs each time. The eggs are pale blue. The male assists the female in building the nest and in feeding the young. Besides seeds of various kinds, which are their principal food, canaries are very fond of bland green leaves, such as those of chick-weed, a supply of which is very necessary for their health; and one of their favorite luxuries is sugar. The C. not unfrequently lives 15 or 16 years. It can be taught various notes and airs, and some even learn to articulate words. The rearing and training of canaries afford occupation to no small number of persons, particularly in the Tyrol. The C. hybridizes readily with some other species of finch, pro-

Canary.

*The pop. of the separate islands is not from the most recent census, of which only the total return is available.

ducing 'mules,' some kinds of which are valued as song-birds.—There are several species very closely allied to the C., one of which, a beautiful little bird, entirely yellow, with an orange crown, a native of Brazil, is sometimes sold in Britain as a song-bird, but its musical powers are very inferior to those of the common species.

CANARY GRASS (*Phalaris Canariensis*), a grass of which the seed is much used, under the name of *canary-seed*, as food for cage-birds, and which is, on that account, cultivated to some extent in the south of Europe, and in certain districts of Germany and England. It is a native of the canary Islands, naturalized in the south of Europe, and in many places in Britain. The chief seats of its cultivation in England are the counties of Kent and Essex. The seed is sown early, generally in February, yet the crop is not reaped till after the ordinary grain harvest, for which reason the cultivation of C. G. is seldom attempted in the northern parts of Britain.—This grass attains a height of two or three feet, and has a crowded, egg-shaped, spike-like panicle, from an inch to almost two inches long; the spikelets are one-flowered, very much laterally compressed, a rudimentary scale-like floret on each side of the perfect floret; the *glumes* winged on the keel, and with two strips of darker green on each side; the *paleæ* awnless, shining, and at last firmly enclosing the seed.

A fine flour is prepared from canary-seed, which is employed as dressing in fine cotton weaving, and for the finishing of silken stuffs. The groats and flour of this small kind of grain are also used in the Canary Islands, in Barbary, and in Italy, as food, the flour being made into bread, which is very nutritious and pleasant.—Other closely allied species of *Phalaris* produce a similar grain, but are inferior in productiveness and quality.—A grass, now generally referred to this genus, and sometimes called REED C. G. (*Phalaris arundinacea*), is very common on the banks of lakes and rivers, and in other wet places in Britain, and throughout Southern and Central Europe. It differs very much in appearance from C. G., having a large spreading panicle, generally of a reddish color; and the glumes are not winged at the keel. It is a somewhat reed-like grass, 4—6 feet high, with creeping roots, which help to secure river-banks; and yields a great bulk of hay, but has been very generally despised as a coarse grass, fit only for littering cattle. The justice of this opinion has, however, been called in question, and the grass proclaimed to be very nutritious, and sufficiently acceptable both to horses and oxen when cut early. It may be mown twice a year. A variety with curiously striped leaves is well known in gardens, as *Ribbon Grass*, *Gardeners' Garters*, or *Ladies' Traces*.

Canary Grass.

CANARY PLANT. See TROPÆOLUM.

CANARY WINE, also known as TENERIFE, is the produce of the Canary Islands, and resembles Madeira; but the name is properly applied only to the Bidogne wine, which must be distinguished from the Malvoisie of the Canaries. The former is made from grapes gathered before they have ripened, and, when new, is crude and unpleasant; but in the course of two or three years, increasing in mildness as in age, becomes so much like Madeira, that it is often sold for it. Like Madeira, it is greatly improved by a voyage to the tropics. It is produced chiefly on the island of Tenerife, and the trade in the wine is mostly carried on at the chief port of this island. The Canary of the island of Palma is inferior to Tenerife, but may be consumed sooner, and has a pleasant flavor.

CANA'STER, the name given to a rush-basket in which tobacco is placed in Spanish America; hence is said to be derived the name canaster, now applied to tobacco of a certain kind.

CANCELLA'RIA, a genus of mollusks—class *Gasteropoda* (q. v.), order *Pectinibranchiata*—with univalve shells, sometimes regarded as belonging to the family *Volutidæ*, or Volute Shells (q. v.), but now generally placed among *Buccinidæ*, or Whelks (q. v.). The spire is prominent, the last whorl ventricose, the surface reticulated, the mouth large, the columella plaited. All the recent species are natives of tropical or subtropical seas, and are found chiefly on sandy bottoms, at the depth of a few fathoms. The fossil species, amounting to nineteen, occur in the newer strata from the chalk upwards.

CA'NCELLING OF DEEDS AND WILLS. The word cancel comes from the Lat. *cancelli* (lattice-work), and a deed was formerly said to be cancelled when lines were drawn over it in the form of lattice-work. The word cancel is now used to signify any sort of obliteration.

The Court of Chancery in England gives relief against the effect of improper cancellation; on the other hand it may order a deed which has been improperly obtained to be delivered up in order to be cancelled. The effect of the cancellation is to make the deed void. If a deed is given up to be cancelled, and the cancellation does not take place, it remains in force at law. But if an obligee deliver up an obligation to be cancelled, and the obligor do not afterwards cancel it, and the obligee happen to get it again into his hands, and sue the obligor on it, the latter cannot plead its voidance, for the deed still remains in force at law—although here, too, equity would relieve, and decree according to the original cancellation. Where a deed is cancelled by consent of the parties to it, it is thereby destroyed as to their interest under it, but third parties may still produce it in evidence. As to a will, its cancellation may have the effect of revoking it, if done with such intention.

In Scotland, the system of registration of deeds and other writings prevents the occurrence of many of the questions that arise in England on this head, but the intention and effect of the cancellation or destruction of documents would in most cases be a question of evidence; and where it is necessary to know the contents of the destroyed paper, its effect may be judicially declared by a form of suit called an action for *proving the tenor*, as indeed may be done in an English court of equity by a bill to recover the contents of a lost document. In the Scotch law, again, a deed or other writing may be judicially cancelled or set aside by an action of reduction, and the courts in England substantially exercise a similar jurisdiction.

It would appear that where a testator has prescribed certain forms for the authentication of his will, and such forms have either not been observed by him, or if observed, have, in some essential particular, been negatived by obliteration, an intention to revoke will be presumed: thus, where a Scotchman, who had long resided in India, executed a will, concluding, 'In testimony of this being my last will and testament, I hereto set my hand and seal;' and the document was found in his repositories with the part to which the seal had evidently been affixed cut (not torn) off, the House of Lords held the deed to be cancelled, because the testator had himself, besides the usual solemnities, prescribed a seal as necessary to the authentication of his will. A will, however mutilated or cancelled by a testator during his insanity, would be good; and of course there is no effectual cancellation when done by a third party without sufficient authority. But all such considerations are questions of evidence. See DEED, WILL.

CANCELLING OF LETTERS-PATENT. The Lord Chancellor may cancel the Queen's Letters-patent, when granted contrary to the law, 'which,' says Blackstone, quoting Sir Edward Coke, 'is the highest point of his jurisdiction.' See LETTERS-PATENT, CHANCELLOR.

CA'NCER, a disease characterized by slow alterations of structure, or tumors in various parts of the body, occurring either simultaneously or in a certain order of succession. In many cases, an isolated tumor in an external part is the earliest symptom; it is then viewed as the starting-point of the disease, and is termed a *malignant tumor* (*tumor mali moris*), from its presumed tendency to infect the system, and to cause the reproduction of growths similar to itself. It is right, however, to remark, that upon the pathology of C. authorities are by no means agreed, some holding that a constitutional taint or *diathesis* must always precede any local development of C., and that the first growth in point of time (or primary C.) is therefore only the first of a series determined by a pre-existing cause in the blood or general system; while others hold that C. is originally a truly local disease, or even that a growth at first simple (*non malignant* or *benign*), may, in consequence of local causes, *degenerate*—i. e., become cancerous, and infect the whole system with the morbid tendency thus secondarily acquired. The discussion of this disputed question involves statements of a too complicated kind to be in place here; but it is a question of considerable importance, as bearing on the probability or improbability of curing the disease by extirpating the primary tumor at an early stage of its development. All authorities are agreed that, when any trace of secondary C. exists, the removal of the parts affected gives scarcely any hope of a favorable result, and, accordingly, operations under these circumstances, unless merely for the relief of local suffering, are discountenanced by all respectable surgeons.

The disease, however, is one of which the ignorant as well as the learned have a well-founded dread, and hence it presents a large field for the practice of imposture, and for that less deliberate, but often not less hurtful kind of quackery which is the result of pure ignorance, grafted on a meddlesome desire to do good. We propose to give such a sketch of the characters and progress of cancerous disease as may serve, in some degree, as a protection

against ignorance on the one hand, and deception on the other. The leading character of C. being a tumor or morbid growth in a part, it is important, in the first place, to observe that not all, nor even the majority, of morbid growths are cancerous. A very large proportion of growths, involving swelling or change of structure in a part, are either determined by a previous process of inflammation—leading to chronic abscess and induration—or belong to what is called the non-malignant order of tumors—e. g., cysts, fatty and fibrous tumors, simple hypertrophy of glandular structures, cartilaginous, bony, calcareous, and vascular growths. See TUMORS. Further, among the tumors admitted by general consent into the order of cancerous, there are widely different degrees of *malignancy* or *cancerousness*, so to speak; some having the tendency to spread rapidly, and infect the system at an early period, while others remain local for a considerable time and may be removed while yet local, with good hope of a permanent recovery.

Now, the practical distinction, or *diagnosis*, to use the technical phrase, of these different tumors, is founded upon a very careful and delicate appreciation of the characters of the malignant and non-malignant tumors, considered as morbid products, and also upon a thorough knowledge of the anatomy and relations of the textures in which they arise. One of the leading characters of malignant tumors is the tendency to involve, by a kind of specific destruction or degeneration, the ultimate elements of the textures in which they arise, and in which they spread. The attempt, therefore, to distinguish these from other growths, must always call for the highest qualities of the surgeon—large experience, guided at every step by consummate science, and, in particular, by minute and thorough knowledge of natural structure. And the difficulties of the inquiry are such, that even in the dead body, or in a tumor excised from the living body, all the resources of the anatomist, aided by the microscope, will occasionally fail in distinctly and surely discovering the true character of the morbid structure.

The most common seats of C. are, among external parts, the female breast, the eye, the tongue, the lip, the male genital organs, and the bones; among internal organs, the liver, stomach, uterus, rectum, gullet, peritoneum, and lymphatic glands. Some of these parts are more liable to primary, others to secondary cancer. Thus, the female breast, the neck of the uterus, the lower lip, the scrotum, the extremity of the penis, are very often the seats of a single cancerous tumor, which in its early stage at least seems to be unconnected with any constitutional taint; while the liver, the bones, and the lymphatic glands are more frequently the seats of secondary or multiple cancerous tumors. There are also differences in the character of the C. itself, apart from its anatomical seat, which are to be taken into account in estimating the probability of its being solitary. Some of these differences are regarded by pathologists as amounting almost to specific distinctions; thus, *scirrhus*, or hard C., observed most frequently in the breast, uterus, and stomach, is more frequently solitary than *encephaloid* (brain-like), otherwise called *medullary*, or soft C.; again, *melanosis*, or *melanic C.*, a variety charged with a brown or black pigment, is almost always multiple in its occurrence; while *epithelial C.*, or *epithelioma*, as it has been recently termed, of which examples are frequently found in the lip, scrotum, penis, or tongue, is so generally solitary as to have led some pathologists to place it in a class altogether apart from the truly cancerous growths, with which, however, it presents too many points of affinity in its fatal tendency to recur after operation, and to infect the lymphatic glands and other structures adjoining the part primarily affected. Again, there are certain varieties of fibrous and of cartilaginous tumor, as well as certain tumors of bone, and bone-like tumors developed in soft parts (osteoid), which must be regarded in the meantime, as occupying a doubtful position between the malignant and non-malignant growths. Paget, (*Lectures on Surgical Pathology*, vol. ii.).

Generally speaking, a tumor may be said to fall under the suspicion of being C. when it more or less completely infiltrates the texture in which it arises, and passes from it into the surrounding textures; when it invades the lymphatic glands adjoining the part first affected; when it is attended by stinging or darting pains, or by obstinate and slowly extending ulceration, not due to pressure; when it occurs in a person having impaired health, or past the middle period of life, and is not traceable to any known cause of inflammatory disease or local irritation, nor to any other known constitutional disease, such as syphilis or scrofula. The probabilities are of course increased if the tumor be in one of the habitual seats of C., or if it be attended by evidence of disease in some internal organ known to be frequently thus affected.

But it is hardly necessary to point out that the very complex elements of *diagnosis* here referred to ought to be always submitted to the scrutiny and judgment of a well-educated medical adviser, whose skill and personal character place him above suspicion, before the disease has assumed such a form as to be beyond the reach of remedial procedure. The patient who broods in secret over a suspicion of C., or who declines to apply for advice from a fear of encountering the truth, is in all probability only cherishing the seeds of future suffering; while if, as often happens, the suspicion is unfounded, a few minutes' careful examination would suffice to remove a source of misery which otherwise would poison the mind for years.

These remarks apply still more emphatically to the misguided persons who trust to the non-professional *cancer curer*, or to the quasi-professional specialist. The charlatan, who pretends to hold in his hands a secret remedy for this most terrible disease, will invariabiy be found to pronounce almost every tumor C., and every C. curable. By this indiscriminating procedure, and by the fallacious promise of a cure without an operation, many persons who have never been affected with C. at all, have been persuaded to submit to the slow torture of successive cauterizations by powerful caustics, at the expense of needless mutilation and no small risk of life. In other cases, truly cancerous tumors have been removed slowly and imperfectly, at the cost of frightful and protracted sufferings, only to return at the end of a few weeks; and Mr. Spencer Wells has lately shown that in some notorious instances persons were reported as cured, when they had actually died of the disease at no long period after the supposed cure was stated to have taken place. (*Cancer and Cancer-curers*, London, 1860).

What is really known as to the cure of C., may be stated in few words. Modern pathological researches render it probable that a complete suspension of the progress of C. sometimes, though rarely, takes place; and individual tumors are found not unfrequently to undergo partial healing, or even to become entirely metamorphosed into inert cicatrices, while others, associated with them, continue to advance. The degree of rapidity of the advance of C. is also, as we have already stated, exceedingly variable. But these observations modify only to a very slight degree the general doctrine, that C. is a disease tending to fatal issue, and hardly, if at all, under the control of remedies, as to its ultimate result. The removal of a cancerous tumor, indeed, is still resorted to by surgeons; and there appears to be no reasonable doubt that when performed early, and in well-selected cases, it has been followed by long-continued exemption.

But the occasional spontaneous arrest of such growths on the one hand, and the doubtful results of operation in a large proportion of cases on the other, have combined to render surgeons of late years more chary of the use of the knife. In aged persons, in particular, the question often resolves itself into a calculation of the chances of life, founded on a great number of conflicting data, and only to be solved by a careful attention to the state of the general health, as well as to the rate of progress of the local disease. Operations are now very rarely performed after the lymphatic glands are involved, or when there is evidence of a deteriorated constitution, or of internal disease; but sometimes great pain, or profuse and exhausting discharge from an external tumor, may justify its removal, as a palliative measure, even under these unfavorable circumstances. For the mode of removal of cancerous and other tumors, see TUMORS.

Among the lower animals, this disease is more rare; nevertheless, cases are not unfrequent, presenting the same malignant characters as those observed in the human subject. Usually manifesting itself in the form of a specific tumor of some organ or tissue, there is a tendency to the invasion of other parts of the system, and the development of a constitutional state called the cancerous cachexia. M. U. Leblanc of Paris, the best veterinary authority on this subject, has shown that the dog and cat are most frequently affected with C.; and next in frequency comes the pig, ox, horse, and mule. It has not been observed in birds, reptiles, or fishes. Females are more liable to C. than males. It is hereditary, but not transmissible from animals to man, or from one animal to another. It does not disappear under the influence of remedies, but, if possible, the tumors should be excised when first seen, and if the knife fail to extirpate the malady, cauterization should be had recourse to. A relapse is almost certain; but Leblanc says there is greater chance for the patient, when a carnivorous animal, if it is kept on a strictly vegetable diet.

CANCER, the *Crab*, the fourth of the twelve constellations of the zodiac, usually represented on the globe as a crab, and denoted in works on astronomy by the sign ♋, which resembles the number 69 laid sideways. It contains, according to Flamsteed, 83 stars, of which the principal is *Acubens*, a star of the third magnitude. In the divisions of the ecliptic, the *sign* called C. occupies a place between 90° and 120° from the vernal equinox; but owing to precession, the sign and the constellation have not coincided for nearly 2000 years. See ECLIPTIC, PRECESSION, ZODIAC. Annexed is a representation of the con-

stellation, which is one of the least striking in the zodiac. Besides Acubens, it has two stars of the fourth magnitude, called by the Romans *Aselli* or the Little Asses; and a nebulous cluster of minute stars about 2° from the Asses, visible to the naked eye, and which goes by the name of *Præsepe* or the Manger.

CANCER. See CRAB.

CANCER, TROPIC OF. See TROPICS.

CANCER ROOT, or BEECH-DROPS (*Epiphegus Virginiana*), a parasitic plant of the natural order *Orobancheæ* (q. v.), a native of North America, growing almost exclusively on the exposed roots of beech-trees. Like all the other plants of its order, it has a curious appearance, having scales instead of leaves. Its stem is branching, and produces distant alternate white flowers, streaked with purple. The whole plant is powerfully astringent; and the root is brownish, spongy, and very bitter and nauseous in taste. It has acquired, in its native country, the reputation of being a cure for cancer. All parts of the plant are used, and externally more than internally. This plant, in conjunction with white oxide of arsenic, is believed to have formed a medicine once famous in North America under the name of *Martin's Cancer-powder*. —Another American plant of the same order, *Phelipæa biflora*, is sometimes also called C. R., and is used in the same way; and an infusion of the Common Broomrape (*Orobanche major*)—a native of Britain and of the south of Europe, parasitic on the roots of broom, furze, and other leguminous plants—has been employed as a detergent application to foul sores.

CA'NCRUM O'RIS, known also as *Noma*, *Water-cancer*, and *Water-canker*, is a peculiar form of mortification, arising apparently from defective nutrition. The disease seldom occurs except between the second and eleventh years, and is usually preceded by measles, remittent and intermittent fever, or some other serious disease. The following is the ordinary train of symptoms: more or less general disturbance of the system, accompanied by loss of appetite, followed by swelling of the salivary glands, and a profuse flow of saliva, which escapes from the mouth involuntarily during sleep; ulceration of the gums, which swell and become livid; looseness of the teeth; and the appearance of ash-colored spots on the gums and adjacent mucous membrane, which turn into dark-colored sloughy sores. These sores spread rapidly by a gangrenous process, expose the bone, and finally make a large aperture in the cheek. In some cases, the entire cheek has been destroyed in a very few days. Fortunately, this terrible disease is more rare in this country than in some parts of the continent, and most of the cases recorded are described by foreign writers. Van Swieten describes a case in which he saw the first set of teeth fall out, the second set destroyed, the lower jaw exfoliated, and the lips, cheeks, tongue, and chin eaten away before the child died. The obvious indications of treatment are to remove the patient to pure air, to administer tonics, nourishing food, and (in moderation) stimulants; to touch the diseased parts with nitrate of siver, or glyceride of carbolic acid, and to wash out the mouth frequently with a weak solution of Condy's fluid.

CANDAHA'R, or KANDAHAR, the capital of Central or Southern Afghanistan, situated about 200 miles to the south-west of Cabul. It is in lat. 32° 37′ N., and long. 66° 20′ E., and has an elevation of 3484 feet above the level of the sea. It is in the form of an oblong square, while all its streets run straight, and cut one another at right angles. At the point of intersection there is a large dome (*Charsu*), 50 yards in diameter. Pop. variously estimated from 25,000 to 100,000. C. is well watered by two canals drawn from a neighboring river, which send to almost every street its own adequate supply; and the same means of irrigation have covered the immediate vicinity with gardens and orchards. C. is a place of great commerce, trading with Bombay, Herat, Bokhara, Samarcand, &c. Among its permanent residents, C. has a larger proportion of Afghans, chiefly of the Dooraanee tribe, than any other city of Afghanistan. There are numerous Hindu and Persian merchants. About two miles to the northward rises a precipitious rock, crowned by a fortress impregnable to everything but heavy artillery. Here, amid all the disasters of the war in 1839—1841, the British maintained their ground. C. has been a pivot for the history of Central Asia during more than 2000 years. It is supposed to have been founded by Alexander of Macedon, owing, most probably, its name to the oriental corruption of Iskender or Scander, as in Scanderoon or Iskenderun of Syria. A comparative blank of upwards of 13 centuries in the history reaches to the famous Mahmoud of Ghiznee, who wrested the stronghold from the Afghans. From that epoch down to 1747, when the native rule was permanently established, C., with brief and precarious intervals of independence, was held by Tatary, India, and Persia in turn. In the war of 1878—1880, the British entered C. unopposed, and they held the city till 1881, some months after they had evacuated the rest of Afghanistan.

CANDEI'SH, or KHANDESH, a district in the province of Bombay, of 10,166 sq. m., with a pop. of (1872) 1,028,642. It lies chiefly in the basin of the middle part of the Tapti, and it is bounded mostly by territories of nearly all the powerful native princes—the Nizan, Scindia, Holkar, and the Guicowar. Through its situation, it necessarily suffered much from the long contest between the Mohammedans and the Mahrattas, and also from the struggles among the rival chiefs of the latter. Accordingly, when, in 1818, it fell to the East India Company on the overthrow of the Peishwa, it presented little better than a scene of desolation, with ruined mansions, dismantled towns, and dilapidated temples. The difficulties of the new government were considerably aggravated by the Bheels, a more than half-savage race, that formed about an eighth of the population; and even beasts of prey, particularly tigers, had, under the constant influences of human strife, multiplied to an unusual extent. But the improvement was regular and steady.

Peace and security reigned; so that roads, formerly hazardous for armed parties, were traversed in safety by unarmed individuals. The staple productions are cotton, wheat, and other grains, and also a little indigo. The cultivators are generally in a progressive condition, more especially in the cotton districts, and the well-watered talooka of Baglan.

CANDE'LA, a town of Southern Italy, province of Foggia, 22 miles south of the town of Foggia. Pop. 5600. It is pleasantly situated on the summit of an eminence. The surrounding district is very fertile.

CANDELA'BRUM, a Latin word signifying properly a candlestick (from *candela*, a candle), but more frequently employed to mean a support for a lamp. There were, perhaps, no articles of furniture in which the ancients combined the beautiful with the

Ancient Roman Candelabra.

Candelabrum, with suspended Lamps.

useful to so large an extent as in their candlesticks and lamps. Candelabra usually stood on the ground, and were of considerable height—from 4 to 8, or even 10 feet. The most common were of wood; but metals of all kinds, including the precious metals, were used for their construction, and sometimes they were even adorned with gems. The candelabra found at Herculaneum and Pompeii are mostly of bronze. In the temples and palaces of the emperors, they were frequently of marble, and of great size and richness. They have usually a capacious cup at the top, either for the purpose of containing oil enough to feed a large flame, or that they might be used for burning incense. Though varying greatly in details, a general design runs through the forms of the candelabra of antiquity. They have all a foot or feet, a shaft, and a plinth on which a lamp is placed, or which is furnished with a socket for a candle. The base often consists of three feet of a lion, goat, griffin, or other animal real or imaginary. Sometimes a figure was introduced either into the body of the shaft, or placed on the top of it, in either case supporting the superincumbent portion of the C. on its head. Sometimes a figure was substituted for the shaft altogether, the receptacle for the oil being placed in one hand. In others, the shaft is a sliding one, like that of a music-stand, the object being, of course, to raise or depress the light at pleasure.

In addition to the various kinds of candelabra which, from their height, seem to have stood on the floor, the ancients had others

intended to be placed on a table. These consisted either of a pillar or of a tree, and from the capital of the former, or the branches of the latter, lamps were suspended, as in the accompanying illustration, which we copy from Smith's *Dictionary of Greek and Roman Antiquities*. The C., in this instance, including the stand, is only three feet high. From the size of the stand in proportion to the rest of the C., it would seem to have been used for some other purpose.

CA'NDIA, in Turkish, 'KIRI'D,' called in the most ancient times *Idæa*, afterwards *Crete*, one of the largest islands of the Mediterranean, is situated at the entrance of the Archipelago, in long. 23° 40′—26° 40′ E., lat. 34° 50′—35° 55′ N. It is very irregular in form, its length being about 160 miles, and its breadth varying from 6 to 35 miles. The history of C. commences with Greek mythology, and historians and poets say that it was governed by its own kings, among whom were Saturn, Jupiter, and Minos, 1300 years before Christ. C. was conquered by the Romans under Metellus, who, on that account held the title of 'Creticus;' on the division of the empire, it fell to the share of the eastern monarchs. In 823 A.D., it was conquered by the Saracens, who built the city of C. on the ruins of Heraclea. In 1204, it was sold by Pope Boniface—to whom Baldwin I. gave it—to the Venetians. In 1645, the Turks besieged Canea, and in 1669 conquered the island, after a war, which lasted 24 years. The Cretans sigh for a union with Greece, and have repeatedly risen in insurrection against Turkish rule, notably in 1866. At the Berlin Congress in 1878, the Porte engaged scrupulously to carry out in C. the reformed system of government drawn up in 1868.

The island of C. is for the most part mountainous, the mountains being chiefly composed of freestone or of marble, which is either gray or white. Towards the south side of the western part of the island, there is a chain of high mountains, extending in length about 37½ miles, which, from their appearing white, especially at their west end, were anciently called Leuci. Mount Ida, now called by the natives Upsilorites, is one in a chain of mountains extending to the north-west of the island almost to Retimo; the mountain is of gray marble, and the surface loose stones: there is no verdure on it except a few small shrubs. Jupiter is said to have passed great part of his youth amongst these mountains in the exercise of hunting and drawing the bow.

The island abounds in springs and fountains, which are found even by the sea-side; most of the rivers are dry in summer, but in winter many of them are very dangerous torrents. The island does not produce any minerals of importance. The soil of C. is fertile, and produces wheat in abundance. The exports, which consist chiefly of oil, wool, linseed, and fruit, amount in annual value to above £400,000, and the imports to about £440,000.

C. had once, according to Homer in his *Odyssey*, 90 cities; there are now only 3 principal towns: Megála Kástron or Candia, pop. 15,000, of which 5000 are Christians; Retimo or Rhithymnos, pop. 6000, of which 2000 are Christians; Canea or Khania, pop. 12,000, of which 8000 are Christians. The total population of the island now numbers little more than 200,000—less than half its amount at the outbreaking of the Greek revolution in 1821.

The population is for the most part of Greek descent; there are only obout 70,000 Turks, with a few Arabs and Armenians, in the island. There are, however, many Greek Moslems in C., the wordly advantages which used to result from embracing Islamism having induced whole districts to abandon the faith of their forefathers; but their change of religious faith was unaccompanied by any change of language.

CA'NDIDATE (Lat. *candidatus*). Among the Romans, a suitor for the office of consul, quæstor, prætor, &c., was named C. because in appearing before the people, he wore a white (*candida*) toga without a tunic. His dress was chosen partly as an ostentation of humility, and partly as it served to display wounds received in battle. The candidature commonly lasted two years: in the first year, the C. was proved by the senate, whose decision, if favorable, was ratified by the popnlar assemblies; and in the second, his name was entered in the list of candidates. During this period occurred the *ambitio*, or canvassing of voters, which often gave occasion to enormous bribery, in spite of the severe enactments passed to prevent the corruption of the electors. The elected C. was styled *Designatus*.

In the early Christian Church, newly baptized converts were styled CANDIDATES, on account of the white garments worn during eight days after baptism. In modern times, a German probationer or theological student who has been approved before the highest ecclesiastical authorities, is called a C.; but a still broader signification is also attached to the word, an applicant for any office whatever, religious or secular, being termed a candidate.

CA'NDLE, a cylinder of wax or fatty matter, with a wick, intended for giving light. Candles are made principally of tallow; also of the solid portion of palm and cocoanut oils, bleached wax, spermaceti, and paraffin, and other oily substances found in coal, shale, and gas-tar. They are either dipped, moulded or rolled. 'Dips' are made by stretching a number of wicks upon a suitable frame, so that they may hang down at a distance from each other equal to about double the intended thickness of the C.; these are then dipped in a trough of melted tallow, and hung upon a rack until cooled, then dipped again and again, until the required thickness is obtained. The dipper has a number of frames prepared before commencing, and by the time he has dipped the last, the first is cool enough to dip again. The tallow in the trough has to be kept only a little above its melting point, for if it were much hotter, it would melt away a portion of the tallow already on the wick, instead of adding to it. Tallow-candles are much improved by being kept a year or a winter before using.

Moulds, or mould-candles, are cast by pouring the tallow down a pewter tube, along the axis of which the wick has been previously fixed. These tubes are well polished in the inside, and several are fitted in a frame, the upper part of which forms a trough, into which the moulds all open; thus, by pouring into the trough, all the moulds are filled at once.

Wax-candles are not moulded, on account of the great amount of contraction which wax undergoes in cooling, and the difficulty of drawing it from the moulds. The wicks are warmed, and suspended over a basin of melting wax, which is poured over them until they acquire the proper thickness; they are then rolled, while hot, between two flat pieces of smooth hard wood, kept wetted to prevent adhesion.

Great improvements have recently been made in the manufacture of candles, and these are especially interesting from being the direct results of the progress of scientific chemistry—of theory applied in practice. All oils or fats are composed of one or more fatty acids combined with a base, called glycerine. The fatty acids constitute the combustible and more solid portion of the compound. Both acid and base are very weak, and it is a general law in chemistry, that a strong base, under favorable conditions, will separate a weaker one from its acid, by combining with the acid, and taking the place of the weak base; and a strong acid will in like manner displace a weaker one. Lime is a strong base, and being cheap, is used to separate the glycerine from the fatty acid of tallow, palm-oil, &c. This it does when the melted fat is stirred for some hours with a mixture of lime and water. The lime forms a hard insoluble soap, by combining with the fatty acid, and the glycerine remains in solution with the water.

This lime-soap is then broken to powder; and the weak fatty acid separated by means of sulphuric acid, which combines with the lime, forming sulphate of lime. The whole being heated, the fatty acid floats on the top, is skimmed off, and the candles made from it. These are called composite candles; they give a purer light than ordinary tallow, from being freed from the glycerine, which not only softens the fat, but diminishes its combustibility. Pure stearic acid, or stearine, the chief fatty acid of tallow, is a hard crystalline substance, perfectly dry, and free from any greasiness, with a somewhat pearly lustre. Its crystalline structure presents a difficulty in the manufacture of candles, for when cast in moulds, it contracts on cooling, and leaves small spaces between the crystals. This has been obviated by mixing a little arsenic with it; but this method is now abandoned, on account of the poisonous gas evolved by the combustion of such candles, and the desired effect is obtained by mixing the stearine with a little wax, and pouring it into hot moulds.

To obviate the necessity of snuffing candles, several contrivances have been adapted; in all of them, the object is effected by causing the wick to bend over and its end to fall outside of the flame, and thus, by coming in contact with the oxygen of the air, to be completely burned—for such combustion cannot take place within the flame. See FLAME. This bending over is variously brought about. One method is by twisting the wick with one strand shorter than the rest, which is strained straight while the candles are being cast; and when released by the melting of a portion, it contracts, and bends the wick. Another method is by adding on one side of the wick a paste, consisting of a mixture of borax, bismuth, flour, and charcoal. Another, by coating one of the threads of the wick with a metallic envelope, by dipping it in fused bismuth; the metal fuses at the end of the burning wick, and forms a small globule, which bends the wick over, and is itself readily combustible at a red heat. These are called *metallic* wicks. Various other contrivances have been adopted for the same object. Price's manufactory of 'patent' candles, as these improved candles usually are called, is perhaps the largest in England. It is situated at Vauxhall, in the neighborhood of London, and its economic arrangements have attracted not a little public attention. *Paraffin* (q. v.), a white crystalline body, obtained by distillation from cannel coal, &c., affords a beautifully white and clear material for candles, and having thus in a great degree the properties of wax at a much smaller expense, it has lately been much used for this purpose. *Ozokerit* is another oily mineral substance used for candles.

Candles were early introduced—with symbolical signification—into Christian worship, and are still so employed in the Roman

Catholic Church. In the Church of England, candles are sometimes placed on the altar; but the practice is a subject of controversy. The numerous superstitious notions and observances connected with candles and other lights in all countries had a more remote origin, and may be considered as relics of the once universally prevalent worship of the sun and of fire. Numerous omens are taken from them, and they are also used as charms. In Britain, a portion of the tallow rising up against the wick of the candle, is called a winding-sheet, and regarded as a sure omen of death in the family. A bright spark at the candle denotes that the party directly opposite is to receive a letter. Windy weather is prophesied from the waving of the flame without visible cause, and wet weather if the wick does not light readily. Lights appearing to spring up from the ground, or issue out of a house, and traverse the road or air by invisible agency, the superstitious in Wales and elsewhere call *corpse-candles*. They are ominous of death, and their route indicates the road the corpse is to be carried for burial. The size and color of the light tell whether the fated person is young or old. It is or was customary in some places to light a candle, previously blessed, during the time of a woman's travail. C. were supposed to be efficacious after death as well as before birth, for they were placed on the corpse. The object was doubtless to ward off evil spirits, who were supposed to be always on the alert to injure souls on entering and on quitting the world. See also CANDLEMAS.

CA'NDLEBERRY, CANDLEBERRY MYRTLE, WAX TREE, WAX MYRTLE, TALLOW TREE, or BAYBERRY (*Myrica cerifera*), a small tree or shrub of 4—18 feet high, but generally a low spreading shrub, a native of the United States of America, but most abundant and luxuriant in the south. It belongs to the natural order *Amentaceæ*, sub-order *Myriceæ*, according to some, a distinct natural order, distinguished by naked flowers, with 1-celled ovary, a drupaceous fruit (stone-fruit)—the scales becoming fleshy—and a single erect seed. The genus *Myrica* has male and female flowers on separate plants; and the scales of the catkin in both male and female flowers are concave. The C. has evergreen oblongo-lanceolate leaves, with two small serratures on each side at the point, sprinkled with resinous dots. The bark and leaves when bruised emit a delightful fragrance. The drupes—popularly called berries—are about the size of peppercorns, and when ripe, are covered with a greenish-white wax, which is collected by boiling them and skimming it off, and is afterwards melted and refined. A bushel of berries will yield four or five pounds. It is used chiefly for candles, which burn slowly with little smoke, and emit an agreeable balsamic odor, but do not give a strong light.

An excellent scented soap is made from it.—*M. Gale* is the SWEET GALE of the moors and bogs of Scotland, well known for its delightful fragrance, a native of the whole northern parts of the world. Several species are found at the Cape of Good Hope, one of which, *M. cordifolia*, bears the name of WAX SHRUB, and candles are made from its berries.

CANDLE-FISH, or EULACHON (*Thaleichthys Pacificus*), a remarkable fish of the family *Salmonidæ*, nearly allied to the Capelin (q. v.), and, like it, strictly a sea-fish, approaching the coasts to spawn, but not entering rivers. The C. inhabits the Pacific Ocean, near the western shores of America, from Vancouver's Island northwards. It is not larger than a smelt, has a somewhat pointed and conical head, a large mouth, teeth on the pharyngeals, and the tongue rough, but the lower jaw, palatines, and vomer destitute of teeth. The color is greenish olive on the back, passing into silvery white on the sides and belly, sparsely spotted with dirty yellow. It is probably the fattest or most oleaginous of all fishes, or indeed of animals, and is used by the Indians not only as an article of food, but for making oil. To broil or fry it, is nearly impossible, because it almost completely melts into oil. Indeed, the Indians often use it, in a dried state, as a lamp for lighting their lodges, merely drawing through it a piece of rush-pith, or a strip from the inner bark of the 'Cypress Tree' of these regions, *Thuja gigantea*—a species of Arbor Vitæ—as a wick, a long needle of hard wood being used for this purpose; and the fish being then lighted at one end, burns steadily until it is all consumed. In order to use the dried fish for food, the Indians often melt it into oil, by the application of heat, and drink the oil. It is also eaten uncooked. Drying is accomplished without any gutting or cleaning, the fish being fastened on skewers passed through the eyes, and hung in the thick smoke at the top of sheds in which wood-fires are kept burning. They soon acquire a flavor of wood-smoke, and the smoking helps to preserve them. They are then stowed away in large frails, made from cedar-bark or rushes, in order to be used for food in winter. Immense shoals of C. approach the shores in summer, and are caught in moonlight nights, when they come to sport at the surface of the water, which may often be seen glittering with their multitudes. The Indians paddle their canoes noiselessly amongst them, and catch them by means of a monster comb or rake—a piece of pine-wood from six to eight feet long, made round for about two feet of its length at the place of the hand-gripe, the rest flat, thick at the back, but having a sharp edge in front, where teeth are driven into it about four inches long, and an inch apart. These teeth are usually made of bone, but the Indian fishers have learned to prefer sharp iron nails when they can get them.

One Indian sitting in the stern, paddles the canoe; another, standing with his face to the bow, holds the rake firmly in both hands, the teeth pointing sternwards, sweeps it with all its force through the glittering mass, and brings it to the surface teeth upwards, usually with a fish and sometimes with three or four, impaled on each tooth. This process is carred on with wonderful rapidity. When a sufficient quantity of C. has been dried for winter, the rest that are caught are made into oil, being for this purpose, piled in heaps until partially decomposed, and then placed in large square pine-tree boxes; a layer about three deep in the bottom of each box, covered with cold water, and a layer of hot stones put in, then a layer of small pieces of wood, another layer of fish, stones, and so on. The oil is skimmed from the surface of the water in the boxes. A vast quantity of oil is thus obtained. The C. is an excellent article of winter-food in a climate of which the winter is severe; and notwithstanding its excessive fatness is of agreeable flavor. It has not yet become an article of economical value to the civilized inhabitants of North-western America, but seems very likely to do so, and to acquire a very considerable commercial importance.

CA'NDLEMAS, in its ecclesistical meaning, is the feast of the Purification of the Virgin Mary, and is observed on the 2d of February. This festival is very strictly kept by the Roman Catholic Church, there being a procession with many lighted candles, and those required for the service of the ensuing year being also on that occasion consecrated; hence the name Candlemas Day. In Scotland this day is one of the four term-days appointed for periodical annual payments of money, interest, taxes, &c., and of entry to premises—the three other term-days there being Whitsunday, Lammas, and Martinmas. See TERM.

An old document of the time of Henry VIII., preserved in the archives of the Society of Antiquaries, London, concerning the rites and ceremonies in the English Church, speaks thus of carrying candles: 'On Candlemas Daye it shall be declared that the beryinge of candels is done in the memorie of Christe, the spirituall lyghte whom Simeon dyd prophecye ["a light to lighten the Gentiles"], as it is redde in the churche that daye.'

But an older and heathen origin is ascribed to the practice. The Romans were in the habit of burning candles on this day to the goddess Februa, the mother of Mars; and Pope Sergius, seeing it would be useless to prohibit a practice of so long standing, turned it to Christian account by enjoining a similar offering of candles to the Virgin. The candles were supposed to have the effect of frightening the devil and all evil spirits away from the persons who carried them, or from the houses in which they were placed. An order of council in 1584 prohibited the ceremony in England. There is a tradition in most parts of Europe to the effect that a fine C. portends a severe winter. In Scotland, the prognostication is expressed in the following distich:

> 'If Candlemas is fair and clear,
> There'll be twa winters in the year.'

Christ's Presentation, the Holiday of St. Simeon, and, in the north of England, the Wive's Feast-day, were names given to Candlemas Day. See Brand's *Popular Antiquities*, Bohn's edition.

CA'NDLE-NUT (*Aleurites triloba*), a tree of the natural order *Euphorbiaceæ* (q. v.), a native of the South Sea Islands, Madagascar, Moluccа, Java, &c., which produces a heart-shaped nut with a very hard shell, and a kernel good to eat when roasted, although in a raw state it possesses in a slight degree some of the active properties so common in the *Euphorbiaceæ*, and is apt to cause purging and colic. It is about as large as a walnut. An excellent bland oil is procured from it, used both for food and as a lamp-oil. The inhabitants of the Society Islands after slightly baking these nuts in an oven, and removing the shell, bore holes through the kernels, and string them on rushes, hanging them up in their houses, to be used for torches, which are made by enclosing four or five strings in a leaf of the screw-pine (*Pandanus*). These torches are often used in fishing by night, and burn with much brilliancy. The lampblack used in tattooing was obtained from the shell of the candle-nut. A gummy substance exudes from the C. tree, which the Tahitians chew.

CA'NDLESTICK. The ordinary C. is so well known that no description is needed. The most important modern improvement in the C., is a contrivance for maintaining the candle at a uniform height, by means of a spring placed below the candle, and confined in the cylindrical body of the C.; this spring presses the candle upwards with sufficient force to drive it completely out, but for a collar at the top, against which the surface around the wick bears, and thus, as the candle melts, it yields to the pressure

of the spring, and maintains a uniform height. The collar, when properly adjusted, also prevents the guttering to which composite candles are liable when exposed to currents of air or moved about.

CANDLISH, ROBERT SMITH, D.D., an eminent Scottish divine, was born in Edinburgh in 1806, entered the university of Glasgow in 1822, and was licensed as a preacher in connection with the Established Church in 1828. In 1834 he became minister of St. George's, Edinburgh. From this period, his public career may be said to have commenced. With intense zeal, he advocated the justice and necessity of ecclesiastical reforms, and became one of the boldest and most vigorous leaders of the popular or 'non-intrusion' party. After the Disruption (see FREE CHURCH), he co-operated with Dr. Chalmers and other chiefs of the newly formed denomination in organizing, consolidating, and extending its aggressive efforts. In 1845—1846, he took an active part in the establishment of the Evangelical Alliance. In 1847, he was, when Dr. Chalmers died, appointed to the chair of Divinity, in the New College, Edinburgh, but did not assume the functions of this office. In 1862, he was appointed Principal of the same college. He died Oct. 19, 1873. A Life by Wilson appeared in 1880. C. wrote *Contributions towards the Exposition of the Book of Genesis; The Atonement, its Reality and Extent; An Examination of Mr. Maurice's Theological Essays; The Fatherhood of God;* and an *Exposition of the First Epistle of St. John.*

CA'NDY. See CEYLON.

CA'NDYS (Gr.), a loose gown, worn by the Medes and Persians over their other garments. It was made of woollen cloth, which was either purple or of some other brilliant color, and had wide sleeves. In the sculptures of Persepolis, nearly all the personages are represented as so attired. A gown of a very similar kind is still worn by Arabians, Turks, and other orientals.

CANDY-SU'GAR is the popular name applied to ordinary sugar when procured in large crystals by the gradual and slow cooling of a concentrated solution of sugar. See SUGAR.

CA'NDYTUFT (*Ibéris*), a genus of plants of the natural order *Cruciferæ*, distinguished by unequal petals, the largest being towards the circumference of the dense corymbs in which the flowers grow, and by a emarginate pouch with the valves keeled and winged, the cells one-seeded, and the cotyledons accumbent. See COTYLEDON. The species are chiefly found in the countries surrounding the Mediterranean Sea, and the name C. is supposed to be derived from that of the island of Candia, the name *Iberis* from Iberia (Spain). One species, *I. amara*, remarkable for its bitterness, is a doubtful native of England. Some species are slightly shrubby, some are herbaceous perennials, some annuals. Some are among the most familar ornaments of our flower-gardens, as the annual White and Purple C. (*I. umbellata*), the Sweet-scented C. (*I. odorata*), and two slightly shrubby species, *I. sempervirens* and *I. semperflorens*, the latter of which, in favorable situations, continues to blossom throughout the whole winter, and pleases the eye at all seasons, both by the abundance and the perfect whiteness of its flowers.

CANE, or KEN, a river rising in Bundelcund, near lat. 23° 54′ N., and long. 80° 13′ E., and, after a north-north-east course of 230 miles, entering the Jumna in lat. 25° 47′ N., and long. 80° 35′ E. It is too rapid and ruggid for navigation; and is remarkable for the matchless beauty of its pebbles.

CANE, a term sometimes indiscriminately applied to any small and smooth rod, of the thickness of a walking-stick or less; but more correctly limited to the stems of the smaller palms and the larger grasses. We thus speak of Sugar C., Bamboo C., &c., among the latter; whilst among the former, this name is particularly appropriate to the species of the genus *Calamus*, also called Rattan. To this genus belong the canes largely imported from the tropical regions of the east for making bottoms of chairs, couches, &c. See RATTAN.

CANE SUGAR. See SUGAR.

CANE'A, or CA'NNA, called *Khania* by the Greeks, is the chief commercial town of Candia or Crete, and is capital of a province. It is situated on the northern coast, and occupies the site of the ancient Cydonia. The present city is of Venetian origin, and dates from 1252 A.D., when a colony was sent from Venice to occupy it. The object of its foundation was to keep down the Greeks who had been in arms, and at open war with their Italian lords, almost without intermission from the day when the Venetians first set foot on their shores. Venetian coats of arms are still observed over the doorways of some of the principal houses. C. is surrounded by a strong wall and deep ditch, both of which, however, are in a state of great dilapidation; it has a good but very shallow harbor. C. is the principal mart for Candian commerce, and exports to France and Italy, oil (530 tuns in 1874), soap (50,000 cwts. in 1874), wax, &c. Several consuls are stationed here, and it is the residence of the Turkish governor of the province, and of the Greek bishop. Pop. 12,000, of whom ⅔ds are native Greeks; the rest mainly Turks. The language spoken is modern Greek. The environs of C. are very beautiful.

CA'NE-BRAKE (*Arundinaria macrosperma*), a large kind of reed or grass, indigenous to the warmer parts of the United States of North America. It grows in marshy situations. It is of a genus allied to the bamboo. The flowers are in panicles.

CANE'LLA (*Canella alba*), a small tree common in the West Indies, where it is often called WILD CINNAMON. Its place in the botanical system has not yet been exactly ascertained, but it seems to be allied to *Pittosporaceæ*. The fruit is a small black berry. The whole tree is very aromatic, and its flowers are extremely fragrant. The bark of the young branches is the *C. Bark* of apothecaries, also known in commerce as *White-wood Bark*, and sometimes called *White Cinnamon*. It forms a considerable article of export from the Bahamas.

It has an aromatic fragrance, regarded as intermediate between that of cinnamon and that of cloves, and a bitterish, acrid, pungent taste. It is employed as a stomachic and stimulant tonic, and as an aromatic addition to tonics or to purgatives, in debilitated conditions of the digestive organs.

CA'NÉS VENA'TICI (Lat. Hunting Dogs), a constellation of the northern hemisphere, added by Helvetius, and known generally as the greyhounds of Helvetius. The dogs are distinguished by the names of Asterion and Chara. On the celestial globe they are represented as being held in leash by Bootes, and apparently pursuing Ursa Major (q. v.) round the pole of the heavens.

CANG, CANQUE, or KEA, an instrument of degrading punishment in use in China. It consists of a large wooden collar fitting close round the neck, and the weight of which is usually from 50 to 60 pounds. Over the parts where the C. fastens are pasted slips of paper, on which the mandarin places his seal, so that the culprit may not be relieved until the full term of his sentence has expired, which sometimes extends to 15 days. On the C. is also inscribed, in large letters, the offence and the duration of the punishment. The criminal having been paraded through the streets by the police, is then left exposed in some thoroughfare of the city. As he is incapable of using his hands, he has to be fed during the time he is suffering the penalty.

CA'NGAS DE O'NIS, a town of the Asturias, Spain, about 35 miles east-south-east of Oviedo. It is a poor place, but in its vicinity are one or two interesting monastic structures, and the cave whence the Goths fled and hid themselves, after the battle of Gaudalete, in 711, and from which, in 718, they issued, and annihilated the Moorish invaders. Pop. 7000.

CANICA'TTI, a town of Sicily, in the province of Girgenti, and 15 miles east-north-east of the city of that name. It is situated on the banks of the Naro, is well built, and has sulphur mines. The inhabitants (1872), 20,908 in number, are principally engaged in agricultural pursuits.

CANI'CULAR, CANICULAR DAYS, or DOG-DAYS, CANICULAR YEAR. Canicular was an old name of Canis Minor (q. v.); it was also used to denote Sirius, or the Dog-star, the largest and brightest of all the stars, and which is situated in the mouth of Canis Major (q. v.). From the Heliacal Rising (q. v.) of this star (Sirius), the ancients reckoned their dog-days, or *Dies Caniculares*, which were 40 in number—20 before, and 20 after the rising of the star. The rising of the dog-star was in ignorance supposed to be the occasion of the extreme heat and the diseases incidental to these days. It was by mere accident that the rising of the star coincided with the hottest season of the year, in the times and countries of the old astronomers. The time of its rising depends on the latitude of the place, and is later and later every year in all latitudes, owing to precession. In time, the star will rise in the dead of winter. The Canicular Year was that known among the Egyptians and Ethiopians. It was computed from one rising of Sirius to the next, and consisted ordinarily of 365 days, and every fourth year of 366. This year was sometimes called the Heliacal Year. The reason for computing the year from the rising of Sirius, seems to have been that, at the time, the heliacal rising coincided with the greatest swelling of the Nile.

CA'NIDÆ (Lat. *canis*, a dog), a family of the Digitigrade (q. v.) section of carnivorous mammalia, which, as now generally defined, is less extensive than the Linnæan genus *Canis*, the hyænas being excluded from it, and referred to the family *Viverridæ* (civets, ichneumons, &c.). These families are, indeed, closely connected, and hyænas may be said to form a connecting-link between them, the dentition, however, making a nearer approach than in either of them to that of the cats or *Felidæ*.—The C. have two flat tuberculous molar teeth or grinders on each side, behind the great carnivorous cheek-tooth—the last præmolar—of the

upper jaw, a dentition resembling that of the bear family, or *Ursidæ*, to which they exhibit a further resemblance in their power of adapting themselves to the use of vegetable food. Their whole organization fits them to be less exclusively carnivorous than the feline tribe. They have generally three incisors or cutting teeth, with one large canine tooth, and four præmolars on each side in each jaw, two true molars on each side in the upper jaw, and three in the lower. The true molars are adapted for crushing either bones or vegetable food. The last præmolars in the upper jaw are remarkably large, and particularly adapted for cutting flesh. See DOG, FENNEC, FOX, JACKAL, LYCAON, WOLF, &c.

Dentition of Canidæ.

CA'NIS MA'JOR, the *Greater Dog*, a constellation of the southern hemisphere, below the feet of Orion. It contains Sirius, the brightest of all the stars, and its place may be found by means of this star, which is on the continuation of the line through the belt of Orion. According to Flamsteed, it contains 31 stars.

CA'NIS MI'NOR, the *Lesser Dog*, is a constellation of the southern hemisphere. It is near Canis Major, and just below Gemini. Procyon, of the first magnitude, is its principal star, and lies in a direct line between Sirius and Pollux; so that the position of the constellation may be found by means of this star. According to Flamsteed, it contains in all 14 stars.

CA'NISTER SHOT. See CASE SHOT.

CA'NKER, a disease of plants, especially fatal to fruit-trees in many gardens. It is a kind of gangrene, usually beginning in the young shoots and branches, and gradually proceeding towards the trunk, killing the tree in the course of a few years. Wet subsoils seem in many cases to induce it, and it begins most readily in shoots that have been imperfectly ripened and injured by frost, or which have received some accidental wound. Those varieties of fruit-trees which have been long propagated by grafting and budding are most liable to it. It is sometimes cured by *heading down* the tree, and causing it to throw out new branches.

CANKER, a vague term applied to various diseases of the lower animals, characterized by their chronic nature, and consisting chiefly in ulceration, suppuration, and the development of fungoid excrescences in the parts affected.

CANKER, in the foot of the horse. This malady, believed by Gerlach of Berlin to be truly cancerous, is observed in two different forms: in the acute stage, when the malady is chiefly local; and in the chronic stage, when the constitution suffers, and all local remedies fail to restore a healthy function of the structures of the foot.

Symptoms.—It usually commences by discharge from the heels, or the cleft of the frog of the horse's foot. The horn becomes soft and disintegrated, the vascular structures beneath become inflamed, and the pain which the animal endures is intolerable. It is therefore very lame on one two, or all feet, according to the number affected. Though there is no constitutional fever, the horse becomes emaciated, and unfit for work. During wet weather, and on damp soil, the symptoms increase in severity. The sore structures bleed on the least touch, and considerable fungoid granulations, commonly called proud flesh, form rapidly.

Causes.—This disease is occasionally hereditary, and it is most frequently seen in low-bred draught or coach horses. Dirt, cold, and wet, favor the production of the disease, and there is always a tendency to relapse when once an animal has been affected.

Treatment.—Pare away detached portions of horn, and, in mild cases, sprinkle powdered acetate of copper over the sore; apply over this pledgets of tow, fixed over the foot by strips of iron or wood passed between shoe and foot.

In severe cases, tar and nitric acid, creasote and turpentine, chloride of zinc paste, and other active caustics, have to be used for a time with the regular employment of pressure on the diseased surface. The animal requires to be treated constitutionally by periodical purgatives and alteratives. Good food, fresh air, and exercise often aid much in the treatment of the disease.

CA'NNA, one of the islands of the Hebrides, off the west coast of Scotland, 7 miles south-west of Skye, and 3 miles north-west of Rum. It belongs to Argyleshire, and is 4½ miles long from east to west, and 1 mile broad. The surface stands high above the sea, and consists of trap (claystone, porphyry, and trap conglomerate, with fragments of old red sandstone and bituminous wood), which has overflowed thin laminæ of coal and shale. The island has a hill of basalt, called Compass Hill, which reverses the magnetic needle. Pop. (1871) 48.

CANNABINA'CEÆ, a natural order of Dicotyledonous plants, or, according to many, a sub-order of URTICACEÆ (q. v.), differing from the proper *Urticaceæ* chiefly in the suspended exalbuminous seed, and hooked or spiral embryo. But only two plants of the order or sub-order are known, both of them valuable, HEMP (q. v.) and the HOP (q. v.).

CA'NNÉ (ancient *Cannæ*), a town of Southern Italy, in the province of Bari, 8 miles west-south-west of Barletta, not far from the mouth of the Ofanto, formerly the Aufidus. It is celebrated on account of the great victory here gained by Hannibal over the Romans in the summer of 216 B.C. Hannibal crossed the Aufidus at a ford, and attacked the Romans, who in a short time were almost annihilated by the terrible Numidian cavalry. Among those left on the field were Paulus Æmilius, the consul of the previous year; Minucius, the late Master of the Horse; and a vast number of Roman knights. The loss of the Romans is stated by Livy at 45,000 infantry and 3000 cavalry. As Hannibal lost in the battle 8000 men, he did not think it prudent to follow the advice of Maharbal, and advance rapidly on Rome. Twenty thousand Romans were made prisoners, partly on the field of battle and partly in the camp.

CANNES, a seaport town of France, in the department of Alpes-Maritimes, pleasantly situated on the Mediterranean, on the road to Nice. It is famed for its salubrity, which has induced a number of English families to make it a winter residence. Lord Brougham used to occupy a fine villa here. Latterly, the town has been much improved. It has fisheries of anchovies and sardines, and a trade in the produce of the district. After his escape from Elba, Bonaparte landed about a mile and a half to the east of C., March 1, 1815. Pop. (1876) 13,519.

CA'NNIBAL (derived from a variety in the spelling of Caribs, the original inhabitants of the West India Islands, who were reputed to be man-eaters, and some tribes of whom, having no *r* in their language, pronounced their name *Canib*), means, like the Greek word *anthropophagos*, which is often used instead of it, one who feeds on human flesh. The practice is often attributed by classical and early Christian writers to races whose practices they denounce as abominable; but the denunciation is often better evidence of the abhorrence of cannibalism by those making the accusation than of its practice by the accused. Homer makes Polyphemus eat men, but only as one of his other unnatural attributes as a monster. The early Christian writers frequently attributed cannibalism to the unconverted. St. Jerome gives his personal testimony to the practice, stating that when he was a little boy living in Gaul he beheld the Scots—a people of Britain—eating human flesh; and though there were plenty of cattle and sheep at their disposal, yet would they prefer a ham of the herdsman or a piece of female breast as a luxury. Statements in old authors still more absurd induced some thinkers to believe that cannibalism is unnatural, and to deny that it was ever practised by human beings except under the pressure of starvation. The accurate observation of late travelers has, however, put it beyond doubt that cannibalism has been and is systematically practised. Comte, as part of his system of positive philosophy, accepting of cannibalism as a condition of barbarism, maintains that the greatest step in human civilization was the invention of slavery, since it put an end to the victor eating the vanquished. The facts, however, which we possess, show that the people systematically addicted to human flesh are not the most degraded of the human race. For instance, in the Australian continent, where the larger animals are scarce, the people, who are of an extremely degraded type, feed on worms and herbs, and have only been known in casual and exceptional conditions to feed on human flesh. The New Zealanders, on the other hand, who are the most highly developed aboriginal race with which late European civilization has had to compete, were, down to a late period, systematic feeders on human flesh, despising the inefficient food which satisfied the natives of Australia. In Angas's *New Zealand Illustrated*, there is a picture of the country mansion of the accomplished chief Rangihaeta, 'one of the finest specimens,' says the author, 'of elaborately ornamented dwellings yet extant.' Its name is Kai Tangata, which means, Eat man; and it had been so called in pleasing memorial of the feasts held within its walls. It has been supposed that the reason why, among the Jews and several eastern nations, the eating of swine's flesh was forbidden as an unclean food, was its resemblance to human flesh, and the danger that persons accustomed to the one might not retain their abhorrence of the other.

In the Crusades, the Saracens charged their Christian enemies with eating unclean food, including flesh of men and of swine. In the old romance of Richard Cœur de Lion, he is represented, on recovering from sickness, as longing for a piece of pork; but that not being procurable, a piece of a Saracen's head was substituted for it, and pronounced by him to be infinitely more palatable. There have been many sad instances where people who naturally had a horror of such food, have been driven by starvation to eat human flesh—as in sieges and shipwrecks. Besides these instances, however, and the systematic cannibals, there is no doubt that people not otherwise habituated to the practice, have been excited by ferocity and revenge to eat, and with relish, the flesh of enemies. In many of the cannibal countries, only the flesh of enemies is consumed. As an instance that this is a natural de-

velopment of ferocity in degraded natures, we may take the fate of the Princess Lamballe in the French Revolution, whose heart was plucked out by one of the savages of the mob, taken to a restaurant, and there cooked and eaten by him. The great Highland chief, Sir Ewen Cameron of Locheil, in a death-struggle with an English trooper, killed him by biting a piece out of his throat, and used to say it was the sweetest morsel he had ever tasted.

CANNING, GEORGE, a distinguished British statesman and orator, was born in London, April 11, 1770. His father, who was descended from an ancient family, incurred the displeasure of his relatives for marrying beneath his station, and died in poverty when his son was only a year old. His mother (who for a subsistence tried the stage, with but little success, married an actor, and subsequently a linen-draper) lived to rejoice in the success and participate in the good-fortune of her boy, whose education was liberally provided by an uncle. C. was first educated at Eton, from which he passed, at the age of 17, to Christ's Church College, Oxford, where he greatly distinguished himself, especially in classics. While here, he cultivated the friendship of the Hon. Charles Jenkinson (afterwards Lord Liverpool), who was of considerable service to him in after-life. From Oxford he went to Lincoln's Inn, but on the suggestion of Burke, as it is said, he soon relinquished the bar for a parliamentary career. He entered the House for Newport, Isle of Wight, in 1793, as the protégé and supporter of the minister, Pitt. In 1796, he was appointed an under-secretary of state. It was not, however, until 1798 that C. made a reputation as an orator and a statesman, by his speeches in favor of the abolition of the slave-trade, and against Mr. Tierney's motion regarding peace with the French Directory, the latter of which, especially, was regarded as a master-piece of eloquence, alike by the House and the country.

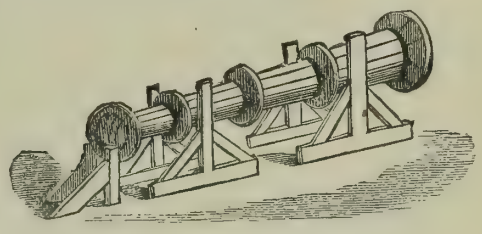
In the debates on the Habeas Corpus Suspension Act, the union with Ireland, and other important questions, C. gave valuable assistance to the ministry, not only by his voice in parliament, but by his pen in a satirical paper, called the *Anti-Jacobin*, in which he especially lashed the 'New Philosphy,' as it was called, promulgated by the French republicans. *The Knife Grinder* is one of the best known and happiest of his efforts in this line. In 1801, Pitt resigned office, and C. joined the opposition against the Addington ministry. When Pitt again became premier in 1804, C. was made treasurer of the navy, an office which he held until Pitt's death in 1806. His opposition to the short-lived Grenville ministry which succeeded, savored of the bitterness of party feeling, and his treatment of Fox in his last days, and of his memory after his death, was far from generous. When the Portland ministry was formed in 1807, C. was appointed Minister for Foreign Affairs, a position for which he was specially qualified, and his despatches, written at this time, are models of manliness and lucidity. In 1812 all his eloquence was enlisted in favor of Catholic emancipation. During the same year he was elected for Liverpool, for which he was again returned three successive times. In 1814 he went as ambassador to Lisbon, returned in 1816, and was made President of the Board of Control, and supported the Liverpool ministry in all their arbitrary and repressive measures until 1820, when he resigned, in consequence of the action of the government against Queen Caroline. Nominated Governor-general of India in 1822, he was on the eve of departure when the suicide of the Marquis of Londonderry called him to the head of Foreign Affairs. In this capacity, C. conferred lasting benefits on his country. He infused a more liberal spirit into his cabinet, he asserted the independence of British politics against the diplomacy that would have entangled the nation with the Holy Alliance, and gave a new direction and impetus to commercial affairs by a gradual laying aside of the prohibitive system. He arranged the relations of Brazil and Portugal; drew the Frenth cabinet into agreement with the British respecting Spanish American affairs; was the first to recognize the free states of Spanish America; promoted the treaty combining England, France, and Russia, for a settlement of the affairs of Greece, and which was signed July 6, 1827; protected Portugal from Spanish invasion; contended earnestly for Catholic emancipation; and prepared the way for the repeal of the corn-laws. In February 1827, a stroke of paralysis forced the Earl of Liverpool to resign, and Mr. C. was called upon to form a new administration. His health, however, gave way under the cares of office, and he died 8th August of the same year. His remains were interred in Westminster Abbey, near those of Pitt. As a parliamentary orator, C. holds a prominent place in British annals. His acuteness of mind, power of expression, and well-pointed wit, were remarkable; but, on the whole, he was inferior to Pitt, Burke, and Fox. He lacked the imposing characteristics of the first, the overpowering enthusiasm of the second, and the winning address of the last. He was intensely British, and his foreign policy was of the character best calculated to promote British interests.

His speeches have been reprinted in 6 vols. 8vo, by Therry, and several memoirs, including one by his private secretary, Mr. Stapleton, have been published.

CANNING, CHARLES JOHN, VISCOUNT, second son of the above statesman, was born December 1812. Educated at Eton and Oxford, he succeeded to the peerage as Viscount C. on his mother's death in 1837, his elder brother, who was a captain in the navy, having been drowned at Madeira in 1828. In 1841 he became Under-secretary of State for Foreign Affairs in Sir Robert Peel's government, and afterwards Commissioner of Woods and Forests. When Lord Aberdeen came into office, he was made Postmaster-general; and in the beginning of 1856, he succeeded Lord Dalhousie as Governor-general of India. His conduct during the awful crisis of the Indian mutiny was decried at the time by many as weak and pusillanimous; but the general opinion now, when all the circumstances of the case are better known, is that he acted with singular courage, moderation, and judiciousness. He died in London, 17th June 1862.

CANNING, SIR STRATFORD. See STRATFOED DE REDCLIFFE, VISCOUNT.

CA'NNON, is a general name for large pieces of ordnance or artillery, as distinguished from those pieces which can be held in the hand while being fired. No military weapon in use before the invention of gunpowder can fairly come under this designation; they were more generally of the kinds described under BALISTA. At what exact date C. were first used is not known; but C. called 'crakys of war,' were employed by Edward III. against the Scots in 1327, by the French at the siege of Puy Guillaume in 1338, and by Edward III. at Crecy, and at Calais in 1346. The first C. or *bombards* were clumsy, wider at the mouth than at the chamber, and made of iron bars hooped together with iron rings. The balls fired from them were first made of stone, afterwards superseded by iron. In the 15th c., various kinds were known by the names of C. bombards, culverins, serpentines, &c. Bombards of great length and power were employed by Louis XI. during his Flemish campaign in 1477, some with stone balls, some with iron.



Mounting of a Cannon.—From Froissart.

About this time, C. began to be made by casting instead of with hooped bars; and bronze or brass as a material began to be used as well as iron. The C. of the 16th c. were generally smaller, but better finished than those of the 15th. The largest C. made in the 17th c., so far as is known, was the Bejapoor cast-iron gun, 'Malick é Meidan,' or 'Lord of the Plain,' made either by Aurungzebe or by the Mahrattas; it was 14 feet long, 28 inches bore, and required a ball of 1600 lbs. weight. From the time of the great European wars in that century, C. have undergone vast improvements, as well as the science and art of artillery necessary for their management. The following is a list of the chief kinds of 'smooth-bore' ordnance still retained for use in the British service, in places where rifled guns are not considered necessary:

BRONZE—Guns, 12, 9, 6, and 3 pounders. Howitzers, 32, 24, 12 pounders; and 4 2-5 inch diameter of bore. Mortars, 5 1-2 and 4 2-5 inch.
CAST-IRON—Carronades (q. v.), 68, 42, 32, 24, 18, 12, and 6 pounders. Guns, 10 and 8 inch; 68, 56, 42, 32, 24, 18, 12, 9, and 6 pounders. Howitzers, 10, 8, and 5½ inch. Mortars, 13, 10, and 8 inch.
WROUGHT-IRON—100 pounder.

By far the most important kind of cannon is now, of course, the rifled ordnance. The history of rifling, and an account of the various methods of making rifled ordnance will be found in the article RIFLED ARMS; meanwhile a tabular view of those now in store is here given. R.M.L.=rifled muzzled-loading, R.B.L.=rifled breech-loading.

BRONZE—R.M.L. guns, 7 and 9 pounders.
STEEL—R.M.L. guns, 7 pounder.
WROUGHT-IRON—R.M.L guns, 100, 80, 38, 35, 25, 18, 12, 9, 7, and 6 1-2 ton; 90 cwt. and 70 cwt.; 64 pounder, 40, 25, 16, 13 and 9 pounders.
WROUGHT-IRON—R.M.L. Howitzers, 8 inch, 6·6 inch, and 6·3 inch diameter.
WROUGHT-IRON—R.B.L. guns, 7 inch, 6 inch diameter; 40 pounder, 25, 20, 12, 9, and 6 pounders.
CAST-IRON—R.M.L *converted* guns, 80 and 64 pounders.

A broad distinction is drawn between heavy ordnance, such as may be used in the navy, in fortresses and batteries on the one hand, and field-guns. The standard English field-guns are 9 and 16 pounder muzzle-loaders of wrought-iron, though 13-pounders both of breech-loaders and muzzle-loaders have been experimentally used with much success.

In 1870, the English field-guns were unquestionably the best in Europe; in 1880, it was generally admitted that they were behind those of every important nation in one or more respects. Germany began to re-arm soon after the war of 1870, and produced

the breech-loading guns of Krupp's cast-steel, which are still the standard. Austria followed suit, remodelling her guns after the plan of Colonel Uchatius, making them breech-loaders; the old bronze being so modified as to acquire the name of steel-bronze, though there is no steel in it. France profited by the experience of Germany, her steel breech-loaders being admirable weapons. Italy uses both bronze and steel, and Russia has steel breech-loaders like those of Germany. Our guns, it appears, are heavier, and throw less powerful projectiles with a lower velocity than these newer weapons; and we have only half the field-artillery possessed by Austria. The technical name for pieces of artillery is rather *ordnance* or *guns* than *cannon*.

This being merely a general or collective notice of all kinds of C. as a class, particulars concerning each kind will be found under such headings as ARMSTRONG, CARRONADE, GUN, HOWITZER, LANCASTER GUN, MORTAR, RIFLED ARMS, SHELL GUN, &c.

CANNON, ALLOYS FOR. The material formerly used for the manufacture of ordnance was Bronze (q. v.), consisting of about 90 parts of copper to about 10 parts of tin. In the casting of small C., such as 8-pounders, the alloy used contained 92½ parts of copper to 7½ parts of tin; while in the larger C. the tin was increased until the proportion reached 88 to 12. The presence of the tin increased the hardness of the alloy, but this was obtained at the expense of the tenacity. Great care must be taken to insure the purity of the copper and the tin. If lead is present, the alloy is always more or less soft, and, moreover, liable to fuse after repeated explosions; while the presence of a mere trace of sulphur, arsenic, phosphorus, &c., renders the alloy very brittle. It was customary, in the casting of C., to use up old C. or other bronze implements, so as to form a beginning of the fused metal in the furnace, and then to add little by little the extra amount of copper and tin. This mode of procedure was followed, owing to the difficulty found in getting copper and tin to amalgamate readily, so as to yield an alloy of uniform composition. This point is of great importance in the casting of ordnance, as the metals when not properly alloyed, are liable to separate during the cooling, and yield a C. of variable composition throughout. With the exception of small steel mountain guns, all British cannon are made of wrought iron.

CANNON FOUNDING. Since Sir W. Armstrong succeeded, by a process first brought under the notice of the British government in 1854, in making of malleable iron a field-gun of far greater efficiency than any previously in use, cannon founding has in most European countries gradually ceased. This manufacture, which was formerly an important one, is, however, still carried on in the United States, Sweden, and Russia, all three of which countries produce cast iron of a very superior quality.

Cannon are cast in moulds of loam or sand prepared with the help of a pattern, as described under FOUNDING. They are usually cast vertically with an extra mass of metal poured in at the top end of each mould to secure by its pressure greater solidity in the walls, as is often done in the case of a hydraulic cylinder. This superfluous portion is, of course, afterwards removed. Cannon are, or at least were, often cast solid with the same object, and afterwards bored, although it is by no means certain that such are generally sounder or of closer texture than those which are cast hollow. In either case the inner surface of the cannon is accurately finished with a boring tool to the required calibre, and the outer surface turned. Brass, or rather bronze cannon were usually cast in loam by means of a clay model on which were often struck ornamental figures in wax, these being melted out of the mould before casting.

In the United States cast-iron guns are made by Rodman's process; that is, they are cast hollow on a core barrel which is filled with water. This is applied so as to cool the metal of the gun in layers, thus modifying the initial strain upon it, and producing the best result that can be obtained from cast iron for ordnance purposes. Within the last few years guns as large in the bore as twenty inches have been cast by this method at Pittsburg, and one of the same size has been made by it in Russia. The latter weighs 44 tons, throws a spherical ball of 9 cwt., and took 3½ months to finish. Its cost was not more than one-fourth that of a built-up gun of steel for the same weight of projectile.

Many of the earlier pieces of ordnance, it is curious to observe, were made of hooped bars, in which one can trace the germ of the process by which the Armstrong gun is made. Indeed it is doubtful if any modern plan of constructing large guns was not tried in olden times, as is seen by an examination of the different kinds of old cannon still preserved. These, however, had to be constructed without the aid of the steam-hammer and other appliances, which render such work comparatively easy nowadays, and were accordingly deficient in strength. The earlier wrought-iron cannon were eventually superseded by those made of cast iron and bronze, but not entirely for some considerable time after the latter had been in use.

The mortar, which was introduced about the commencement of the 14th c., appears to have been not only the most ancient form of cannon, but the first European fire-arm as well. From the beginning of the 15th c. cannon were cast in bronze, and some of great size are stated to have been used at the siege of Constantinople in 1463. Probably hand cannon of cast iron date as far back as bronze guns, and at anyrate we know that large and excellent cannon were made of cast iron in the early part of the 16th c., they having been used at Flodden, and England having even then acquired a reputation for this kind of ordnance. See FIREARMS. Cannon founding has therefore been practised for nearly 500 years, and although the art is now to all appearance doomed to decay, no one can predict, in these days of metallurgical wonders, what further change improvements in the manufacture of iron and steel may bring about as respects the making of large firearms. In order that the cast guns made on the old system may still be available for some purposes in modern warfare, Colonel Hay Campbell, some years ago, proposed a plan for lining bronze, and Sir W. Palliser another for lining cast-iron cannon with a tube of wrought iron. Many have been transformed on the Palliser system, which consists in boring a certain thickness off the old gun, and forcing a coiled wrought-iron barrel into the interior, and are said to have given very remarkable results as regards endurance.

Certain peculiarities in the manufacture of special kinds of ordnance are noticed in the articles relating to them.

CA'NNON-BALL TREE (*Couroupita Guianensis*), a tree of the natural order *Lecythidaceæ*, a native of Guiana, of great size, the trunk being often more than two feet in diameter. It has large ovate-oblong leaves; the flowers are produced in racemes, they are white and rose-colored; and the fruit is large, 'about the size of a 36-pound shot,' nearly round. The hard woody shell of this fruit is used for drinking-vessels.

CANNSTADT, a town of Würtemberg, beautifully situated on the Neckar, about 3 miles north-east of Stuttgart. It owes its origin to the Romans, of whose presence there are still found many traces. It has numerous mineral springs, discharging 800,000 cubic feet of water in 24 hours, which are much frequented during the season; manufactures of woollens, cottons, tobacco, &c.; and a large trade by means of the Neckar. Pop. (1880) 16,020.

CA'NO, ALONSO, an illustrious Spanish painter, the founder of the School of Granada, in which city he was born, March, 1601. He received his first instructions in the principles of art from his father, Miguel Cano, who was an architect; studied sculpture under J. Montanes, and painting under Pacheco and Juan de Castillo; and attained celebrity so early, that, in 1638 or 1639, he was appointed court painter and architect to the king. C. was of a hasty temper, and was accused of having murdered his wife in a fit of violent jealousy, but the accusation appears to have been quite groundless. He was, however, subjected to the torture; but no confession having been elicited, he was acquitted and received again into the royal favor, named residentiary of Granada, and spent his last years in acts of devotion and charity. He died at Granada in 1664 or 1667. In the opinion of Fuseli, he excelled all his contemporaries except Velasquez. His eminence in the three departments of the fine arts—sculpture, painting and architecture—obtained for him the hyperbolical honor of being called the *Michael Angelo* of Spain. His pictures, marked by graceful design and pleasing coloring, are very numerous, and are preserved in Granada, Seville, Madrid, Malaga, and other Spanish cities.

CANOE'* is a boat made of a hollowed trunk of a tree, or of the bark shaped and strengthened. Canoes have been made large enough to carry twenty or thirty hogsheads of sugar. Some have decks, and carry sail of rush or silk-grass; but they are generally open boats, rowed by paddles, and steered by an oar. They are seldom wide enough for two men to sit abreast, but vary greatly in length. Near sea-coasts, canoes are often made of light wooden-frames, covered with seal-skins, which are also drawn across as a deck, with only a hole left for one man to sit in. In the Hudson's Bay Territories, canoes are used which are light enough to be carried over the *portages*, or portions of river too shallow for navigation. Canoes, hollowed out of the trunks of oaks, seem to have been in use among the early inhabitants of the British Islands. They have been dug up in considerable numbers in England, Scotland, and Ireland. They appear to have been chiefly of two sorts—one about 10 feet long, with square ends and

* The word is sometimes said to have been borrowed by the Spaniards from the native Indian name of such boats. But a similar name exists in the Aryan languages: Ger. *kahn*, a boat; Old Fr. *cane*, a ship, and *canot*, a boat. The root of these words is the same as that of *cane* (Lat. *canna*), a reed or hollow stem, and signifies hollowness, capacity: Gr. *chaino*, to gape or *yawn*. From the same root come *cann*, a drinking-cup: *cannon* (Ital. *cannone*, properly a large tube, being an augmentative from *canna*, a hollow stem or tube); *canon* (Gr.), a ruler or straight rod, most readily obtained from a joint of a reed; *canal* (Lat. *canalis*, a pipe or conduit).

projecting handles; the other, about 20 feet long, sometimes sharp at both ends, sometimes round at the prow and square at the stern. This name is also applied to a pleasure boat designed for long excursions by a single person.

CA'NON, a word originally Greek, and signifying a measuring-rod (see CANOE—foot-note), applied in various arts and sciences to what serves for a rule or standard, but particularly employed to designate collectively those books which constitute the Holy Scripture, and are accepted by Christians as a rule of faith. See Bible. In ecclesiastical language, the word *canon* signifies, besides, not only a church-precept, but also the decree of a universal council, which is held valid as law. See CANON LAW. At one period the word was used to designate the prayers which the Roman Catholic priests said before, at, and after the consecration of the Host; the term is also employed to denote the catalogue or register of Catholic saints.

CANON, an ecclesiastical dignitary, so called as living under a rule, or as following the rule or canon of divine service. His office is of no great antiquity. According to Paschier, the name was not known before Charlemagne. This, however, is not precisely true, for the term C. was applied in the 4th c. to cenobites living under a common rule; but the office of C. is supposed to have been first instituted by Chrodegand, or Chrodegang, Bishop of Metz, in 763. It is at least certain that he was the author of the oldest canonical rule, which was simply an adaptation of the monastic rule (commonly but erroneously attributed to St. Augustine) to the priests and 'clerks' specially attached to the service of a cathedral or other church. It enjoined on the canons manual labor, the practice of silence at certain times, confession twice a year, and other duties needless to specify. The canons formed the council of the bishop, and assisted him in the government of his diocese. They lived in a house called a *monastery*, slept in a common room, ate at the same table, and were originally supported out of the episcopal revenues.

In 816, Louis le Débonnaire induced the Council of Aix-la-Chapelle to draw up a general rule for the whole body of canons. Canons found their way not long afterwards into England, Scotland, and Ireland. Various reforms of C. were made in the 11th and beginning of the 12th century. Gradually, however, many began to emancipate themselves from the restrictions of monastic life, and to live independent of any rule, which is not at all surprising, for the canons were wont to keep apart from the 'lower clergy,' as they called parish priests and others who really labored to impart religious instruction. They were often of noble families, loved titles—at Lyon, they were called *counts*—and in general were men of the world rather than true churchmen. Some of these reformed or remodelled Canons were called Black Canons, from wearing a black cassock; others, White Canons, from wearing a white habit like the *Præmonstratenses* of Picardy in France. The class of *secular* canons, whose manner of life was not conventual, and who therefore escaped destruction in England when the monasteries were abolished by Henry VIII., probably originated in a tendency to relax the severity of rule enjoined on the regulars, which indeed was hardly less stringent than in the case of ordinary monks. Secular canons still exist in the Anglican Church, and their duties—making allowance for the difference between the Roman Catholic and Protestant religions—are much the same in kind as they were before the Reformation. See CATHEDRAL.

CANON, in Music, a kind of fugue in which not merely a certain period or phrase is to be imitated or answered, but the whole of the first part with which the C. begins is imitated throughout by all the other parts. As in fugues, the melody of the part to be imitated is called the subject, and the others its reply. The C. is the highest degree of mechanical musical contrivance. The ancients spent more time in the construction and resolving of mere puzzling and unentertaining canons, than in the cultivation of good harmony and melody. Good canons, however, are always interesting, and different from any other composition. For a full treatment of the method of writing a C., see Marpurg's *Abhandlung von der Fuge* (Peters, Leipzig).

CANON LAW is a collection of ecclesiastical constitutions for the government and regulation of the Roman Catholic Church, although many of its regulations have been admitted into the ecclesiastical system of the Church of England, and still influence other Protestant bodies. It was compiled from the opinions of the ancient Latin Fathers, the decrees of general councils, and the decretal epistles and bulls of the Holy See. These, from a state of disorder and confusion, were gradually reduced into method, and may be briefly described in the following chronological order: 1. *Gratian's Decree*, which was a collection of ordinances, in three books, commenced by Ivo, Bishop of Chartres, 1114 A.D, and subsequently corrected and arranged by Gratian, a Benedictine monk, in the year 1150, after the manner of Justinian's *Pandects of the Roman Law*.

This work comprises ecclesiastical legislation, as it may be called, from the time of Constantine the Great, at the beginning of the 4th, to that of Pope Alexander III., at the end of the 12th century. 2. The *Decretals*. They are a collection of canonical epistles, in five books, written by popes alone, or assisted by some cardinals, to determine any controversy, and first published about the year 1230, by Raimundus Barcinus. They lay down rules respecting the lives and conversation of the clergy, matrimony and divorces, inquisition of criminal matters, purgation, penance, excommunication, and other matters deemed to be within the cognizance of the ecclesiastical courts. To these five books of Gregory, Boniface VIII. added a sixth, published 1298 A.D., called *Sextus Decretalium*, or the *Sext*, which is itself divided into five books, and forms a supplement to the work of Barcinus, of which it follows the arrangement. The *Sext* consists of decisions promulgated after the pontificate of Gregory IX. Then there came the *Clementines*, which were constitutions of Pope Clement V., published 1308 A.D. These decretals form the principal portion of the canon law. John Andreas, a celebrated canonist in the 14th c., wrote a commentary on them, which he entitled *Novellæ*, from a very beautiful daughter he had of that name, whom he bred a scholar; the father being a professor of law at Bologna, had instructed his daughter so well in it, that she assisted him in reading lectures to his scholars, and therefore, to perpetuate her memory, he gave that book the title of *Novellæ*. 3. The *Extravagants* of John XXII. and other later popes, by which term is meant to be denoted documents which transcend the limits of a particular collection of regulations. These books, viz., *Gratian's Decree*, the *Decretals*, and the *Extravagants*, together form the *Corpus Juris Canonici*, or great body of the 'canon law,' as formerly received and administered by the Church of Rome. There are, however, other publications of a later period, of more or less authority, but which do not appear to have received the formal sanction of the Holy See.

This C. L., borrowing from the Roman civil law many of its principles and rules of proceeding, has at different times undergone careful revision and the most learned and scientific treatment at the hands of its professors, and was very generally received in those Christian states which acknowledge the supremacy of the pope; and it still gives ecclesiastical law more or less to Roman Catholic Christendom, although its provisions have in many countries been considerably modified by the *concordats* (q. v.) which the popes now and then find it expedient to enter into with Roman Catholic sovereigns and governments, whose municipal system does not admit of the application of the C. L. in its integrity.

Indeed, the fact of its main object being to establish the supremacy of the ecclesiastical authority over the temporal power, is sufficient to explain why, in modern times, it is found to conflict with the views of public law and government, even in the case of the most absolute and despotic governments.

This ecclesiastical system, however, never obtained a firm footing in England, and the great lawyers and statesmen have always shown not only an unwillingness to defer to its authority, but even an aversion to its rule. There was, however, a kind of national C. L. in England, composed of *legative* and *provincial* constitutions, adapted to the particular necessities of the English Church. The legative constitutions were ecclesiastical laws, enacted in national synods, held under the Cardinals Otho and Othobon, legates from Pope Gregory IX. and Pope Clemont IV., in the reign of King Henry III., about the years 1220 and 1268. The *provincial* constitution are principally the decrees of provincial synods, held under divers archbishops of Canterbury, from Stephen Langton, in the reign of Henry III., to Henry Chicheley, in the reign of Henry V., and adopted also by the province of York in the reign of Henry VI. At the dawn of the Reformation, in the reign of Henry VIII., it was enacted in parliament that a review should be had of the C. L.; and till such review should be made, all canons, constitutions, ordinances, and synodals provincial being then already made, and not repugnant to the law of the land or the king's prerogative, should still be used and executed. And as no such review has yet been perfected, upon this enactment now depends the authority of the C. L. in England, the limitations of which appear, upon the whole, to be as follows: that no canon contrary to the common or statute law, or the prerogative royal, is of any validity; that, subject to this condition, the canons made anterior to the parliamentary provision above mentioned, and adopted in our system (for there are some which have had no reception among us), are binding both on clergy and laity; but that canons made since that period, and having no sanction from the parliament, are, as regards the laity at least, of no force. See CANONS OF THE CHURCH OF ENGLAND.

In Scotland, Presbyterian though the ecclesiastical system of that country be, the old Roman C. L. still prevails to a certain extent. 'So deep hath this canon law been rooted,' observes Lord Stair in his *Institutes of the Scotch Law*, 'that even where the pope's authority is rejected, yet consideration must be had to these laws, not only as those by which church benefices have been erected and ordered, but as likewise containing many equitable

and profitable laws, which, because of their weighty matter, and their being once received, may more fitly be retained than rejected.' In two old Scotch acts of parliament, made in 1540 and 1551, the C. L. is used in conjunction with the Roman law to denote the common law of the country, the expression used being 'the common law, baith canon, civil, and statutes of the realme.'

See on the subject of this article generally the following authorities—Blackstone's *Commentaries*, by Kerr, vol. i. pp. 65 and 66; Stephen's *Commentaries*, 4th edition, vol. i. pp. 61 and 69—vol. ii. pp. 251, 256, 257, and 290—vol. iii. pp. 45, 48, and 421—and vol. iv. p. 242; Dr. Irving's *Study of the Civil Law;* Burn's *Ecclesiastical Law;* Phillimore *Ecclesiastical Law* (2 vols., 1873); Rosshirt, *Kanonisches Recht;* Phillips, *Kirchenrecht* (8 vols., 1845—1875). See also the articles in Wetzer and Welte's *Kirchenlexikon* (Catholic); Herzog's *Real. Encyklopädie* (Protestant); Knight's *Political Dictionary;* Wharton's *Law Dictionary;* Dr. Hook's *Church Dictionary.* In regard to Scotland, see Stair's *Institutes of the Law of Scotland*, I. 1, 13, and II. 8, 20; and Erskine's *Institutes*, I. 1, 28.

CANO'NICAL HOURS are the times fixed for divine service in the Catholic Church, but no longer strictly adhered to. These have not always been the same, and it is not known when nor by whom they were settled—some say by Popes Damasus, or Gelasius, or Gregory—but they are now fixed at seven; viz., Matins and Lauds, Prime, Tierce, Sext, Nones, Vespers, and Compline. These used to be observed as follows: Prime, Tierce, Sext, and Nones, at the first, third, sixth, and ninth hours of the day, counting from six in the morning; Vespers at the eleventh hour; Compline, or Completorium, as completing the services of the day, at midnight; and Matins shortly after midnight. These hours were by the Anglo-Saxons called Uhtsang, Primesang, Undersang, Middaysang, Noonsang, Evensang, and Nightsang. The first two and the last formed the nocturnal, the remaining four the diurnal offices. The reasons given for the dividing the day into seven parts were—that in seven days the creation was completed, that seven times a day the just man falls, there are seven graces of the Holy Spirit, seven divisions of the Lord's Prayer, seven ages of a man's life, &c. The hours had also each its mystical reference to certain sacred occurrences, such as the incidents at our Lord's birth and crucifixion. The word 'hour,' in C. H., is derived, as some have suggested, from *ora*, a prayer; but more probably from *hora*, an hour, and called canonical because according to the canon or rule of the church. The proper offices for the C. H. are to be found in the BREVIARY (q. v.).

CANONICALS, a term used to describe the proper ecclesiastical dress of the clergy. See VESTMENTS.

CANONIZATION, in the Church of Rome, the act of the pope by which a deceased person is solemnly declared to be a saint. It had its origin in the practice of the early church, of inserting in the commemorative prayer of the Eucharistic Liturgy the roll of the names of those who had died as martyrs, or distinguished themselves as confessors of the faith. This record was entered in the diptychs of the church, and read in the so-called 'Canon' of the Liturgy. Each bishop was at first accustomed to declare deceased persons to be saints.

In the West, the exercise of this power came to be reserved to the popes, and the ceremonial itself was invested with much solemnity, and regarded as of very great importance. The first papal C. was accomplished by John XV. The popes have possessed the exclusive right since 1170. The right of *Beatification* (q. v.) also belongs to them. When it is proposed to canonize a person of reputed sanctity, the pope declares his views in a consistory, and an inquiry is instituted as to the virtues and merits of the person proposed. The form of inquiry is that of a regular process at law, and an ecclesiastic is specially appointed to contend against the claims advanced, who receives the designation of *Advocatus Diaboli;* and on failure of satisfactory proof, the process is abandoned. When a favorable decision is pronounced, the ceremony of C. is performed in St. Peter's Church with great pomp. The last C. was in 1862.

The Greek Church also recognizes *Canonization*. The right to perform the ceremony lies with the Patriarch of Constantinople, but it has rarely occurred. An analogy to Christian canonization has been found in the Apotheosis (q. v.) of the ancient Romans.

CANONRY, the office and dignity of a CANON. See CATHEDRAL.

CANONS, BOOK OF, in Scottish ecclesiastical history, a code of canons or rules for the Church of Scotland, prepared by the Scottish bishops, in obedience to the command of Charles I., revised by Laud, and confirmed by letters-patent under the great seal, 23d May 1635. It tended much to increase the dissatisfaction prevalent throughout Scotland, and which soon broke out so violently. It not only required the most strict adherence to the Liturgy, then not yet published, but enjoined many things concerning ceremonies in worship beyond what Laud had been able to introduce in the Church of England; it also took away the powers of church-courts, and decreed the penalty of excommunication against all who should deny the government of the church by bishops to be scriptural, while its very first canon decreed that penalty against all who should deny the king's supremacy in ecclesiastical affairs.

CANONS OF THE CHURCH OF ENGLAND, called Constitutions and Canons Ecclesiastical, agreed upon, with the king's license, in the synod held at London in 1603—1604. They were drawn up by the Convocation, in order to give effect to the decisions of the Conference held at Hampton; and are, for the most part, a digest of old canons, with some new ones added. They are 141 in number. They are the basis of the ecclesiastical law, as far as the clergy are concerned, but they are not binding upon the laity, except in so far as they are declaratory of the ancient canon law. There had been a previous body of canons drawn up in 1571, but these had not been sanctioned by the sovereign.

In 1640, the Convocation, which was then assembled with the parliament, prolonged its session beyond it, and passed a body of canons of a very arbitrary character; amongst other things, enjoining that on some Sunday in every quarter, every officiating minister should insist on the divine right of kings and their prerogatives, and enforce conformity to the rites of the Church of England. In these canons, it was directed that the communion table should be railed in, and be placed as in cathedrals, as is now done in all churches. These canons were abrogated by an act passed in the 13th year of Charles II. An account of these canons and those now in force may be found at length in Hook's *Church Directory*.—Every clergyman, when instituted to a benefice or licensed to a cure, promises CANONICAL OBEDIENCE to the bishop—i. e., the obedience due according to the canons of the church.

CANO'PIC VASES were vases used by the Egyptian priests to contain the viscera of embalmed bodies. They were arranged in a series of four—the first contained the stomach and larger intestines; the second, the small intestines; the third, the lungs and heart; and the fourth, the liver and gall-bladder; and each had on its lid the head of the particular deity who was supposed to preside over the contents.

CANO'PUS, or CANO'BUS, a city of ancient Egypt, from which the Canopic mouth of the Nile derived its name, was situated on the sea-coast, 15 miles east of Alexandria. The Canopic mouth of the Nile appears to have been at an early period the only one into which foreign ships could enter. At C. the boundary-line between Asia and Africa was drawn by ancient geograpers. There was a temple of Hercules here, which was a secure sanctuary to all who fled to it; also one of Serapis, as several extant Greek inscriptions show. The inhabitants of C., a mixed Egypto-Hellenic people, were infamous, in the Greek and Roman times, for their profligacy. The city declined after the rise of Alexandria. Traces of its ruins are visible about three miles from Aboukir.

CANOPUS is also the name of a very brilliant star of the southern hemisphere, in the constellation of the ship Argo, and, as Plutarch relates, received its name from Canopos, the pilot of Menelaus.

CA'NOPY (Lat. *Canopeum* Gr. *Konopeion*, from *Konops*, gnat or mosquito). The derivation of this word throws a curious light on its original meaning, which probably was a mosquito-curtain. The simplest form of C., in this its primitive sense, is that mentioned by Herodotus (ii. 95), who tells us that the fishermen on the Nile were in the habit of suspending the net with which they had fished during the day on an upright pole, from which it was expanded into the form of a tent, and served to protect them from the attacks of insects during the night.

As it has been proved that insects will not pass through the meshes of a net, though wide enough to admit them, it is probable that this simple contrivance may have been quite effectual for the purpose for which it was used. Horace (Epod. ix. 9), and others of the ancient writers, mention gnat-curtains (canopea). Subsequently, the same term came to be used for the projecting covering and hangings of a bed, without reference to their original use, and latterly for any projecting covering of a similar form, to whatever use it might be adapted, or of whatever materials it might be formed. C. is thus used to signify the covering which is borne over the heads of kings and other persons of distinction, and still more frequently over the Holy Sacrament and the image of Christ, in processions in Roman Catholic countries. See BALDACHIN.

In Gothic architecture, C. is the term applied to those rich coverings which are frequently met with over niches and tombs, and sometimes over doors and windows. It belongs chiefly to the decorated and perpendicular styles, though it was not unknown much earlier. The C. consists of a roof, which may be supported on pillars all round, or may have one, or if in an angle *two*, sides attached to the wall, with dependent ornamental work representing drapery. The early English canopies are usually simple in form; those in French buildings of the same period being greatly

more complicated and elaborate, as, for example, those in the cathedrals of Chartres and Bayeux. In the decorated style, the canopies were richly ornamented and very various in form, as in the accompanying illustration. Some canopies are ornamented by pinnacles supporting smaller canopies, the whole terminating in a structure resembling a small turret, or crocketed spire. In the

Canopy over Chaucer's Tomb in Westminster Abbey.

perpendicular style, though more varied in form, the canopies resemble those in the decorated. Most of the cathedrals and larger churches of England furnish examples of canopies, many of which are enumerated in Parker's *Glossary of Architceture*. For the use of canopies in Italian architecture see BALDACHIN.

CANO'SA, a town of Southern Italy, in the province of Bari, 13 miles south-west of Barletta. It is situated on the declivity of a steep hill, upon the summit of which there are the remains of an old castle. It has a cathedral; and in an adjoining court is a tomb to Bohemond, Prince of Antioch. It is chiefly remarkable, however, in connection with the discovered antiquities of ancient *Canusium* (one of the chief cities of the Apulians, the origin of which is obscured in the mists of mythology), on the site of whose citadel the modern town is said to stand. The antiquities consist of subterranean sepulchres, containing painted vases and funereal furniture of the most magnificent description in perfect order, painted busts, marble statues, &c. Many of the bodies found here were attired in cloth of gold, with head-dresses gleaming with precious stones, and earrings and bracelets of rich and exquisite workmanship. The objects were transferred to the museum at Naples. The ruins of an amphitheater, aqueduct, &c., have also been found. C. suffered by earthquake in 1851. Pop. 14,500.

CANO'SSA, a town of Northern Italy, in the province of Reggio, about 12 m. S.W. of the city of Reggio, celebrated as the place where, in 1077, the Emperor Henri IV. of Germany obtained absolution from Pope Gregory VII., after three days' humiliation. The place, formerly of some importance, is now deserted.

CANO'VA, ANTONIO, the founder of a new school of Italian sculpture, was born November 1, 1757, at Possagno, a village in the Venetian territory. Having displayed in boyhood great talent in modelling, the artist gained the patronage of Giovanni Faliero, a Venetian senator, by whom he was sent to work under a sculptor at Bassano. His first imaginative performance, 'Eurydice,' half the size of life, was executed in his 17th year. After this he went to Venice, where his study of art properly began. In 1779, Faliero sent him to Rome, with an introduction to Cav. Zuliano, the Venetian ambassador, and one of the most illustrious patrons of art at this time in Italy. In Rome the first result of his studies appeared in the statue of 'Apollo,' which must be regarded as his earliest effort in ideal sculpture; but a far greater progress toward the pure style of the antique was evident in his next work, 'Theseus with the Centaur.' Nevertheless, C. did not rigorously adhere to the severe simplicity of the antique, but rather took pains to mitigate it by a peculiar grace and loveliness of his own, such as characterized his group of 'Cupid and Psyche,' which was produced soon after he had completed the monument of Pope Clement XIV.

This is apparent even in the colossal monument of Clement XIII. (erected in St. Peter's, 1792); though this work, on the whole, is a magnificent effort of genius, simple in style, and with nothing overwrought in the figures. Among his other works may be noticed a 'Winged Cupid,' 'Venus and Adonis,' a 'Psyche holding a Butterfly;' 'Penitent Magdalen,' in life-size 'Hercules hurling Lichas from the rock,' a colossal work, but not free from affectation; 'Kreugas and Damoxenos' (two pugilists), 'Palamedes,' and 'Perseus with the head of the Medusa,' a work which, more than all his previous efforts, served to raise his fame. In 1802, C. was appointed by Pope Pius VII. chief curator of all Roman works of art, in the Papal States, but was soon called away to Paris, to prepare the model of a colossal statue of Bonaparte.

After the fall of the French empire, C., in 1815, was employed by the Roman government as ambassador to recover the works of art which had been taken to Paris, and paid a visit to England. On his return to Rome, he was created Marquis of Ischia, with a pension of 3000 scudi. This money he expended in the support of art and artists in Rome. C. died in Venice, 13th October 1822. A marble statue was erected to his memory in the Church de' Frati, 1827. Another monument to C. was erected in the library of the capitol, by order of Leo XII., in 1833.

It is universally allowed that to C. belongs the honor of having restored to sculpture the position which it had lost among the modern fine arts. After Michael Angelo Buonarotti and Bernini, he was the third of epoch-making Italian sculptors. His delicate execution and masterly treatment of marble are unrivalled, and even his faults—viz., his exaggerated nicety and carefulness, and his use of corrosives to produce fine finish—served to attract by the novel effects which they produced. The essential characteristic of all his works is sentiment—often verging, however, on sentimentalism—and this also, like his delicacy in details, was accordant with the taste prevalent in his time, and was the chief cause of his popularity, as of his errors. When judged by the sterner principles of antique sculpture, the works of C. are found deficient in that objective or realistic character which Thorwaldsen could express so well.

During his leisure hours C. amused himself in painting, in which he attained such a degree of excellence in following the coloring of the Venetian masters, that his pictures have even deceived connoisseurs. In his private life, C. was a very amiable and benevolent man. Biographies of C. have been written by Missirini (4 vols. Prato, 1824), Cicognara (Venice, 1823), Rosini (Pisa, 1825), and D'Este (Florence, 1864).

CANROBERT, FRANÇOIS CERTAIN, DE, Marshal of France, born in 1809, studied in the military school of St. Cyr, and in 1828 entered the army. In 1835 he sailed for Algeria, and during the war in the province of Oran was made a captain. In the storming of Constantine, he was one of the first who entered the breach, when he received a wound in the leg. About the same time he had the decoration of the Legion of Honor conferred upon him. In 1846 he became a lieutenant-colonel, and soon after colonel. In 1848 he had the command of an expedition against the tribes of the Bouaoun, whom he defeated at the Pass of Djerma, and was victorious against the Kabyles. As general of brigade, in 1850 he led an expedition through the rocky country of Narah, and destroyed the Arab stronghold there. In January 1853, he became a general of division. He had the command of the first division of the French army under Marshal St. Arnaud, sent to the Crimea in 1854; and at the battle of the Alma, was wounded in the breast and hand by the splinter of a shell. On the death of the marshal, C. took the chief command of the French army. In the war in Italy against the Austrians, in 1859, C. had the command of the third division of the French army; and at the batttle of Magenta, June 4, his *corps d'armée* turned the left of the Austrians. In the great battle of Solferino, on the 24th of the same month, his division was hotly engaged, and lost 1000 men in killed and wounded. In 1860, he married Miss Macdonald, a Scotch lady. When war was declared by France against Prussia, in 1870, he was one of the generals in command at Woerth, where the French received such a defeat. C. was shut up in Metz with Bazaine, and became a prisoner in Germany. In 1877 he was elected a member of the French Senate.

CA'NSO (Cape), the eastern extremity of Nova Scotia, and the southern boundary of the entrance of Chebucto or Chedabucto Bay. It is in lat 45° 17′ N., and long. 61° W.—2. (Strait), a passage of 17 miles in length and 2½ in average breadth, connecting the inlet just mentioned with the Gulf of St. Lawrence, so as to form an island of Cape Breton. Of the three channels between that inland sea and the open ocean, it is the one that is least frequently used by European vessels.

CANT, on shipboard, is a name given to such timbers, near the bow and stern, as lie obliquely to the line of keel. It is also a general term for anything sloping, inclined, or turned aside. 'Canting' is to turn anything over, or out of its proper position.

CANT, ANDREW, a Scottish divine of the 17th c., was first minister of Pitsligo, in the north of Scotland, and afterwards in Aberdeen. In July 1638, he was one of the commissioners sent to that city, to compel the inhabitants to subscribe the National Covenant; and in November of the same year, he was a member of the memorable General Assembly, held at Glasgow, which abolished Episcopacy in Scotland. He was with the Scots army

when it obtained possession of Newcastle, August 30, 1640; and in 1641, on the second visit of Charles I. to Scotland, C. preached before his majesty at Edinburgh. In 1660, in consequence of a complaint presented to the magistrates of Aberdeen, charging him with having published a seditious book, entitled *Lex Rex*, and with fulminating anathemas and imprecations against many of his congregation, C. relinquished his charge and left the town. He died about 1664.

CANTA'BILE, in Music, is found in several significations. In general, it is placed over passages of easy and flowing melody, as well in instrumental as vocal music. In songs, the melodies which lie chiefly in the middle region of the voice are marked C.: extreme tones of the voice have a peculiar *timbre* and character quite foreign to the cantabile. C. marked at the beginning of a piece means rather slow than quick. In the C. style the finest effects can be produced by the singer in swelling, sustained sound, the portamento, &c. C. is also called *cantilene*.

CANTA'BRI, a rude race of mountaineers in ancient Spain, were of Iberian origin, and lived in the district now known as Burgos, and on the coasts of the Bay of Biscay, which derived from them its name, *Oceanus Cantabricus*. The most important of their nine towns were Juliobrica (near the source of the Ebro), Vellica, and Concana. The C. are described as like the Scythians and Thracians in hardihood and martial character, sleeping on the bare earth, enduring extreme pain without a murmur, and, like most savages, leaving agricultural toil to their women. Their bravery was evinced in the Cantabrian war, a six years' contest with the Romans, begun under Augustus, and concluded by Agrippa, 25—19 B.C. Tiberius afterwards stationed garrisons in the towns of the conquered C.; but some portion retreated into their fastnesses among the mountains, where they preserved their independence. They are supposed to be the ancestors of the BASQUES (q. v.).

CANTA'BRIAN MOU'NTAINS, the general name of the several ranges of coast and boundary mountains, extending along the north coast of Spain, from Cape Finisterre, to the southern base of the West Pyrenees, and so dividing the coast districts from the interior elevated plateau of Castile.

The summits of the mountains here and there reach the lower line of the snow region, with a more gentle slope on the south side, and forming plateau-districts from 1600 to 2000 feet high on the north, where the slopes are steeper and intersected by coast rivers, leave in several parts only narrow stripes of flat coast-land, and running out into the sea form several bold promontories. The whole group of mountains is named variously by the people of various localities, and includes the Sierra de Aralar, Salvada, Anagña, Sejos, Albas, and Altuna—all more or less wild and romantic, but having those fertile and prosperous trading districts which distinguish the Basque Provinces and Asturias from the sterile central pleteau of Spain.

CANTAL, a central department of France, formed out of the south portion of the old province of Auvergne. It has an area of 2090 square miles, and a population, in 1876, of 231,086. See AUVERGNE.

Cantaliver.

CA'NTALIVER, or CA'NTLIVER, a large bracket used in architecture for supporting cornices, balconies, and even stairs. Cantalivers are often highly ornamented. The accompanying example is from a stair at the corner of Randolph Crescent, Edinburgh.

CANTARINI, SIMONE, also known as SIMONE DA PESARO or IL PESARESE, an Italian painter, was born at Pesaro in 1612. He studied under Guido Reni at Bologna; but his intolerable arrogance made him numerous enemies, and in consequence he left the city, and went to Rome, where he won a high reputation, and was thought by many to excel even his master in the graceful finish of his brush. On his return to Bologna, he opened a school, but shortly after accepted an invitation from the Duke of Mantua to visit that city. Here also his excessive self-esteem involved him in disagreeable relations with everybody, and at last he quarreled with the duke himself, on which he left for Verona, where he died in 1648, under suspicion either of having poisoned himself, or of having been poisoned by a Mantuan painter whom he had injured. C. was distinguished in modelling and flesh-coloring. A 'Madonna upborne by Angels,' and a head of Guido when old, in the gallery at Bologna; and others elsewhere, remain as proofs of his skill. His thirty-seven etchings closely resemble the etchings of Guido Reni, and have, in several instances, been fraudulently sold with the mark of this master forged upon them.

CANTA'TA, in Music, is a name given to a vocal composition; but it is so very indefinite, that it in no way shows in what respect such composition differs from any other. In Zedler of Halle's great *Lexicon*, the C. is defined as a 'long vocal composition, the text of which is Italian,' &c.; while in Sulzer's *Theorie der Schönen Künste*, it is said to be 'a short piece of vocal music of a pathetic nature,' &c. The C. is always more extended and wrought out than the simple song, and consists of different movements.

CANTEE'N, is a refreshment-house in a barrack, for the use of the soldiers. The chief articles of food are supplied to the troops direct by the government; but wine, malt liquor, and small grocery-wares, the soldier is left to buy for himself; and the C. is, or is intended to be, a shop where he can make these purchases economically without the necessity of going beyond the precincts of the barrack. No soldier is obliged to buy anything at the C.; he may lay out his small sums elsewhere if he prefer. Formerly the canteens were under civilians called C.-tenants, and spirits were sold. Between the years 1836 and 1845, it was found that, among 112 canteens in the United Kingdom, the rent and head-money paid varied from £4 per annum (one at Guernsey) to £1344 per annum (one at Woolwich); they brought in collectively to the government about £70,000 annually. Great intoxication having resulted from the sale of spirits at the canteens, the War Office prohibited such sale in 1847; as a consequence, the rents had to be lowered to the extent of £20,000 in the following year, the canteeners finding their profits much reduced. The rent paid was found to be injurious to the soldiers, who were charged higher prices within the barrack than without, and who were thence driven to places where dangerous temptations are at hand. The results of this system being undeniably bad and demoralizing, the War Office now makes the canteen a regimental establishment, controlled by a committee of officers and with a C.-sergeant as salesman. Pensioned non-commissioned officers may be appointed C.-sergeants. The profits are applied for the benefit of the men of the corps.

In French barracks, the C. is a sort of club-room for the whole regiment. The cantineer is a non-commissioned officer, who acts merely as an agent for all, selling the liquors and commodities at prime cost.

CANTEEN, besides its application to a room or building, is a name also given to a vessel used by soldiers to contain whatever beverage may be obtainable on the march or in the field. It is sometimes of tin, sometimes of wood. In the British army, the C. is a tin vessel for holding soup, &c.; the lid is fitted with a folding handle, and can be used as a small frying-pan. It is carried by the soldier on the march.

There is still another use of the word C., as a name for a leathern or wooden chest, divided into compartments, and containing the plate and table-equipage for a military officer when on active service.

CA'NTERBURY, a municipal and parliamentary borough, a county by itself, a cathedral city, and seat of the metropolitan see of all England, in East Kent, on the Stour, 56 miles east-south-east of London, on the high road from London to Dover. The distance from London by the South-Eastern Railway is 81 miles; by the London, Chatham, and Dover line, about 60. It stands on a flat between hills of moderate height. It has little manufacture or traffic. The chief trade is in corn, wool, and hops. Pop. (1871) 20,962; (1881) 21,701. Many work in the hop-grounds. C. was wont to return two members to parliament; but it was disfranchised for seven years from 1883 on, as a penalty for bribery and corruption. It is noted for its brawn. Some remains of the walls (1¼ mile in circuit and 20 feet high) which formerly surrounded C., and one of the gates, still exist. Near the city wall is a large artificial mound, known as the Dane John (probably *Donjon*), and connected with this mound is a public garden, laid out in the end of the 18th c., from the top of which is a fine view of the country around. But the great glory of C. is its magnificent

Cathedral. When St. Augustine became Archbishop of Canterbury, 597 A.D., he consecrated under the name Christ's Church, a church said to have been formerly used by Roman Christians. Cuthbert, the 11th archbishop, 740 A.D., added a church to the east of this. In the course of ages, it received numerous additions, until it assumed its present magnificent form. Among those who helped to repair, enlarge, and rebuild it, were Archbishops Odo (940 A.D.), Lanfranc (1070), and Anselm (1093). In 1174 the choir was destroyed by fire, and in order to the rebuilding of it, a number of French and English artificers were summoned. Among the former was a certain William of Sens, and to him, a man of real genius, the work was intrusted. The church was rich in relics: Plegemund had brought hither the body of the martyr Blasius from Rome; there were the relics of St. Wilfred, St. Dunstan, and St. Elfege; the murder of Thomas Becket (q. v.) had recently added a still more popular name to the list of martyrs. The offerings at these shrines, especially the last, contributed greatly to defray the expenses of the magnificent work.

William of Sens did not, however, live to see its completion. He was succeeded by another William, an Englishman, and to

him we owe the completion of the existing unique and beautiful choir, terminated by the corona or circular chapel called Becket's Crown. Gervasius, a monk, who witnessed the fire of 1174, and has left an account of it, tells us that the parts of Lanfranc's church which remained in his time were the nave, the central and western towers, the western transepts, and their eastern chapels. In the 14th c., the nave and transepts were transformed into the Perpendicular Style of that period. The central tower called the Angel Steeple, was carried up (1486—1504) to about double its original height, also in the Perpendicular Style; it is 234 feet high, and 35 feet in diameter. The north-west tower was taken down in 1834; it was 113 feet high, and divided into five stories. The Norman plinth still remains on each side of the nave in the side aisles, and portions of Norman ashlaring may still be seen about the transepts outside the west wall, and on the east piers of the great tower. The indiscriminate use of the 'Round' or 'Norman,' and the 'Pointed' or 'Early English' arch, is also a very striking feature in the eastern part of the building. The Lady Chapel, now called the Dean's Chapel, stands on the north side of the church, and was built in 1468; the roof is a fan-vault. The north transept is called the Martyrdom, for here took place the murder of Becket, on Tuesday, December 29, 1170. Fifty years later, his remains were translated from the crypt to a shrine in the newly erected Trinity Chapel, eastward of the choir. About the year 1500, the yearly offerings at this shrine amounted to £4000; but they had then declined much in value. A curious mosaic pavement still remains in front of the place where the shrine stood, and the stone steps which led up to it are worn by the knees of countless pilgrims; but the shrine itself was demolished in 1538, and the bones of the saint burned by order of Henry VIII. In 1643, the building was further 'purified,' as it was called, by order of parliament. Still very many most interesting monuments remain—such as the tombs of Stephen Langton; that which is commonly, but wrongly, supposed to be the tomb of Archbishop Theobald; with those of the Black Prince, of Henry IV., of Archbishops Maphan, Peckham, Chicheley, Courtenay, Sudbury, Stratford, Kemp, Bourchier, Warham, and of Cardinal Pole. The total exterior length of the cathedral is 545 feet, by 156 in breadth at the eastern transept. The crypt is of greater extent and loftier —owing to the choir being raised by numerous steps at the east end—than any other in England.

The Archbishop of C. is primate of all England, metropolitan, and first peer of the realm. He ranks next to royalty, and crowns the sovereign. His ecclesiastical province includes all England, except the six northern counties. Among his privileges, he can confer degrees in divinity, law, medicine, and music. His seats are at Lambeth and Addington Park. He is patron of 149 livings, and has an income of £15,000 a year. There are fourteen old churches in C., mostly of rough flint, and containing fragments of still older structures. St. Martin's Church stands on the site of one of the 7th c., and is partly built of ancient Roman brick and tile. Attached to the cathedral is a grammar school, remodelled by Henry VIII. Part of St. Augustine's Benedictine Abbey still remains, with its fine gateway, near the cathedral. It occupied, with its precincts, sixteen acres. The old buildings have lately received large modern additions, in order to fit them for the purposes of a missionary college in connection with the Church of England. Another recent institution for education is the Clergy Orphan School, which occupies a conspicuous position on St. Thomas's Hill, about a mile out of the city. The ruins of a Norman castle, 88 by 80 feet, the third in size in England, stands near the city wall. C. stood, in Roman times, at the union of two Roman roads from Dover and Lympne, the chief seaports of the Romans. C. was the capital of Kent, and the center from which England was Christianized. St. Augustine, the apostle of England, sent by Gregory I., was the first archbishop, and baptized King Ethelbert of Kent. C. was the Saxon *Caer Cant*, City of Kent, and capital of the kingdom of Kent. The Danes in the 9th, 10th, and 11th centuries often ravaged and burned the city. Henry VIII. confiscated the treasures of the cathedral, and Edward VI. levied fresh exactions from it. The cathedral suffered much in the parliamentary struggles, but it has since been repaired.

CANTERBURY, now a provincial district of New Zealand, in the South Island; but till 1876 a province, with Christchurch as its capital, and Lyttleton as its port. The district was settted in 1850 by the Canterbury Association, a society of peers, bishops, and commoners interested in the colonization of New Zealand. It has a coast-line of about 200 miles, and is well watered by numerous rivers. Coal (in abundance), iron-ore, fire-clays, and quartz have been discovered in the province, and several coal-mines are in operation. On the eastern side of the great range of hills are the far-famed Canterbury Plains, the great sheep district of the colony—'three millions of acres rolling back in gentle rise forty miles, to the foot of the central highlands, watered by twenty rivers, and spreading north and south further than the eye can reach.'

The natural pastures of C. are very fine; and to this circumstance is mainly due the rapid advance in prosperity of the country. In 1881, wheat occupied 208,561 acres estimated to yield 4,915,298 bushels; oats, 89,280 acres, yielding 2,406,476 bushels; barley, 28,640 acres, yielding 732,345 bushels; potatoes, 6264 acres, yielding 29,112 tons. In 1881, the pop. (91,922 in 1878) had increased to 111,049: area broken up and under crop 1,307,847 acres; the total area of C. being about 13,000 sq. miles.

CANTERBURY BELLS. See CAMPANULA.

CANTHARE'LLUS. See FUNGI, EDIBLE.

CANTHA'RIDINE. See CANTHARIS.

CAN'THARIS (Gr. a small beetle, plural *Cantha'rides*), a genus of insects of the order *Coleoptera*, section *Heteromera*. See COLEOPTERA. It belongs to a family called *Trachelides*, or necked beetles, the head being separated from the thorax by a distinct neck or pedicle, and forms the type of a subdivision of that family called *Cantharidiæ*, many of the species of which possess blistering properties analogous to those of the common BLISTERING FLY, SPANISH FLY, or BLISTER BEETLE (*C. vesicatoria*). This insect, the best known and most important of the genus, is about an inch long; has a large heart-shaped head, rather broader than the thorax; thread-like antennæ three times longer than the head; a nearly quadrangular thorax; and soft elytra (wing-covers) concealing the abdomen, and of equal breadth throughout. It is of a bright glossy green color. The common Blistering Fly is found in the south of Europe, and in the south of Siberia. It is abundant in Italy, Sicily, and Spain, in the south of France, and in some parts of Germany and Russia. It is rare in England. The larva is not well known. The perfect insect feeds on the leaves of the ash, privet, lilac, elder, and honeysuckle; and rests on them during the night, the day being its time of activity. It is therefore taken by beating the branches of the trees in the morning or evening, when it is comparatively lethargic, a cloth being spread below to receive the insects as they fall. The gathering of *Cantharides* takes place, in the south of France in the month of May. It requires great caution to prevent injury to those who engage in it, the insects emitting a volatile substance with a strong smell, which causes inflammation of the eyes and eyelids, convulsive sneezing, and irritation of the throat and bronchial-tubes nor can they be handled without danger of blistering.

Those who collect them, therefore, generally wear gloves and veils. Unpleasant effects have been exeprienced from even sitting under trees on the leaves of which cantharides were numerous. Various methods are employed for killing cantharides when they have been taken; the cloths containing them are very generally immersed in hot vinegar and water, and they are afterwards carefully dried; sometimes they are killed by the vapor of vinegar, and sometimes by oil of turpentine. Unless kept with great care, they soon begin to lose their active properties, although, in stoppered bottles, they remain fit for use for years. They are very liable to be injured by mites, and afford a favorite food also to a kind of moth and to some other insects. They are imported into Britain from the south of Europe, and also from St. Petersburg.

The active principle of the blistering flies is *cantharidine*, which possesses such powerful blistering properties, that $\frac{1}{100}$th of a grain placed on the lip rapidly causes the rise of small blisters. Administered internally, blistering flies cause heat in the throat, stomach, intestines, respiratory organs, &c.; and if in large doses, they give rise to inflammation of a serious nature, and sufficient to cause death. Externally, they are employed as a *blistering agent*. There are various medicinal preparations of blistering flies, such as *Vinegar of Cantharides*, obtained by macerating blistering flies in acetic acid; *Tincture of Cantharides*, procured by digesting blistering flies in proof-spirit, &c.; but that most commonly employed is *Plaster of Cantharides* or *Blistering Plaster*, obtained by mixing equal parts of blistering flies, yellow wax, resin, and lard. See BLISTER.

CA'NTICLES, a word which literally signifies songs, but which is specially applied to a canonical book of the Old Testament, called in Hebrew *The Song of Songs*—i. e., the most beautiful song. The author is commonly supposed to be Solomon, and in the rich luxurious splendor of its coloring, it admirably harmonizes with the 'golden time' of that magnificent monarch. The theme which it celebrates is love; but what kind of love, whether earthly or spiritual, is a question that has perplexed biblical critics. The oldest interpretations are allegorical, and are either political or religious. The former of these, considered C. as the symbolical expression of a deep longing for the reunion of the kingdoms of Judah and Israel; the latter, of the love of God for his chosen people, the Jews. The religious interpretation passed over from Judaism to Christianity, and assumed a new aspect in consequence. Origen found the Beloved Bridegroom in Christ, and the Bride in the Church of the believing soul.

Only among the theologians of the Syrian school do we find an effort made to adhere to more intelligible principles of interpretation, but the 'mystical view' obtained the upper hand, and has continued to be the predominant view of the poem amongst orthodox theologians. For a while an attempt was made to distinguish between a primary and a secondary sense, both more or less directly present to the mind of the author; but modern scholarship in the main contents itself with endeavoring to fix the primary or literal meaning. Nor is this an easy task. Some commentators hold, for example, that C. is an anthology of detached idyls; others argue that it is a dramatic unity composed of connected parts. Ewald has done much to establish the latter view. Ewald's followers hold that the poem was written about the middle of the 10th century B.C. in the northern kingdom of Israel, and conceived in a spirit of hostility against the luxurious court of Zion. Solomon, the type of a sensual monarch, has carried off to his harem a northern shepherd maiden, who in the poem appears surrounded by the ladies of his court. The king fails even by the proffer of honorable espousals to overcome the maiden's fervent attachment to her shepherd lover in the north country, and wholly abashed, ceases to press his suit. Finally, true and chaste love triumphs in the union of the peasant lovers.

CANTI'RE, or KINTY'RE (Gaelic, headland), a long narrow peninsula of Argyleshire, running north and south between Arran Isle and the Atlantic, and united at the north end with the mainland of Scotland by the isthmus of Tarbet, a mile broad between East Loch Tarbet, a small loch or bay of Loch Fyne, and West Loch Tarbet. It is 40 miles long, and, on an average, 6½ broad. The surface is much diversified by low, undulating, moorish hills, with many lochs. The highest point is Bennear, 1515 feet. It contains much cultivated land. The north four-fifths of C., and the south-west corner round the Mull, or promontory, of Kintyre, consist chiefly of mica slate. Old red sandstone occurs on the south-east shore. Coal is found between Campbelton and the west coast. A light-house, 297 feet above the sea, stands on the Mull of Kintyre. C. includes 10 parishes. Pop. about 18,000. Campbelton (q. v.) is the chief seat of population. C. was in ancient times peopled by Picts and Celts more densely than the rest of Scotland. The Scots from Ireland subdued it in 210 A.D., were expelled from it in 446, but returned in 503 under Fergus, the first Scottish king, who fixed his seat at Campbelton. Kenneth II. (MacAlpine), on defeating the Picts in 843, removed to Forteviot. From the 8th to the 12th c., C. was occupied by Northmen from Scandinavia, and afterwards by the Macdonalds of the Isles, and more lately by the Campbells. Many burying-grounds and small ruined chapels or monasteries in C., show its former populousness. Near these chapels, and in the villages, are many high, upright slate crosses, with rude figures and inscriptions on them. C. contains many ancient watch or ward forts often vitrified.

CANTO FERMO, in Church Music, means plain song, or choral song in unison, and in notes all of equal length. Its introduction into the Christian church is attributed to Pope Gregory the Great, before the invention of the modern notation. See also GREGORIAN TONES.

CA'NTON. In Heraldry, the C. occupies a corner of the shield, either dexter or sinister, and in size is the third of the chief. It is one of the nine honorable ordinaries, 'and of great esteem.'

CANTON (from the Fr. *canton*, a corner, a district; Gr. *kante*, a point, corner, border; allied to Eng. *cantle*) signifies in geography a division of territory, constituting a separate government or state, as in Switzerland. In France, C. is a subdivision of an arrondissement.

CA'NTON, a large commercial city and port in the south of China, and capital of the province of Kwang-tung (of which the name C. is merely a corruption). It is situated in lat. 23° 7′ 10″ N., and long. 113° 14′ 30″ E., on the north side of the Chookeang, or Pearl River, in a rich alluvial plain, 32 miles from the sea. The river (the entrance to which is known by the name of the Boca Tigris, a Portuguese translation of the Chinese *Hu-mun*, 'Tiger's Mouth') is very picturesque. The city is surrounded by a brick rampart six miles in circumference, and entered by 12 gates, to each of which a guard-house is attached. It forms an irregular square, and is divided by a wall into the North and South, or Old and New City. The former is inhabited by the Tartar population, the latter by Chinese; and between the two, communication is maintained by four gates in the separating wall. The suburbs are very extensive, and in one of these, facing the river, stood the European factories or *hongs*. Most of the streets of C. are crooked and labyrinthine beyond description, but there are a small number of straight thoroughfares which make it easy enough for a stranger to find his way. As a rule, a tolerably straight street leads from the water-side to each gate of the city on the southern front, and is more or less prolonged through the interior. Many of the streets are devoted to distinct trades; thus, there is a 'Carpenter' Street, 'Apothecary' Street, &c. The Joss-houses, chiefly Buddhist Temples, are said to be 124 in number. The largest of these, on Honam Island, covers seven acres, and has 175 priests attached. It is called *Hae Chwang Sze*, or 'The Temple of the Ocean Banner.' Another famous structure is 'The Temple of the Five Hundred Gods,' situated in the western suburbs.

There are also several many-storied towers or pagodas, a Mohammedan mosque, founded about A.D. 850 by the Arabian voyagers, who then were accustomed to visit C., a foundling-hospital, an English and an American missionary hospital. Streets of wooden houses were formerly to be seen on the river-side, but these were swept away during the late quarrel with Yeh; and one large site that they occupied was walled in for the purpose of erecting new foreign factories, the old ones having been totally destroyed by fire. A very remarkable example of life upon the water is the boat-town of Canton. The total population of the city has been vaguely estimated at 1,000,000. The *climate* of C. may be pronounced healthy; though the heat from June to September is oppressive, and the thermometer sometimes, though rarely, stands at 100° in the shade. In ordinary years, the winter minimum is 42°, and the summer maximum 96°. The north-east monsoon commences in October, and is the prevailing wind till March, when the south-west monsoon sets in. Its average temperature is 70½° F., and the annual fall of rain 70·625 inches. The Cantonese are notorious for their turbulence and hatred of foreigners, and the European factories have more than once been attacked by infuriated mobs, who were only kept at bay by force of arms. This hostility may, however, be greatly due to the baneful influence of those in power; for here the government of the mandarins of the present Manchu Tartar dynasty appears to have reached its maximum of corruption and barbarity, and was fitly represented by the notorious Yeh, late governor-general of Kwang-tung and Kwang-se. The author of *Twelve Years in China* gives us some startling facts illustrative of mandarinic rule in this part of China. After the defeat of the Triad rebels, who besieged C. in 1844—1845, it is estimated that 1,000,000 of people perished in the province.

The admirable situation of C. for conducting traffic explains how, from an early period, it was a favorite port with foreign merchants. The Arabs, as has been said, made regular voyages hither as early as the 9th century. The Portuguese found their way to it in the 16th century, and were followed by the Dutch a hundred years later. These in turn were overtaken and supplanted by the English before the close of the 17th century, and an immense trade was carried on by the agents of the East India Company. Their monopoly ceased on the 22d April 1834. Since that date the proceedings of the C. government officers have originated two wars with the British. The city was captured by the allied French and English forces December 1857, and continued to be garrisoned by them till October 1861. See CHINA. After the treaty of Nankin (signed Aug. 29, 1842), C. was known as one of the five ports; Amoy, Foochow, Ningpo, and Shanghai having also been thrown open to foreign commerce.

The chief exports from C. are tea, silk, sugar; the chief imports, raw cotton, piece-goods, opium, metallic wares, &c. 'War and rebellion' (say the authors of the *Treaty Ports of China and Japan*, Lond. and Hong-kong, 1867), 'the opening of Hankow as a shipping port for tea, and, above all, the proximity of Hong-kong and Macao to the delta of the Canton River, with its unrivalled facilities for smuggling, have robbed C. of the pre-eminence it so long enjoyed in commercial prosperity.' A comparison of the value of the exports and imports for the succeeding twelve years shows, however, that the city has steadily recovered ground. In 1877, the total value of exports was £3,686,000; of imports, £1,116,000, exclusive of treasure. In 1878, the exports were £4,332,094, and the imports £2,936,393. The revenue for 1877 was £318,156; for 1878, £280,206; and in the latter year, 1718 vessels, of 1,403,139 tons, entered and cleared the port. The number of Chinese conveyed between C. and Hong-kong for the same year was 650,000, and 26,000 to Macao. The total taxable trade of the province was estimated by H.M. consular agent, in 1878, as amounting to £25,000,000.

See Mrs. Gray's *Fourteen Months in Canton* (1880); Dr. Gray's *China* (1878); *The Middle Kingdom*, by Dr. S. W. Williams; *The Chinese*, by Sir John Davis; Meadows's *Chinese*; *Twelve Years in China* (Edin. 1860); *Report of the Missionary Hospital in the Western Suburbs of Canton*; *Treaty Ports of China and Japan* (Lond. and Hong-kong, 1867).

CA'NTONMENTS, in the general operations of European armies, are temporary resting-places. Many circumstances, especially the state of the weather and the supply of food, influence a general in determining whether to go into C. or to encamp, in the intervals between active operations; or he may take the former course during an armistice. The quartermaster-general previously examines the district, and determines how many men and horses

to place in each village; arrangements are also made for a main guard, cavalry pickets, alarm-posts, road-barricades, lines of sentries, mounted orderlies, &c., to guard against a sudden surprise from the enemy. In C. the men are not generally under canvas, as described in CAMP.

In India, C. are *permanent* places, regular military towns, distinct and at some little distances from the principal cities. If on a large scale, such a cantonment contains barracks for European cavalry, infanty, and artillery; rows of bungalows or houses, each enclosed in a garden, for the officers; rows of huts for the native soldiery; magazines and parade-grounds; public offices and buildings of various kinds; and a bazaar for the accommodation of the native troops. During the revolt in 1857—1858, most of the outbreaks began in the cantonments. It was in the cantonment outside Cawnpore that Nana Sahib commenced his treachery.

CANTONNÉE, in Heraldry. When a cross is placed between four other objects, e. g., scallop shells, it is said to be cantonnée.

CA'NTON'S PHO'SPHORUS, or PYRO'PHORUS, is obtained by heating in a close vessel 3 parts oyster-shells and 1 part sublimed sulphur, when the sulphuret of calcium (CaS) is formed, which takes fire when exposed to or thrown into the air.

CA'NTOR. See PRECENTOR.

CANTU, CESARE, one of the best of modern Italian authors, was born September 5, 1805, at Brescia, in Northern Italy, and was educated at Sondrio, where he was appointed professor of *belles-lettres*. Having been imprisoned for the offence of expressing liberal tendencies in a historical work on Lombardy, C. spent his leisure hours in describing the sorrows of a prisoner in the form of a historical romance, *Margherita Pusterla* (Florence, 1845). C. has also written several religious hymns and songs, which have become popular; but his great work is the *Storia Universale* (35 vols., Turin, 1837—1842). His *History of Italian Literature* appeared in 1851; *History of the Last Hundred Years*, 1852; *History of the Italians*, 1859; and *Milano, Storia del Popolo e pel Popolo*, 1871.

CANTU'RIO, or CANTU', a town of Northern Italy, 5 miles south-east of Como. It is situated in the midst of a rich district, has a church with an elegant tower, which served as a beacon during the middle ages, and manufactures of iron-wares. Pop. 5500.

CANUN, a Turkish musical instrument, strung with gut-strings; is played on by the fingers, on which are thimbles of tortoise-shell, pointed with pieces of cocoa-nut, forming plectra for striking the strings with. The C. is a favorite instrument with the ladies in seraglios, many of whom produce very pleasant music and harmony on it.

CANUTE, or CNUT, succeeded to the rulership of the Danes in England on the death of his father, Swein or Sweyn, and was by them proclaimed king of England. On the death of Ethelred, he shared the sovereignty with Edmund Ironside, who ruled over the south, while C. was monarch over the north of England. The sudden decease or assassination of Edmund made C. sole ruler in 1017, and he continued to reign until his death, in 1035 or 1036.

His rule was marked at first by cruelty, but when all who were likely to interfere with his power had been disposed of, he exhibited great mildness and justice, combined with talent and judgment. The Anglo-Saxons, whose complete subjugation he had effected, did not feel their chains: they had experienced no such good government since the time of Alfred and Athelstane. He was easily accessible to all his subjects; and won the hearts of the people by his lôve for song and ballad, and his liberal patronage of gleemen. One verse of an English song written by C. is still extant. As soon as English affairs were settled, C. superseded his brother Harold as king of Denmark; and in 1028 he extended his dominion over Norway—becoming thus one of the most powerful princes of Europe. In his latter years he was devout.

CA'NVAS, regarded from an artist's point of view, is the principal material upon which oil-paintings are made. Two kinds are prepared for this purpose, of which the best is called *ticking*. Before it is put into the artist's hands, it is usually *primed*, or grounded (see GROUND) of a neutral gray, or other tint, as he may direct. Certain sizes of C. being in greater requests than others, are kept ready stretched on frames. Those used for portraits are known by the names of *kit-cat*, which measures 28 or 29 inches by 36; *three-quarters*, 25 by 30 inches; *half-length*, 40 by 50; *Bishop's half-length*, 44 or 45 by 56; *Bishop's whole length*, 58 by 94.

CANVAS, SHIP'S. See SAIL, SAILCLOTH.

CANZO'NÉ is the name of one of the oldest and most prized forms of the Italian lyric. The word is borrowed from the Provençals, whose *cansós* or *chansós*, however, were not restricted to any precise form, but were simply verses intended to be sung. The Italian writers first attempted to regulate the wayward and arbitrary character of the Provençal *cansós*; Dante, and subsequently Petrarch, being especially successful. The *Canzone Petrarchesca* or *Toscana* was any considerable lyrical poem, composed of stanzas exactly corresponding to one another in number of lines, measure, and position of rhymes, and which customarily closed with a short stanza. About the end of the 16th c., the Italian writers began to deviate from the strict form of the Petrarchian canzone. Torquato Tasso and Chiabrera are the most notable names in the new movement. The most of the canzones of the latter—called by their author *canzonette*—are written in short lines and stanzas, the position of the rhymes being also completely arbitrary.

CAOU'TCHOUC, GUM ELA'STIC, or INDIA RUBBER, a substance which, on account of its peculiar properties, is extensively used in the arts, and of which the use is continually and rapidly increasing. It is one of the products of the wonderful chemistry of nature, being found in the milky juices of plants, and most abundantly in the natural orders *Moraceæ*, *Artocarpaceæ Euphorbiaceæ*, *Apocynaceæ*, *Asclepiadaceæ*, and *Papayaceæ*. It exists in the milky juice of plants growing in temperate climates; but it is only in tropical and subtropical countries that it occurs so abundantly as to be of economical importance. Its uses to the plants in which it is elaborated have not been ascertained; and the conjectures of theorists on this subject are not supported by arguments sufficient to give them much probability. In the milky juice, the C. is diffused in the form of minute globules, and not, strictly speaking, in solution; and when the juice is extracted from the plant, and allowed to stand for a short time, these globules separate from the watery part of it, and form a sort of cream on the top, or, in close vessels, appear throughout it as a flaky coagulum. Caoutchouc, as well as some of its useful and curious properties, must have been known in America at a very early period, because balls made of the *gum of a tree*, lighter and bouncing better than the wind-balls of Castile, are mentioned by Herrera when speaking of the amusements of the natives of Hayti, in his account of Columbus's second voyage. In a book published in Madrid in 1615, Juan de Torquemada mentions the tree which yields it in Mexico, describes the mode of collecting the gum, and states that it is made into shoes; also that the Spaniards use it for waxing their canvas cloaks to make them resist water. More exact information regarding caoutchouc was afterwards furnished by M. de la Condamine, who visited South America in 1735, but it is curious to note that some of the purposes for which india-rubber is most extensively used at the present time are the same as those for which it was employed in South America nearly three centuries ago. It was at first known by the name of *Elastic Gum*, and received that of india-rubber from the discovery of its use for rubbing out black-lead pencil marks, for which purpose it began to be imported into Britain in small quantities about the end of last century, being much valued by artists, and sold at a high price. Even before this time its employment for the manufacture of flexible tubes for the use of surgeons and chemists had been successfully attempted; but the expensive character of the solvents then known for it, prevented its general application to any purpose in the arts. It was not till 1820 that its employment began to extend beyond the rubbing out of pencil marks, although in the meantime the quantity imported had considerably increased.

Its application to the manufacture of water-proof cloth first gave it commercial importance. About the same time a method was discovered of fabricating articles of various kinds by casting caoutchouc in moulds. Its elasticity and flexibility, its insolubility in water, and its great impenetrability to gases and fluids in general, have now been found to adapt it to a great variety of uses; but for by far the greater number of its applications it is now employed in the vulcanized state.

The caoutchouc of commerce is obtained most largely from South America, but considerable quantities are also procured from British India, the Indian Archipelago, the West Coast of Africa, and the Mauritius. During the year 1872, the actual imports of this material into Great Britain were:

	Cwts.
From Brazil	68,143
" New Granada, Ecuador, and Central America	16,390
" British India	13,855
" Strait Settlements	15,296
" West Coast of Africa	14,135
" Mauritius	10,433
" Other Countries	18,862
Total	157,114

In 1852 the total imports were only 15,269 cwts.; in 1862, 59,703 cwts.; and in 1876, 157,509 cwts. The average annual yield of Brazil for the five years preceding 1871, according to a table sent from that country to the Vienna Exhibition of 1873, was about 5,000,000 kilogrammes. The value of the 169,587 cwts. of C. imported in 1880 was £2,387,947.

Brazilian caoutchouc is the product of several species of *Siphonia* (natural order *Euphorbiaceæ*), but chiefly *Siphonia elastica*.

Bates says that 'this tree is not remarkable in appearance; in bark and foliage it is not unlike the European ash, but the trunk, like that of all forest trees, shoots up to an immense height before throwing off branches.' The caoutchouc of New Granada, Ecuador, and Central America is obtained from *Castilloa elastica* (nat. ord. *Artocarpaceæ*), that of East India from the beautiful glossy-leaved *Ficas elastica* (nat. ord. *Moraceæ*), now so common as an ornamental plant in our conservatories, that of Borneo from *Urceola elastica*, and that of Western Africa from several species of *Landolphia*, and also *Ficus*. Species of *Vahea*, *Willughbeia*, *Euphorbia*, and other genera likewise yield useful varieties of caoutchouc, and the sources of some kinds are unknown.

Caoutchouc is sometimes collected by cutting the trees down, but much more usually by making simple incisions in the trunks. The method of collecting and preparing the liquid caoutchouc is thus described in a work recently published at Rio Janeiro. In a few hours, the juice which flows out fills the basins, made of large leaves and plastic clay, which are adapted to the lower part of the tree. It is then poured into other vessels of various shapes; in a short time it becomes thickened, and solidifies in consequence of the evaporation of the liquid part.

In order to dry it completely, the practice is to expose it to a gentle heat; for this purpose it is suspended over a brasier lighted with wood, and the flame maintained with the fruits of auricuri, in such a manner that it may receive the smoke, hence the blackish color which with the caoutchouc of commerce generally presents. Whilst it is liquid, it is fashioned by means of moulds, according to the purposes to which it is destined. An attempt has recently been made to import the juice of the tree, and subject it to the drying process in this country, but little has as yet been imported into Britain. The characters of the juice are, that it possesses the consistence of cream, has a yellow color, is miscible with water, but not with naphtha or other of the solvents of ordinary caoutchouc, and its specific gravity varies from 1·02 to 1·41—ordinary caoutchouc being 930. The juice contains about 30 per cent. of caoutchouc. When heated, it coagulates (as the glaire of egg does), owing to the presence of albumen; and exposed to the air, it dries up, and leaves a film of caoutchouc. In the preparation of pure caoutchouc, the natural juice is mixed with five or six times its bulk of water, and then either heated or mixed with common salt or hydrochloric acid, when the pure caoutchouc separates as a white opaque substance, which becomes transparent when dry. Pure caoutchouc is a carbo-hydrogen, its composition being carbon 87·5 and hydrogen 12·5.

Para caoutchouc is the best, and commands the highest price in the market. The other South American kinds are of medium quality. East Indian rubber—naturally a fine quality—is too often injured by adulteration and careless collecting. The poorest kind is the West African, being clammy, offensive in its odor, and only slightly elastic.

Commercial C. is a tough fibrous substance, possessing elastic properties in the highest degree. Reduced to the temperature of freezing water (32° F., it hardens, and in greater part, if not entirely, loses its elasticity, but does not become brittle. When heated, as by placing in boiling water, it softens, and becomes very much more elastic than at ordinary temperatures, though it does not in any degree dissolve in the water. If suddenly stretched to seven or eight times its original length, it becomes warm; and if kept in this outstretched form for several weeks, it appears to lose in great part, its elastic properties, and in this condition is readily cut into those thin threads which are used in the *elastic* put in gloves, bonnets, &c., and the elasticity of which is readily renewed by the application of gentle heat. Of late years, however, elastic thread is usually prepared with vulcanized rubber.

Commercial caoutchouc is insoluble in water and alcohol, is not acted upon by alkalies or acids, except when the latter are concentrated, and heat is applied; but is soluble in ether, chloroform, bisulphide of carbon, naphtha, petroleum, benzol, and the essential oils of turpentine, lavender, and sassafras. Many other essential and fixed oils, when heated with C., cause it to soften, and produce thick glutinous compounds, especially linseed oil, which, in the proportion of 1¼ lb. of the oil to 4 oz. C. in thin strips or films, yields a solution, which, when strained, is of great use in rendering shoes, cloth, &c., waterproof. When heated to 248° F., C. fuses; and at 600° it is volatilized, at the same time undergoing decomposition, and yields a liquid called *Caoutchoucine* or *Caoutchisine*, with the specific gravity 680, and possessing great solvent powers over C. and other substances. Caoutchoucine is necessarily very expensive, and hence its use is limited; but cordage steeped in it and dried acquires great supple and tenacious properties, and cloth saturated with it, and dried by exposure to the air, becomes water-tight.

In the employment of C. as a branch of manufacture, the first operation is the purification of the crude material as it comes from abroad. The crude material is cut into minute shreds, and washed by powerful machinery, immersed in water, which releases the solid impurities, and the pure C. being removed, is placed on iron trays, and dried in a room heated by steam. The material then undergoes a process of kneading under very heavy rollers, which causes the adhesion of the various pieces of C. to each other, and ultimately yields a mass or block of C. in which the condensation is so perfect that all air-holes, and other cells and interstices, disappear. The block of C. is then cut under water by powerful knives or shears into sheets, from which the pieces sold by stationers may be shaped out, or from which C. bands or thread may be obtained. In the manufacture of square threads, mere cutting is had recourse to; and the delicacy of the operation may be understood when it is stated that one pound of C. will yield 32,000 yards of thread. The round thread elastic is prepared from C. which has been treated with about double its weight of bisulphide of carbon, containing about 5 per cent. of alcohol, which yields a soft material resembling in consistence bread-dough or putty; and this being squeezed through a series of small holes, is obtained in minute round threads, which are first received on an endless piece of velvet, and ultimately on an endless web of common cloth 500 to 600 yards long, during the transit of the threads across which, the solvent or bisulphide of carbon evaporates, and leaves the caoutchouc. When it is wished to weave these threads into cloth, they are wound upon bobbins, taking care to stretch the C. as much as possible, so as to deprive it, for the time being, of its elasticity; and after it has been woven into the cloth, a hot iron is passed over the fabric, and immediately the C. resumes its elasticity.

In the manufacture of water-proof clothing, or Mackintoshes (see MACKINTOSH), which was the first application of rubber on a large scale, the caoutchouc is made into a solution with spirits of turpentine, or other solvent, and spread upon the cloth; when thus coated, the fabric is pressed between heavy rollers. This variety of water-proof cloth has now, however, been almost entirely superseded by another kind made with vulcanized rubber, which we shall notice presently.

Vulcanized Caoutchouc.—Pure india-rubber is now used only to a limited extent in the arts, but it is applied in the vulcanized state to an almost endless variety of purposes. The remarkable change which caoutchouc undergoes when mixed with sulphur and heated, according to circumstances, from 240° to 310° F., was discovered by Charles Goodyear, in America, in 1843, and independently, about the same time, by Mr. Thomas Hancock, in England. In the process of vulcanizing, the rubber, as a preliminary step, is either torn into shreds or crushed into thin pieces by machinery, and afterwards washed. There are two principal kinds of vulcanized rubber, one hard and horny in its texture, the other soft and elastic. In the case of the former, the caoutchouc is mixed with about one-third of its weight of sulphur, and heated for several hours, the temperature finally rising to fully 300° F. For the soft kind of vulcanized rubber, on the other hand, a much smaller proportion of sulphur is required—namely, from 2½ to 10 per cent., and the heat to which it is subjected in the vulcanizing chamber is considerably less. Usually, too, with this latter kind, the articles are made before the rubber is heated. The sulphur is commonly added in the ground state, but sometimes the rubber is treated with some solution containing this element, such as the bisulphide of carbon.

Although sulphur is the only essential ingredient required for vulcanizing rubber, yet other substances are usually added. Thus, in the case of machinery belting, pipes, and some other articles, the silicate of magnesia (French chalk) is used to prevent adhesiveness. Litharge, or carbonate of lead, again, is frequently mixed with the rubber and sulphur for certain purposes; but there is really a long list of materials more or less used in preparing different qualities of vulcanized caoutchouc, each manufacturer using mixtures, the exact nature of which he is careful not to divulge. Asphalte, tar, lampblack, whiting, rosin, sulphide of antimony, and ground cork are some of the ingredients most commonly employed in this way. Belting for machinery, and some kinds of tubing, are formed of alternate layers of canvas and vulcanized rubber.

Natural caoutchouc, as already stated, is elastic, cohesive, impervious to gases, insoluble in water, and resists many chemical re-agents; but it loses its elasticity by cold, softens by heat, and is destroyed by many fixed oils. After being vulcanized, caoutchouc has its elasticity greatly increased, is not hardened by cold, and does not soften or become viscid at any temperature short of its absolute decomposition. Besides, it is barely soluble in turpentine, naphtha, and the other solvents of pure caoutchouc; nor does oil readily penetrate or soften it.

It would be a hopeless task to attempt to specify the many useful purposes to which vulcanized caoutchouc is applied, even if we had the space to spare. From the year 1843, when it was first made, to the present time, the various patented applications of it must be two or three thousand in number. The mere abridgments of the specifications connected with this material, issued by the English Patent Office, form a thick volume. Under the head

GOLOSHES, will be found a brief description of the process of making india-rubber shoes. Water-proof coats are now made in a similar way, the mixture of rubber and vulcanizing materials being pressed on the surface of any suitable woven fabric by heated iron rollers in a calender. The coats are then cut out and the various pieces put together, without sewing, by some solvent, such as turpentine, which makes the edges adhere. They are afterwards heated in the vulcanizing chamber. Both coats and shoes of this material have, however, the objectionable property of preventing the escape of moisture from the skin. Belting, buffers, wheel tires, washers, valves, pipes, fire-hose, and other engineering appliances, form a large branch of the rubber trade. For medical and surgical purposes, many articles are made of this material. Of such an apparently trivial matter as vulcanized rubber thread, one English firm turns out about 3000 lbs. per day, and another single small article—namely, tobacco pouches—is made in another factory at the rate of 3000 per diem.

Hard vulcanized rubber, termed vulcanite, and sometimes ebonite, is made into a great many small articles, such as combs, chains, bracelets, boxes, penholders, paper-knives, knife-handles, buttons, &c., as a substitute for materials like horn, bone, ivory, and jet. As in the case of these substances it is formed into various objects by molding, cutting, carving, polishing, and other processes. Vast numbers of these articles are now sold, but some time must yet elapse before the quality of this material is thoroughly tested. The black color of vulcanite ornaments has still a tendency to turn gray, but the brittleness which was a fault of combs made of it a few years ago, seems to be overcome. With respect to objects of considerable size, vulcanite has been made into furniture, ornamental tiles, and even rails for railroads. A kind of vulcanite is now very largely employed as an insulator in electric cables, experience having shown that there are certain objections to gutta-percha being used for this purpose.

There are some useful applications of india-rubber in the liquid or semi-liquid state, which it is worth while to note; thus, when melted at 398° F., and mixed with half its weight of slaked lime, it forms a useful cement or lute, which can be easily loosened, but it will dry and harden if red lead is added. A very tenacious glue is formed by heating caoutchouc, coal tar, and shell-lac together. It forms an ingredient in some special kinds of varnishes, and it also improves the lubricating qualities of mineral oils, when a small quantity is dissolved in them.

In Great Britain there are six or eight large india rubber factories, each employing from 400 to 600 hands, besides a great number of smaller works. The manufacture of caoutchouc is also an extensive industry in the United States, and in some continental countries, especially France. According to an estimate made by M. Ballard in 1867, the annual French consumpt of raw india-rubber was then 180,000 lbs., the value of which in a manufactured state was fully £3,000,000. This would indicate that the industry is more largely developed in France than in England. In most india-rubber factories a large number of the work-people are females; and with respect to the operatives engaged in them generally, there is this peculiarity, that as no great skill is required on their part, employment in such works has proved quite a boon to many persons who have never learned a trade.

CAP, in Ship-building, is a strong, thick block of wood fixed near the top of each mast; it has a hole to receive the upper end of the lower mast, and another to receive the lower end of the topmast, with eyebolts to aid in hoisting the topmast. There is also a C. of smaller size at the point of junction between the topmast and the top-gallant-mast. When made of iron the C. is called a *crance*.

CAP. See PERCUSSION CAPS.

CAP OF MAI'NTENANCE, or DIGNITY, is a cap worn by noble and royal personages on certain state occasions. Such a cap was sent by Pope Julius II. to King Henry VIII., for writing his book against Martin Luther.

CAPA'CITY, LEGAL, is such a condition of individuals, in regard to their natural qualities and actual position under the constitution of the country as fits them for the application of the laws civil and criminal. Generally speaking, all persons have this legal capacity excepting *aliens*, persons *attainted*, *convicts*, *insane* persons, and to some extent also *infants*, *femmes*, *coverts* or married women, and persons under *duress*; see these heads. See also CONVEYANCE, CONTRACT, PLAINTIFF, PURSUER, DEFENDANT, SUIT.

CAP-À-PIE' (Fr. head to foot), in the military language of the middle ages, was applied to a knight or soldier armed at all points, or from head to foot, with armor for defence and weapons for attack.

CAPA'RISONED, in Heraldry. A war-horse completely furnished for the field is said to be caparisoned.

CAPE, in Geography, the extremity of a portion of land extending into the sea beyond the general line of the shore. On a low sandy coast, a cape generally forms an obtuse angle, being merely a change in the trending of the land. On rocky shores, capes usually form acute angles, and are here sometimes called points or promontories.

CAPE BRE'TON, a rocky island of irregular form in British North America, stretching in N. lat. between 45° and 47°, and in W. long. between 60° and 61° 30′. It is separated from the peninsula of Nova Scotia by Chebucto or Chedabucto Bay and the Gut of Canso, contains 3120 squares miles, with a population (1881) of 31,258. Its principal exports are pine, oak, birch, maple, fish, and coal. Though the island produces maize and other grains, yet it depends for its bread-stuffs chiefly on the United States. C. B., originally a French possession, was taken by the English in 1745; but being subsequently restored to France, it was again captured in 1758, and ceded in 1763. After having been for a time a distinct colony, it now forms part of the province of Nova Scotia. The towns are Sydney, Arichat, and Port Hood, the once famous Louisbourg, stripped of its fortifications, having become merely a village.

CAPE COAST CASTLE, the chief settlement of Great Britain in North or Upper Guinea, lat. 5° 5′ N., and long. 1° 13′ W. The place, as its name implies, is defended by the great castle near the water's edge, and by three small forts on the hills behind. C. C. C. was the capital of the Gold Coast until 1875; when Accra was made the seat of government, as being more healthy. Pop. 10,000.

CAPE COD, properly a narrow peninsula of Massachusetts, which, with a length of 65 miles, forms the south-east boundary of the great bay of that state. The northern extremity, marked by a revolving light 155 feet high above the level of the sea, is in lat. 42° 3′ 40″ N., and long. 70° 14′ 48″ W. It has been proposed to cut the neck of the peninsula by a canal.

CAPE HA'TTERAS, a dangerously low point of North Carolina, United States, in lat. 35° 14′ N., and long. 75° 30′ W. It forms the eastern extremity of the insular banks of the same name, projecting virtually into the Florida Stream, and marking the spot where the coast-line abruptly turns from the direction of north-east to that of due north.

CAPE HA'YTIEN (formerly called *Cape Français* and *Cape Henri*), a seaport town, of the island of Hayti, on its north coast, in lat. 19° 40′ N., long. 72° 54′ W. It is pleasantly situated on a small bay, partly encircled by hills, has wide and well-paved streets, and some handsome squares. A great portion of it, however is in ruins, the effects of the revolutionary wars at the end of last century. Safe anchorage is found within its harbor, which, however, is rather difficult of access. C. H. carries on considerable trade with the United States. Population stated at from 12,000 to 16,000.

CAPE HORN, or HOORN, the most southerly point of America, terminating an island of its own name, in the archipelago of T erra del Fuego. It is in lat. 55° 58′ 40″ S., and long. 67° 16′ W., having a perennially antarctic climate, and being in itself merely a detached link, bare and rugged, of the chain of the Andes. It was discovered by Schouten, a native of Hoorn in Holland, about 90 years later than the Strait of Magellan, and since then the course of navigation of sailing vessels has been round the cape instead of through the strait.

CAPE LA HAGUE, a promontory of France, forming the north-west extremity of the peninsula of Cotentin, in the department of Manche. It juts out into the English Channel, opposite the island of Alderney, and about 16 miles north-north-west of Cherbourg, and 50 miles south of St. Alban's Head, in Dorsetshire.

CAPE LA HOGUE, often confounded with Cape la Hague, is situated on the east side of the same peninsula. Here the united English and Dutch fleets defeated the French in 1692.

CAPE OF GOOD HOPE, popularly regarded as the most southerly promontory of Africa, though it is half a degree to the north of Cape Agulhas. The latter is merely a projection on a coast-line, which diverges inconsiderably from a parallel; but the former is really the turning-point from south to east on the voyage from Europe to India. This celebrated promontory is in lat 34° 22′ S., and long. 18° 29′ E., being the termination of Table Mountain, which, as it recedes towards the bay of its own name, rises from the height of 1000 feet above the sea to that of 3582. The Cape (for so it is called by way of eminence) was discovered and doubled by Diaz, a Portuguese navigator, as early as 1486—six years before Columbus, in aiming at the same goal by a different route, led the way to America. But it was only in 1497 that Vasco de Gama, realized the value of Diaz's discovery, by rounding it on his adventurous voyage from Lisbon to Calicut. The result was not merely to open a new channel for the traffic of the East, but it was also to transfer trading superiority from the republics of Italy to the states of Western Europe.

CAPE OF GOOD HOPE, a British colony, was so called from the cape on its south-western extremity. It was established by the Dutch in 1652, some attempts at a settlement having been previously made by the Portuguese. The former only intended it at first as an intermediate station between Holland and their East Indian possessions; and at first occupied only a small tract of ground on the slopes of Table Mountain, with some portion of the adjoining flats; but they had in their neighborhood scattered tribes of improvident natives, singularly feeble of purpose, and incapable of organization on a large scale. The tide of immigration set in from Holland, and when the country was finally taken possession of by the British in 1806 (there having been a brief occupation of it from 1796 till 1803), the Dutch had extended their dominion as far to the east as the mouth of the Great Fish River, and from that point in a waving line across the country to the west, a little south of Orange River.

In entering upon the government of this large territory, the British found themselves face to face with a race of a totally different sort from that of the purposeless Hottentot—a people styled Kaffirs, of the great Bantu stock, consisting of tall, athletic, finely formed men, of warlike dispositions, with an incurable propensity to steal from any one, provided he was not of their own tribe, and particularly so if he was a foreigner. The inevitable result was a succession of wars—those, namely of 1812, 1819, 1828, 1835—1836, 1846—1847, 1851—1852.

Cape Colony proper is bounded on the north by the Orange River and the Kei. But of late the area of this British possession has been greatly extended by the annexation of districts lying to the northward. Of these successive annexation the most important are that of British Kaffraria (see KAFFRARIA) in 1866; of Basuto-land, lying in the upper basin of the Orange River, in 1868; of two vast districts across the Kei called Fingo-land and Noman's-land, now called Griqua-land East (q. v.), in 1875; of Griqua-land West, in 1876; and of the Transvaal (q. v.) in 1877, restored to the Boers in 1881, though remaining under British suzerainty. The area of Cape Colony proper is 181,592 sq. miles, and its pop. in 1875, 496,381. The area of the whole colony, with the newly incorporated districts (but excluding the Transvaal), is estimated at 233,495 sq. m., and its pop. at 1,120,162.

The highest range of mountains within the colony is 9000 feet above the sea. The mountains keep at a distance from the coast-line of from 30 to about 100 miles, and receive different names in their course, such as the Stormberg, Sneeuwberg, Nieuwveld, Roggeveld, and Kamiesberg. Between this principal range and the sea on the east, there are two other ranges less continuous and regular.

South Africa being not far from the region of the trades, south-east winds prevail, especially in the summer-time; the only other wind that may be said to blow is that from the north-west, which prevails during the colder months. But whichever of these two winds predominates—the one bearing a supply of rain from the Indian Ocean, the other, if less frequent, more richly laden from a part of the Atlantic nearer the line than the country which it fertilizes—it fails to deposit its stores on the opposite side of the principal water-shed which crosses its path. Hence the curious fact of the transposition of seasons in the same latitude. As the harvest in such latitudes depends more on the supply of rain than anything else, people are reaping on the one side of the country whilst they are sowing and planting on the other. Certain parts of the country are liable to long-continued droughts, because while very heavy rain-falls take place, the rain is confined to a particular part of the year. The country, however, is admirably adapted for the storage of water. In many places one meets with the successive beds of dried-up lakes, with a narrow outlet at the lower ends, through which a periodic stream flows. By closing up this outlet, artificial lakes or dams may be formed to almost any extent, and of unlimited number; and from the steepness of the slope, the lands lower down admit easily of being laid under water.

As regards minerals, the diamond fields are in Griqua-land (q. v.), till recently beyond the limits of the colony, and in the Free State. In 1874, the lieutenant of West Griqua-land issued an order for the better management of diggings and mines of precious stones and minerals, in which he requires that miners shall have a certificate, dealers a license, and the mines be under official inspection. This ordinance created a great outcry against it by a great body of dealers; but it seems necessary that such protection should shield the weak and the dealer who wishes to trade according to recognized law. The discovery of gold lately caused a rush to the Transvaal: coal is said to abound in the Stormberg Mountains, but the only mineral which has greatly added to the wealth of the colony is the rich copper ore found in Namaqua-land.

There is in the colony almost a total want of navigable rivers, but the system of railways is rapidly extending. In 1880 there was a mileage of about 600 miles open for traffic, the existing lines being mainly connected with three systems—the Western, starting from Cape Town; the Midland, from Port Elizabeth; and the North-western, also from Port Elizabeth. The railways are all the property of the government. Direct telegraphic communication with Europe was established in 1879, by the East African submarine cable from Aden to Natal, and thence by the land-lines. The shipping at Cape Town is now secured by a break-water and docks. The same cannot be said of Port Elizabeth, East London, and the Kowie; but measures have been taken which, it is hoped, will protect these also from the fierce south-east winds.

This splendid country is at present occupied by an assemblage of very varied races. The Portuguese were the first Europeans who landed here. The Dutch are probably still the most numerous, notwithstanding the exodus to the Orange River Free State, prompted by the slave question. Next in number are the English, by whom some parts of the country, particularly in the east, are occupied almost exclusively. The French are also largely represented, many refugees having settled in it subsequently to the Revocation of the Edict of Nantes, but they are now nearly absorbed in the Dutch population. They were at first located principally in the west, where they introduced the culture of the vine, but their names are now found in almost every part of the land. There is also a considerable importation of Germans, who have been settled on the frontiers adjoining the Kaffirs for defensive purposes. As regards the colored inhabitants, large numbers of Kaffirs have been retained in the districts which they formerly occupied, and others have come into the country as shepherds and servants. There is a large number of people of Malay origin in and around Cape Town, and in towns on the east coast, who gain a livelihood as fishermen, porters, and the more laborious sorts of skilled labor. There are a few Mozambiqueres and Hottentots, besides a number of half-casts, to whom the name Africander properly belongs.

The constitution of the country, after several changes, was fixed in its present form, by an act passed by the colonial legislature in 1872, which provides for responsible government. The confederation of the South African colonies, so as to include Natal, has been long aimed at, but not yet accomplished. The organized part of the Cape Colony is divided into 7 provinces, and between 30 and 40 districts. There are two elective chambers, elected by colonists having a certain property qualification or a specified annual income.

The Legislative Council consists of 21 members, some elected for 10 and some for 5 years. The House of Representatives numbers 72 members, chosen for 5 years. The British crown, which appoints the governor, retains the right of veto on all legislation. The administration is vested in an executive council, composed of the governor, the lieutenant-governor, and a ministry of 5 members—the Colonial Secretary, the Attorney-general, the Treasurer-general, the Commissioner of Crown Lands and Public Works, the Secretary for Native Affairs. The supreme court, which has its sittings in Cape Town, has two judges besides the Lord Chief-justice. Another court holds its sittings in Graham's Town, in which there are two judges only, but there lies an appeal to the supreme court. In other parts of the colony, justice is administered by the judges going on circuit. A colonial university has recently been founded.

Wool is the staple product of the colony; ostrich farming and the culture of the vine are carried on. The following tables show the exports and imports of the colony for recent years:

	Imports.	Exports.
1870	£2,352,043	£2,453,768
1874	5,725,412	4,468,747
1880	8,078,048	4,488,872

The Cape Colony is not exceptional in showing a decline in imports and exports in 1877; but the insecurity caused by the troubles ending in the Zulu war of 1879 has told against the prosperity of the colony. The official tables include in the returns of revenue also the loans raised by the government; the increase since 1873 is accordingly not to be regarded as normal.

	Revenue.	Expenditure.
1870	£ 831,211	£ 795,695
1873	2,078,220	2,159,653
1875	2,246,179	2,272,275
1880	3,541,720	3,742,665

CAPE RIVER, properly *Vaunks*, taking its popular name from the proximity of its mouth to Cape Gracias a Dios, on the east reach of the Mosquito shore in Central America. After a generally north-east course of nearly 300 miles, it enters the Caribbean Sea, about lat. 14° 59′ N., and long. 83° 11′ W., being navigable for a considerable distance upwards.

CAPE ST. VINCENT, a headland forming the south-west extremity of Portugal, in lat. 37° 2′ N., long. 9° W., is celebrated on account of two naval battles in which British ships were engaged, fought off it, one in 1693, the other in 1797. In the for-

mer, Admiral Rooke, who with some 20 English and Dutch men-of-war was convoying a fleet of some 400 merchantmen, was attacked off this point by the French Admiral De Tourville, and after a running fight lost several ships, and 80 merchantmen. In February 1797, Sir John Jervis, with a fleet of 15 sail, gave battle to a Spanish fleet of 27 sail of the line, and defeated them, capturing four ships and driving the rest into Cadiz Bay, where they were blockaded.

CAPE TOWN, the capital of Cape Colony, faces Table Bay to the north-east, is flanked by the mountain Lion's Head, with its continuation to Lion's Rump or Signal Hill, and has behind it the precipices of Table Mountain. Its latitude is 33° 56′ S., its longitude 18° 28′ 7″ E. Its mean temperature 58·3° F. for winter, 76·6° for summer, and 67·3° for the year. Pop. 50,000. It is connected by railway with a widening area; by telegraph with the diamond fields and the Orange Free State, as also by Nadal and Aden with Europe; and by a weekly mail service with England. It is the chief port for the coasting trade as well as foreign exports and imports; is well supplied with fish, as well as meat, dairy produce, and every sort of fruit and vegetables, at a moderate price. It has a supply of fresh water of excellent quality. C. T. is the seat of the government, the supreme court, and a college and university. All the churches are well represented—the English Episcopal, the Roman Catholic, and representatives of Presbyterians, Lutherans, Wesleyans, Congregationalists, a Free Church (chiefly an off-break from the Dutch Church), a Jewish synagogue, and a Mohammedan mosque, the Malay population being of that faith. There are also banks and insurance offices. The town is built upon a double slope, which subsides into a plain on the north-east side. Its streets, at right angles to each other, are lined with houses, for the most part of an Eastern type, with heavy walls, flat roofs, and large public apartments, interspersed with increasing numbers of shops and warehouses, of the sort to be met with in England.

The most remarkable structures are the breakwater, with the docks and patent slip; the castle, with its outworks and bastions; the barracks for the military, the Roman Catholic Cathedral, with a few other places of worship; the museum and library, with the Botanic Gardens in front; and between it and Government House, a park, with its avenues shaded by stately oaks. Out of town, a little distance to the north-west, is Somerset Hospital, and the Royal Observatory, about two and a half miles to the north-east.

C. T. returns four members to the colonial assembly. The municipality is administered by a town-council of 18 members—three from each of six separate districts—and is precided over by a Mayor elected annually by the council. The port of C. T. possesses about 50 vessels, with a united tonnage of about 5000 tons. There are 5 newspapers in C. T., which are issued three times a week; 2 bi-weeklies, 1 weekly, 1 fortnightly, and 3 monthly magazines.

CAPE VERD, the most westerly headland in Africa, jutting out into the Atlantic Ocean, between the rivers Gambia and Senegal, in lat. 14° 43′ N., long. 17° 34′ W. It was discovered by the Portuguese about 1445, and is said to have derived its name from a group of gigantic baobab-trees which adorns its summit.

CAPE VERD ISLANDS (*Ilhas Verdes*), a group of islands belonging to Portugal, lying in lat. 14° 45′—17° 19′ N., and long. 22° 45′—25° 25′ W., and distant about 320 miles west of the cape from which they take their name. The principal islands are ten—viz., Santiago, the largest and most important, Fogo, Brava, Maio, Boavista, San Nicolâo, San Antonio, San Vicente, San Luzia, and Sal. There are besides four islets, barren and uninhabited. The total area is about 1700 square miles, with a pop. (1880) of near 100,000. The islands are all very mountainous, and owe their origin to the action of submarine volcanoes. The highest elevation is reached in a volcanic peak, 9157 feet above the sea, on the island of Fogo, and which is still active. The climate is unhealthy during the rainy season. Though water is deficient, vegetation is luxuriant, yielding African and Southern European products. Sugar, cotton, coffee, tobacco, and indigo are grown, and the trade in archil, monopolized by government, has in some seasons yielded as much as £24,000. Several of the European domestic animals thrive well. Turtles are abundant in the surrounding seas, and whales also are fished by British and American vessels. Amber is found on the coasts, and great quantities of salt formed by solar evaporation is obtained from the lagunes on the shores, especially on the island of Sal. The inhabitants, who are mostly negroes, indolent but harmless, speak a corrupted form of Portuguese, called Lingua Creoula. The revenue for 1882—1883 was estimated at about £52,000, and the expenditure for the same year at £45,000. The islands are under a govenor-general, exercising both civil and military authority. The chief ports are Porto Praya, on the island of Santiago, and Porto Grande, the best harbor in the whole group, on the island of San Vicente. The islands were discovered about the middle of the 15th c. by the Portuguese, who shortly after colonized them.

CAPE WRATH, a pyramidal promontory of unrivalled wildness and grandeur, forming the north-west extremity of Scotland and of Sutherland, and running out into the Atlantic, in lat. 58° 38′ N., and long. 4° 58′ 5″ W. It consists of gneiss, with beds of dark hornblende rock, is intersected by complex granite veins, and presents deep fissures and tall pinnacles. From it a reef of rocks, perforated with arches and caverns, juts out into the sea. Off the cape is Stag Rock, a pillar 200 feet high. C. W. is 600 feet high, and there is a light-house near it, 400 feet above the sea, and seen 25 miles off. From the Cape can be seen N. Rona, 50 miles off; Hoy Head, Orkney; the Butt of Lewis; and a grand panorama of mountains in Sutherland.

CAPEFIGUE, Baptiste Honoré Raymond, a French publicist and historian, was born, 1802, at Marseille. He studied law at Aix, and in 1821 proceeded to Paris for the purpose of completing his juridical course, but soon betook himself to journalism and authorship. He held a post in the foreign office until 1848. This, however, did not interfere with his amazing activity. Besides contributing extensively to many of the Parisian journals, he 'manufactured' not less than a hundred volumes of history—not, indeed, intrinsically valuable, but indicating wonderful facility in the use of the pen. The best is the *Histoire de la Restauration* (3d edit. 1842). *Les Reines de la Main Gauche* (15 vols.) appeared in 1858–64. C. died Dec. 1872.

CA'PELIN (*Mallotus Grænlandicus*), a small fish of the family of *Salmonidæ*, extremely abundant on the coast of Newfoundland, and much used as bait in the cod-fishery. It is also, in a dried state, an article of commerce, and is imported, although not very largely, into Britain, where it sometimes appears on the breakfast or supper table. Its flavor, which is very agreeable, suggests to most persons the idea of its belonging to the herring rather than the salmon family. It is nearly allied to the smelt, but the teeth are smaller and more numerous. It is the only known species of its genus.—Shoals of capelins arrive periodically on the coast of Newfoundland, the vast numbers changing the very color of the sea.

CAPE'LLA, a bright star of the first magnitude, on the left shoulder of Auriga. C. is also called Capra or the *She-goat*, a name also sometimes given to Capricorn.—The poet's fable C. to be Amalthea's goat, which suckled Jupiter in his infancy.

CAPELLA. See A Capella.

CAPELLA, Martianus Mineus Felix, learned author a belonging to the second half of the 5th c., was born in Africa, but where is not definitely ascertained, Of his life nothing whatever is known. The work which has preserved his name to posterity is the *Satiricon*, a kind of encyclopædia, highly esteemed during the middle ages as a work of reference. It is written in a medley of prose and verse, and is full of curious learning, but possesses no literary value; the style has all the bombastic pomp of the African school of later Latinists. It consists of nine books. The first two consist of an allegory, *The Nuptials of Philology and Mercury*, while the remaining seven are devoted to the 'liberal arts,' grammar, dialectics, rhetoric, geometry, arithmetic, astronomy and music. The first edition of the *Satiricon* appeared in 1499, under the care of Franciscus Bodianus; the best in 1836; under the care of U. F. Kopp.

The book on astronomy is remarkable as containing a hint of the true theory of the solar system. Mercury and Venus are there declared to move round the *sun*, and not round the *earth;* and their relation to these bodies is properly explained. Now as Copernicus knew C., and quotes from him, it is not unlikely that he derived the first idea of his doctrine from this writer.

CAPERCAI'LZIE, CAPERCAILLIE, WOOD-GROUSE, or COCK OF THE WOODS (*Tetrao Urogallus*), the largest of the gallinaceous birds of Europe. It is a species of Grouse (q. v.), almost equal in size to the turkey; the male, which is the largest, sometimes weighing fifteen pounds or more. In figure and appearance, it much resembles the black-cock, but the tail of the male C. is rounded, and not forked, as in that species; and the male C. has the feathers of the head elongated. The general color of the adult male is brownish black, minutely freckled with grayish white, and with lighter brown; the quill-feathers dark brown; the tail-feathers nearly black, some of the longer tail-coverts on the sides of the tail tipped with white; the chest is of a shining dark green; there is a small scarlet patch of naked skin above the eye, and the bill is whitish. The general color of the female and of young males is dark brown, freckled with yellowish brown; the front of the neck and the chest are yellowish chestnut; and the feathers of the under parts are generally edged with white. The C. has the feet feathered to the toes, but the toes are naked.

It is an inhabitant of pine-woods; feeds on berries, seeds, worms, insects, &c., and on the young shoots of the pine, greatly preferring the Scotch fir to the spruce; occasionally also eating, at least in winter, the buds of the birch and other trees. The female

makes her nest on the ground, and lays from six to twelve eggs, of a pale reddish or yellowish brown, spotted with other shades of brown, and more then two inches long. Like the black-cock, the C. is polygamous.—The geographical distribution of the C. is very extensive: it is found on the pine-covered mountains of all parts of Europe, from Spain and Italy almost to the North Cape, and is abundant in the northern parts of Asia. It was at one time found both in Scotland and Ireland, but was completely extirpated about

Capercailzie.

the end of the 18th or beginning of the 19th century. Through the exertions, however of the Earl of Fife and other proprietors of great Highland estates, but particularly of the Marquis of Breadalbane, it has again been restored to the forests of the Highlands of Scotland. The C. is very capable of domestication, and breeds readily, if allowed the range of a space containing a few pine-trees. It is much esteemed for the table. The market of Stockholm is well supplied with it in winter; and since the establishment of steam communication, the C. has been regularly imported into London. See Brown's *The Capercaillie in Scotland*, 1879.

CAPE'RNAUM, meaning 'the field of repentance,' or 'city of comfort,' was in the time of our Saviour a favorite and exalted city, and one of the three which he upbraided 'because they repented not.' It was situated on the north-western coast of the Sea of Galilee, or Lake of Gennesareth. It is now a heap of ruins, extending more than a mile along the shore and back towards the mountains, so overgrown with grass and bushes, that it is difficult to move among them. C. is called by the natives of Syria Tell-hûn.

CA'PERS are the pickled flower-buds of the caper-bush (*Capparis spinosa*). They have an agreeable pungency of taste, with a slight bitterness, and have long been in very general use as a condiment and ingredient of sauces, along with boiled mutton and other kinds of food. They possess medicinal properties, being antiscorbutic, stimulant, and laxative.

They are of a grayish green color, to improve which, however, copper is sometimes used, as in the case of gherkins and other pickles, rendering them poisonous. This can be detected by thrusting a polished iron rod into the vessel which contains the C.; the surface of the rod soon becoming coated with copper, if it is present.—The caper-bush is a native of the south of Europe, and other countries near the Mediterranean. It is extensively cultivated in some parts of the south of France and in Italy, but most of all in Sicily. It succeeds in the open air even at Paris, but in Britain requires the aid of artificial heat. It is a trailing, rambling shrub, loving dry places, and often growing on rocks or walls, adding a fresh charm of beauty to many an ancient ruin. It begins to flower early in summer, and continues flowering till winter. The buds are gathered every morning, and are immediately put into vinegar and salt: at the end of the season, they are sorted according to their size and color, the greenest and least expanded being the best, and are again put into vinegar, the finest being sent to the market in bottles, the coarser in small barrels. The fruit, which is a small berry, is also pickled in the south of Italy. The flower-buds of the caper of Mount Sinai (*Capparis Sinaica*) are pickled like those of the common species; the seeds are also pickled, and are called by a name signifying Mountain Pepper. The fruit of *Capparis aphylla* is made into a pickle in India. Species of *Capparis* are numerous in India, the warm parts of America, &c. See CAPPARIDEÆ.—Various substitutes for C. are sometimes used, as the flower-buds of the Marsh Marigold (*Caltha palustris*), those of the Indian Cress (*Tropæolum majus*), and those of the Bean Caper (*Zygophyllum Fabago*).

Caper (*Capparis spinosa*).

CA'PETIAN DY'NASTY, the third Frankish dynasty, founded about the close of the 10th c., when Hugo Capet ascended the throne. The surname CAPET has been derived from *cappetus*, 'a monk's hood,' because, though duke of France, Hugo was also abbot of St. Martin de Tours. On the death of the last Carlovingian monarch (Louis V., surnamed *Le Fainéant*—i. e., the Slothful), Hugo, the most powerful of French vassals, seized the throne, and by moderation and prudent concessions made to the authorities of the church, as well as to his brother-nobles, who had made themselves independent, contrived to retain the power he had seized.

He was crowned at Noyon, July 3, 987. In order to establish his dynasty, Hugo caused his eldest son Robert to be crowned as co-regent, 988. Capet first made Paris the capital of France. He died in 996; when his son Robert, a well-disposed but feeble ruler, ascended the throne, who died 1031, beloved by his domestics, but despised by his neighbors and vassals, forgotten by his people, and permitting all power to vanish from his hands. It was during his long lethargic reign that the towns and cities of France began to form themselves into corporations, to act in their own name, to contract obligations, and lay the foundations of middle-class freedom. In many other ways, also, the happy dissolution of royal power sowed the seeds of national prosperity. Robert's sons were Henry, who succeeded him, and Robert, ancestor of the older House of Burgundy.

Henry left two sons—Philippe I., who ascended the throne, and Hugo, who distinguished himself in the first crusade (1096), and died 1102. Philippe, under the regency of Baldwin, Count of Flanders, came to the throne when only eight years old, and first really began to reign after the death of the regent (1066). He took hardly any part in the great movements and events of his times, but supported Robert, son of William the Conqueror, in his rebellion against his father. Consequently, William commenced an expedition against Paris, and would probably have dethroned Philippe, but died in 1089. By his dissolute course of life, Philippe fell under a sentence of excommunication issued by Pope Gregory VII., in 1094, and, after doing penance, died in 1108.

His successor, Louis VI., surnamed *Le Gros*, had, during Philippe's lifetime, been active in the support of the crown, and now extended the royal power which had been almost entirely confined within the duchy of Paris. By bold and vigorous measures he brought everywhere his vassals into real subjection to his authority, liberated the towns from baronial oppression, partly abolished feudal bondage, and extended considerably the jurisdiction of the crown. His life was an almost incessant contest with the small and turbulent vassals who had rioted in the license afforded them by the weakness of his predecessors. He died 1137, leaving a numerous family.

As his eldest son and co-regent, Philippe, had died during the reign of Louis, his second son, Louis VII., *le Jeune*, now came to the throne, and by his marriage with Eleanor of Guienne, heiress of the Duke of Aquitaine, gained a considerable accession to the power of the crown. He engaged in the second crusade, and led 100,000 men to the East; but was unsuccessful, and returned to France after an absence of two years. In 1152 he divorced his unfaithful wife Eleanor, who subsequently married Henry Plantagenet, afterwards Henry II. of England. This marriage made Henry far more powerful than the king of France, and Louis would probably have lost his crown had not the disturbances in England—the quarrels with Becket and with his own sons—proved sufficient to occupy Henry's attention. Louis le Jeune died 1180.

Philippe Auguste (q. v.), his son by a third marriage, ascended the throne ten months before his father's death, and proved himself the most able ruler of the Capetian dynasty. Against the wishes of his family, he married Isabelle of Hainault, great-granddaughter of the last of the Carlovingians, and thus finally united the two houses. His successor, Louis VIII., who died 1226, was said to have been poisoned by the Count of Champagne, paramour of the queen, Blanca of Castile. Louis VIII. was followed by his son Louis IX. (SAINT LOUIS, q. v.), who died at Tunis, 1270. Of the eleven children of St. Louis, the eldest, Louis, died aged 16 years, while the youngest, Robert, became the founder of the Bourbon dynasty (see BOURBON). The second son, Philippe III., *le Hardi*, succeeded his father, and by the decease of two brothers and two uncles, acquired possession of Poitou, Auvergne, and Toulouse. His son (Philippe IV., *le Bel*) acquired by marriage Champagne with Navarre. These acquisitions, and his attempt to secure for his uncle, Charles of Anjou, the throne of Naples, involved Philippe III. in contentions with Italy and Spain. He subjugated Navarre, 1276, and died of the plague in 1285. Philippe IV., *le Bel*, succeeded to the throne when seventeen years old. He soon gave signs of a despotic character, plundered the

estates of the church, defied papal authority, persecuted the order of Templars (q. v.), and removed the residence of the pope to Avignon. The atrocious act of burning the grand-master, with sixty knights, of the order of Templars, after they had recalled all the confessions drawn from them by torture, has left an ineffaceable blot on the name of Philippe le Bel. He died 1314; and left three sons and a daughter.

The eldest son, Louis X., *le Hutin*, who ascended the throne, displayed remarkable weakness of character, and died 1316. He was succeeded by Philippe V., *le Long*, second son of Philippe le Bel, who died without issue. By his death (1322) the crown came to Charles IV., *le Bel*, third son of Philippe le Bel, and the last of the direct line of the Capetian kings. He died 1328, leaving by his third marriage a daughter, named Blanche, who married Philippe, Duke of Orleans, and died (1392) leaving no issue. Isabelle (daughter of Philippe le Bel) married Edward II. of England, and was mother of Edward III., who consequently took the title of king of France, which was retained by the kings of England until the reign of George III.; but Philippe of Valois, cousin of the last Capetian king, and grandson of Philippe III., *le Hardi*, claimed the crown of France by virtue of the Salic law, and so founded the dynasty of Valois (q. v.).

CA'PIAS, in the practice of the English common law, is a writ directed against the person, and so called from the commencement of the process in the old Latin form. It has various applications, the principal of which are the following:

CAPIAS AD RESPONDENDUM is a writ which a plaintiff, after action, may sue out upon affidavit against a defendant who, there is reason to believe, is about to quit England, and against whom there is a cause of action to the amount of £50 or upwards, whether as matter of contract or of damage. The writ directs the sheriff to arrest the defendant, who remains in custody on such arrest until he shall have either given a bail-bond with reasonable sureties. This arrest is only when the defendant's absence will prejudice plaintiff.

Capillaries:
a, the artery; *b*, the vein; *c*, the intervening capillaries.

CAPIAS AD SATISFACIENDUM, or CA. SA. This is one of the writs by which a plaintiff can put a judgment recovered by him into execution. The object of it is to imprison the debtor till satisfaction, when imprisonment is still permitted. See on the subject of Capias generally, APPREHEND, ARREST, ATTACHMENT, EXECUTION, and BAIL.

CAPILLAI'RE, a medicinal syrup, used as a pectoral in chronic catarrhs, is prepared by adding sugar and orange-flower water, to an infusion of the fern called MAIDENHAIR (q. v.), or by pouring boiling syrup on the fern.

CA'PILLARIES. The tubes which convey the blood from the left side of the heart to the various parts of the body are termed arteries, while those which return it to the right side of the heart, after it has discharged its various functions in the body, are known as veins. The name of capillary (from *capilla*, a hair) is given to the minute vessels which form the connection between the terminal branches of the arteries and the commencements of the trunks and the veins. These little vessels are of various sizes, some admitting only one blood-corpuscle at once, while others are large enough to allow of the simultaneous passage of two, three, or more corpuscles. In the muscular tissue their average diameter is 0·003 of a line; they are smallest in the brain, and largest in bone.

Their arrangement varies in different parts. In the accompanying figure, which represents their distribution in muscular tissue, they run for the most part parallel to one another; in other cases (as around fat-cells) they have a spherical arrangement, and in the skin and in parts of the intestines they form loops; and many other forms of distribution might be mentioned. These various arrangements have been discovered by the microscopic examination of tissues that have been successfully injected with colored fluids.

The circulation of the blood through the C. may be readily seen in the web between the toes of the hind-foot of the frog, in the tongue of that animal, in the tail or gills of the tadpole, in the wing of the bat, &c.

The principal uses of the capiliary system of vessels will be noticed in the articles on DIGESTION, NUTRITION, RESPIRATION, and SECRETION.

CA'PILLARY A'CTION. When a clean glass tube with a fine bore, open at both ends, is plunged into a liquid capable of wetting it, such as water, the liquid is found (1) to rise in the tube above the level of its surface in the vessel containing it; (2) to rise the higher in the tube above that level the finer its bore is; (3) to stand above the general level in the tube where it approaches the sides (as in fig. 1, which is drawn on a greatly exaggerated scale), so that its upper surface in the tube is curved and concave. When a similar tube is plunged into a liquid incapable of wetting it, such as mercury, phenomena of a precisely opposite nature are presented. The liquid stands in the tube below the level of its surface in the vessel; and where it approaches the sides of the tube, it stands below its general level in the tube, so that its upper surface is curved and convex as in fig. 2, the convexity and depression in the tube increasing with the fineness of its bore. While such is the case with the two classes of liquids described, there are others on which fine tubes have no action, so that they stand in such tubes at the same level as in the vessel, and with plane upper surfaces.

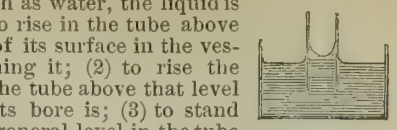


Fig. 1. Fig. 2.

These are the leading phenomena to be explained by what is called C. A., the tubes with fine hair-like bores being called capillary tubes, from Lat. *capillus*, a hair. The phenomena, however, though connected by name with such tubes, are not dependent on them, but may be produced without their intervention by any contrivance which gives room for the so-called capillary action. For instance, if two plates of glass with parallel faces be placed together with two of their edges in contact, and the two opposite be separated a very little by a fine wedge; and then if they be put standing with their common edge vertical in a trough (fig. 3), containing a little colored fluid capable of wetting the glass, the fluid will rise between the plates, the height attained at any point being inversely as the distance between the plates at that point, so that its upper surface will be a curve of the kind known as the hyperbola—being highest near the common edge, and lowest near the edges separated by the wedge. If the same apparatus be placed in a trough containing mercury, the mercury will be depressed between the plates till its upper surface forms a hyperbola convex to the zenith.

To understand the peculiar action producing these phenomena, it must be kept in view that the surface of a fluid at rest under gravity is a horizontal plane (see HYDROSTATICS), and that this plane is maintained by gravity and the mutual attractions of the particles of the fluid mass. Suppose now a fluid at rest in a vessel to have a foreign body, such as a capillary tube, suddenly plunged into it, and separating, as by walls, a portion of the fluid from the rest. By cohesion (q. v.), the fluid particles inside the tube will be held on—drawn downwards—to the mass of the fluid, while by adhesion (q. v.) they will be drawn upwards towards the sides of the tube. By the ordinary action of gravity, as in tubes of a large size, the fluid will at once tend to rise in the tube to its level in the vessel. Whether it will succeed in doing so, or whether it will rise still higher, must depend on the adjustment of the forces of cohesion between the fluid particles and their adhesion to the solid of the tube. The relation of these forces may be generally explained: Let *mm'* (fig. 4) be the surface of the column, *mn*, of a liquid contained in a space, *abb'a'*, above or below the surface, *nn'*, of the external liquid. There being equilibrium between the liquid in the tube and in the vessel, any line of liquid particles may be taken and supposed to be detached from the rest and enclosed in a tube, without altering the forces exerted.

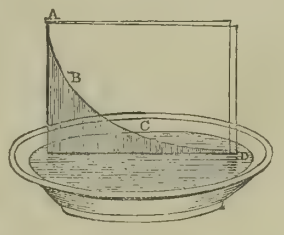


Fig. 3.

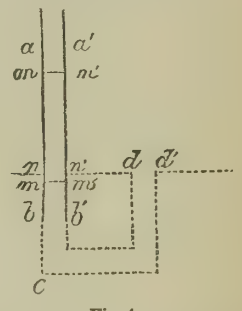


Fig. 4.

Let the line included between the dotted lines be conceived so detached. The actions which the particles of the liquid in the tube exert on each other, or sustain from the sides of the tube, have no tendency to make the liquid move either up or down. But the column, *mb*, in the tube has some action exerted on it by the sides of the tube above the surface, *mm'*. Let A, depending on the force of adhesion, represent this upward action of the tube.

The column is also attracted downwards by the detached column *bc*, i. e., by the liquid in the imaginary tube. Let C, depending on the force of cohesion, represent this downward action of the liquid. Also the part *bc* of the liquid is attracted upwards by the tube *ab* by the attraction which we have represented by A. Thus the liquid column is acted on by two upward actions = 2A, and a downward action, C. The whole force acting on it, excluding gravity, is 2A — C. Gravity would make the liquid rise to *nn'* at once, i. e., till it stood as high in the tube as in the vessel. Whether, then, it will rise above *nn'*, or be depressed below it, must depend on whether 2A is greater than C, equal to it, or less than it. If 2A = C, the liquid will stand in the tube at the level *nn'*, as if these forces did not act at all. If 2A be $>$ C, then 2A — C will be an upward force, and the column will be raised above the level *nn'*. If 2A be $<$ C, then 2A — C will be a downward force, and the column be depressed.

Regarding the forms of the upper surfaces of columns of liquid in capillary tubes, it can be demonstrated mathematically that the same relations of the forces of attraction and cohesion, which determine the elevation or depression of the liquid column, determine also the form of its upper surface in the two cases of elevation and depression. In fact, the case of the elevated column resembles that of a cylinder of any very elastic substance (so elastic as to suffer change of form very readily under pressure), supported wholly by *the rim* at one of its ends; or, what is the same thing, by vertical forces acting in the lines composing its outer surface. Gravity draws down the concentric shells, of which the cylinder may be conceived to be composed, the further the more remote they are from the outermost, or that which is directly supported, the central rod being the most depressed. It would appear that the form of the surface has an important bearing on the cause of the production of the whole phenomena.

The third fact of observation—viz., that the liquid rises higher or is more depressed the finer the bore of the tube—is thus explained in the case of elevation: Since the action of adhesion is confined to the superficial layer of the fluid, and between the same substances is, *cæteris paribus*, constant in quantity for an equal extent of surface, the wider the tube the shorter must be the column sustained, as the contents of the column raised by cohesion increase more rapidly when the bore increases than the attracting surface. The column increases with the square of the diameter of the tube, while the attracting surface increases only with the diameter. The height, therefore, is inversely as the breadth of the tube.

That the depression must increase as the bore of the tube diminishes, appears from reasoning similar to that employed in the case just discussed.

The degree of elevation varies with the nature of the fluid, the variation depending partly on the difference of cohesion between the particles of the fluid, and partly on the difference of adhesion between the fluid and glass. It is found that temperature affects these forces, so that the height diminishes as the temperature rises.

The depression of mercury in a fine glass tube makes it necessary to use a correction in reading off the height of the mercurial column in the barometer, which, owing to it, stands always a little lower than the height due to the atmospheric pressure. Experience, however, has shown that the capillary depression is nearly one-half less in tubes which have had the mercury boiled within them than in unboiled tubes, as by the boiling a film of air, which in unboiled tubes adheres to the glass, is expelled. By widening the bore of the tube also, the error may be diminished so as to be neglected altogether. In a tube of $\frac{1}{4}$ inch in diameter, in which the mercury has been boiled, the depression is 0·02 inch, while with a similar tube of $\frac{1}{2}$ inch diameter it is only 0·003. The depression of mercury, it is found, is slightly increased by an elevation of temperature. It may be mentioned that in reading off the level of mercury in any instrument, such as the barometer, the height should be taken from the convexity of the curve. If the liquid used in the instrument, however, wets the tube, the height should be taken from the concavity.

As already stated, the phenomena are not dependent on the intervention of tubes; any capillary cavity suffices to produce them. When two light bodies, such as two bits of cork, are left to float on water, near each other, they soon come together, moving at last with a rush. This is sometimes given as an example of the gravitation that draws the planets to the sun; but it is really owing to this capillary action that we are considering. When the liquid wets the floating bodies, it rises slightly all round them, and this sustained liquid hangs as a weight on them on all sides. So long as it rises equally, there is no motion; but when the bodies come near each other, the space between them becomes like part of the inside of a capillary tube, the water rises higher there than on the other sides, and the bodies move towards the sides that are most strongly pulled. When the floating bodies are not wetted by the liquid, the surface between the two bodies is depressed, as that of mercury is inside a glass tube, and the bodies descend, as it were, down the opposing slopes, and meet in the bottom of the hollow. If one of two bodies floating on water is smeared with oil so as to prevent the water from adhering, instead of coming together, the two will recede from each other, for reasons analogous to the above.

C. A. plays a most important part in nature in a great variety of ways. An instance of its employment by man is seen in the wicks of lamps and candles, which, being composed of fibrous materials, furnish hair-like channels by which the melted oil is elevated to the flame, and supplied as fast as it is consumed. C. A. influences the circulation of fluids in the porous tissues of animals, and it is the principal mode in which water, with the various substances which it holds in solution, is supplied to the roots of growing plants. It is through it that in summer droughts moisture is raised to the surface for the maintenance of vegetable life. C. A., too, effects many phenomena usually considered under the head DIFFUSION (q. v.) of fluids and gases. The reader, on referring to the article OSMOTIC ACTION, will also see that it enters into the explanation of the phenomena known as exosmose and endosmose.

A familiar illustration of C. A. is furnished when one end of a towel happens to be left in a basin of water, while the other hangs over the side below the level of the water; the basin is soon emptied of its contents. It is important to observe that, although the towel will become wet, not a drop will flow from it, unless the outside end reach below the level of the water in the basin. In this respect C. A. resembles that of the syphon. And this shows the error of supposing that water may rise through the earth by C. A. and flow out as springs at a higher level that the source whence it is drawn.

Some very interesting experiments have been made by M. Poiseuille (*Ann. de Chimie et de Phys.* III. xxi. 76) concerning the flow of liquids through capillary tubes, the results of which must here be stated. It appears that when the tube exceeds a certain length—which is greater as the bore increases—the following laws regulate the rate of efflux of the liquid, the efflux taking place under pressure: 1. The flow increases directly as the pressure, so that under double the pressure, double the amount is discharged in equal times. 2. In tubes of equal diameter, the quantities discharged vary inversely as the length of the tube. If a tube 2 inches long discharge 100 grains in 5 minutes, a tube 4 inches long will only discharge 50 grains. 3. In tubes of equal lengths, but different diameters, the flow is as the fourth power of the diameters. If one be $\frac{1}{50}$ of an inch in bore, and the other $\frac{1}{100}$, the efflux from the larger will be 16 times as great as from the smaller. It is further found that the efflux varies with the nature of the liquid, the material of the tube not appearing to affect the result in any great degree. No law of the rate of efflux has yet been discovered, depending on the density, capillarity, or fluidity of the fluids.

It may be mentioned, in conclusion, that the tubes to be used in the experiments on capillarity should be perfectly clean and dry. If wetted, the film of moisture on the tube forms a new tube, and the action will be the same as with a tube of the substance forming the film. The reader should consult Miller's *Elements of Chemistry*, and J. Clerk Maxwell's *Theory of Heat*, where the phenomena are treated from a different point of view; the phrases 'superficial energy' and 'superficial tension' being substituted for 'capillarity,' and the hypothesis of molecular attractions being avoided.

CA'PITA, DISTRIBUTION PER—i. e., distribution by heads, or by numbers, equally—occurs in the case of several claimants to the property of a deceased person, all severally claiming in their own right, in equal degree of kindred, and not under any right of representation. See INHERITANCE SUCCESSION.

CA'PITAL (Lat. *capitulum*, from *caput*, the head), the head of a column, pilaster, &c. Till the period of the renaissance, the head of a column in English was called chapiter (chapter), its diminutive being chapitrell. See COLUMN.

CAPITAL, in Fortification, is an imaginary line dividing a defence-work into two similar and equal parts. The C. of a bastion is a right line drawn from the point or salient angle to the middle of the gorge or entrance in the rear. The C. of a ravelin is a right line drawn from the re-entering angle of the counterscarp to the salient angle of the ravelin. See the wood-cut in CAPONIERE.

CAPITAL, in Geography, the principal city or town of a country, that in which the sovereign usually resides, and where the legislature meets, and the chief legal courts are held.

CAPITAL, in Trade and Political Economy, is in its restricted sense applied to the money, or the property convertible into money, with which a trader or producer carries on his business. In this sense, Adam Smith and many other writers called it stock; and there is a convenience in having a separate term for expressing the sense of the word C., since it is totally different from its wider sense as an element in political economy. Many attempts have been made to define C. in its general sense, but with very im-

perfect success, since no sooner is a restrictive definition laid down, than some one can point at things which are C., and yet are not included in the definition. It has, for instance, been called the produce of past labor stored up and applied to the facilitating of future labor; but, as we shall see, many things become C. which the hand of man has never touched. There is no doubt, however, that the existence of C. arises out of the fact of labor or industry having been exercised; and perhaps a good general understanding of its character may be derived from treating it as the *impulse* or *impetus* which past industry gives to facilitate future industry.

Wherever something is reserved from immediate consumption, and made to serve in future production, there is capital. We cannot have a better illustration than in the first bow and arrow made by the savage. He has expended on this machine for securing his food a portion of the time and labor which he might have given to the tedious task of catching his food with his own hands, and at this sacrifice he has obtained the means of more easily and economically obtaining it in future. All C. is not, however, *directly* made by the industry of the owner, or, indeed, by industry at all. The accidental finder of a diamond, or a pearl, worth £100, possesses so much capital. His acquisition, however, would have no value but for those productions of industry which it is permitted to represent, and if pearls and diamonds were often found, they would cease to be valuable; the trade of finding them is as laborious and as ill remunerated in the long-run as most others. The owner of a barren heath, which was intrinsically worth nothing, finds it become suddenly valuable by the progress of a large town; but it is the industry of that town which has given the value, and the owner having the good fortune to have a hold on a portion of the produce of that industry, becomes a capitalist. It is impossible to enumerate all the elements of which C. in the general sense consists, or all the ways in which it can be made. Whatever thing done enables some other thing to be done which supplies any of the necessities or wishes of the human race becomes capital. Thus, the education and skill of the barrister, the physician, and the artist—the agility, acquired through long and toilsome practice, of the ropedancer and the juggler—all are capital. It makes C. to shift the place of a thing, bringing it from where it is not, to where it *is*, wanted. So, also, the changing of a person's place may become C. to him, as where he leaves a district in which his trade is not required, or exceeds the demand, for one where he can pursue it to advantage. Successful emigration thus creates C., bringing into human use districts of land which previously lay useless. The total C. at any time in existence consists of an aggregate of the several capitals at the command of individuals or communities. But it is essential to any unit of C. that it should be sufficient for the purpose it is intended for, otherwise it may seem to be, but will not in reality be, a part of the general aggregate—it will, in fact, be lost.

If an expenditure of £1000 be necessary to raise a sunk ship, and only £900 are expended, that sum, which might have been available for some other purpose, is lost. C. as distinguished from property or wealth, is a *moving force;* and if it be not sufficiently strong for accomplishing its purpose, it is lost. This is one of the most important truths in all political economy, since most of the great losses suffered by communities and individuals arise from undertakings for which they have not adequate C., or for which that which seems to be C., does not really turn out to be so. Perhaps the most memorable mistake of this kind ever made was when the French revolutionary government issued assignats (q. v.). These were ostensibly issued on a good security—namely, the security of the forfeited land. But however valuable that land might be in the long-run, it was not available to pay the assignats; there was no purchaser for it; and the assignats consequently fell in value. Gold to a far less amount than the money value of the land—that is to say, than the price which would be paid for it when sold in the natural course of things—would have been a sufficient C. for the issue of these assignats. The same mistake is often exhibited on a small scale when a landed proprietor keeps together a large estate, which he cannot afford to improve and cultivate properly. It loses its power of C. in his hands; and he would be much better off if he sold a portion of it for money to be invested in improvements on the remainder. Probably 19 out of every 20 bankruptcies arise from the bankrupts having undertaken enterprises beyond the reach of their C.—from over-trading, or over-speculating, as it is otherwise called. When speculation becomes epidemic, the whole community suffers from undertakings too great for its C. and a crisis occurs. Such was the the great railway crisis of 1847. Parliament had, in the previous year, passed bills for the construction of railways, which, if they had all been made, would have cost upwards of £130,000,000—a sum which the country, rich as it was, could not afford to advance. Though it is an axiom that people cannot trade beyond their C., yet what can be accomplished by any given amount of C. must depend on the skill and sagacity of the person employing it. Competition no doubt tends to equalize profits, but competition is itself a contest in which each tries to drive a more profitable trade than his neighbors, and some are more successful than others. A frequent element of success is the rapid circulation of C. by which it is made to return many profits, though perhaps small ones, in the course of the year. The trader who turns over his C. ten times at a profit of 3 per cent. makes more than he who draws a single profit of 10.

If the nature of C., as the produce of past, and the promoter of future industry, were better understood by the working-classes, they would be saved from much unhappiness and mischief. Whatever C. may be to the rich man, it is bread itself to the working family. The withdrawal of the C. embarked in the cotton trade alone would starve millions; and yet many educated men have endeavored to teach working-people that C. is their natural enemy. Its strength may no doubt be sometimes used for evil purposes, but none save evil results can arise from destroying it. The only way in which any man can effectually protect himself from such mischief as he supposes it may do, is to save, and become a participator in it. Itself the result of industry, it is a more powerful instrument in the hands of him who has made it than in any other's. The savings of working-men are the best laid out C. in the world. The first pound laid past is the most profitable of all—it represents freedom from debt, and the capacity of its owner to purchase what he wants with ready money—a privilege probably bringing him a profit of many pounds, or many hundreds per cent. upon his capital.

CAPITAL ACCOUNT; such is the name given to what concerns the capital stock of a railway or other public company. In authorizing a railway company—which we take as an example—parliament gives power to raise so much money by shares, and so much by borrowing. The amount that may be borrowed is equal to a third of the share stock, but it cannot be legally borrowed until at least one-half of the share stock has been paid up. The form of borrowing is that of giving a mortgage on the whole property of the railway; the deed of mortgage, which is called a debenture, expresses the sum lent, the rate of interest that is to be paid, and the period for which the loan is given. See DEBENTURE. Unitedly, the money got for shares and by debentures forms the capital of the company; and, deposited in a bank, constitutes the *Capital Account*. On this fund the directors of the company make draughts to pay for the land, and all the works connected with the line, as also rails, locomotives, carriages, and, in short, everything involved in perfecting the railway up to the point of working. From the first, the holders of debentures receive interest, which must be paid in all circumstances, and the principal must be returned at the conclusion of the period for which it has been borrowed; at least, such are the ordinary obligations towards debenture holders. For the share part of the capital no return is made till the railway has been in operation, and drawings come in from the traffic.

As soon as the traffic commences, there begins a new account called the *Revenue Account*, and which, kept in the same or a different bank, has no connection with the Capital Account. This, it may be judged, at once introduces a great complexity into the financial affairs of railways. In ordinary businesses, the profits of a concern are the free proceeds after deducting interest on capital and all expenses; and no attempt is made to keep two accounts, or to detach one part of the revenue from the other. As shareholders in a railway occupy the position of partners in a business, it might be expected that they would receive a divisible part of the proceeds equal to their respective claims after all expenses whatsoever had been paid. This is not the plan usually adopted. In general, the shareholders are only temporary partners; they buy shares in order to sell them at an advance. What they mainly look to is the rise on shares in the market, and therefore any process of management which can promote this important object meets their approval. Hence, the keeping of two accounts, two bank pass-books, and two books of cheques. From the revenue account are drawn all payments for wages, rates, and taxes, coke, oil, and other petty furnishings, also repairs on carriages and locomotives, maintenance of way, and general management. What remains is the fund, whence is paid, first, the interest on the debentures, and, second, the dividend of the shareholders. From the C. A. are drawn all other outlays: first, the repayment of principal to debenture holders, and, second, the expenditure for new carriages and locomotives, new rails, and other substantial repairs upon and additions to the plant. As all railway traffic exceeds the expectations formed respecting it, the demands on the C. A. for fresh additions of one kind or other, become exceedingly onerous. Were the shareholders to look to ultimate advantages, they would sanction the payment for permanent improvements out of the current revenue; but, as has been stated, shareholders for the most part care nothing for the remote and contingent prosperity of the undertaking, and will not or cannot make a corresponding sacrifice. Greatly diminished by primary outlay, and now operated upon for all sorts of additions and improvements, the C. A. is at length exhausted, and new

powers have to be got from parliament to create new shares and new debentures, and which shares are only taken up by being guaranteed a preferable claim on the funds of the company. Where a large extension of traffic must be provided for, the creation of fresh capital is indispensable and legitimate; but it is equally open to remark that the C. A., as usually conducted, affords the means of enormously increasing the company's obligations, and is, in fact, an expedient to give good dividends to present holders of stock at the cost of their successors.

Perceiving what must be the consequences, those among the proprietary of the small and more prudently managed railways who look to permanent investment, lose no opportunity to urge 'that the capital account shall be closed, and the whole expenditure of the company, including the payment of dividends and interests, be taken from revenue.' Objections are raised to these remonstrances, sometimes on plausible, sometimes on sufficiently valid, grounds; and it may be said that in remarkably few cases have railway companies been able, or been disposed to close their Capital Account. See RAILWAYS (Legislation and Management).

CAPITAL FELONIES. See FELON.

CAPITAL PUNISHMENT in criminal jurisprudence is the punishment of death. It is called *capital* punishment because the head (Lat. *caput*), from being the most vital, is usually that part of the body which is acted on. This applies especially to beheading and hanging; but almost all modes of depriving a criminal of life appear to have in view the peculiar vulnerability, and, at the same time, vitality of the head. This extreme penalty, notwithstanding the practice of the world from the remotest times down to the present day, has frequently been reprobated by philosophers and philanthropists, who have even gone so far as to deny the right so to punish to any earthly power. The weight of authority, however, appears in favor of capital punishment. Mr. Bentham, one of the most reasonable and discriminating authorities on the subject, in his well-known and valuable treatise, says, that the idea of C. P. would naturally suggest itself in the infancy of a state. When any one had committed an offence, and disturbed the peace of society, the question would then first arise: 'How shall we prevent these things?' and the answer most likely to occur to a set of barbarians would be: 'Extirpate the offender, and give yourself no further trouble about him.' And in conformity with this view of the matter, he alludes in a note to the case of the Hottentots, who have no fixed laws to direct them in the distribution of justice, and consequently, when an offence has been committed, there is no form of trial, or proportion of punishments to offences; but the kraal (village) is called together, the delinquent is placed in the midst, and without further ceremony, demolished with their clubs, the chief striking the first blow. The Marquis Beccaria, in his remarkable *Essay on Crimes and Punishments*, strongly argues against the capital sentence being carried out in any case, denying the right, in fact, of government so to punish, and maintaining, besides, that it is a less efficacious method of deterring others, than the continued example of a living culprit condemned, by laboring as a slave, to repair the injury he has done to society.

Bentham on the contrary, holds that death is regarded by most men as the greatest of all evils; and that especially among those who are attached to life by the ties of reputation, affection, enjoyment, hope, or fear, it appears to be a more efficacious punishment than any other. On the question of right, Beccaria is still more pointedly refuted by Sir Samuel Romilly, who observed: 'Beccaria and his disciples confess that it is not the greatest of evils, and recommend other punishments as being more severe and effectual, forgetting undoubtedly, that if human tribunals have a right to inflict a severer punishment than death, they must have a right to inflict death itself' (*Memoirs*, vol. iii. p. 278). It is not a little interesting to know, that such was the opinion of one who did so much as a statesman to mitigate the severity of the criminal law.

Against C. P. arguments are often urged from Scripture, based on the general principle of Christian charity. To these it is replied that they proceed on a misapprehension and misapplication of the principle; and reference is confidently made to the Old Testament as sufficiently exhibiting the mind of the great Lawgiver in regard to this matter.

Death was, in former times in England, the ordinary punishment for all felonies, and the certain doom of those who could not avail themselves of *benefit of clergy* (q. v.), i. e., the common law inflicted death on every felon *who could not read*, and the law implied that punishment, where a statute made any new offence felony. On the other hand, the numerous act of parliament creating felonies without benefit of clergy, show that the statute law was still more sanguinary, so that of the 160 offences referred to by Blackstone as punishable with death, four-fifths had been made so during the reigns of the first three Georges. That some idea may be formed of such Draconian justice as was then established, we may mention the following as among the offences which involve sentence of death—stealing in a dwelling-house to the amount of 40*s*.; stealing privately in a shop goods of the value of 5*s*.; counterfeiting the stamps that were used for the sale of *perfumery!* and doing the same with the stamps used for the certificates for *hair powder!* Thanks, however, to the exertions of Sir Samuel Romilly, the inhumanity and impolicy of such a state of the criminal code gave way, towards the end of the reign of George III., to a course of legislation which has reduced the application of death as a punishment within its present humane limits.

Practically, indeed, it is only in the case of treason and murder that the capital sentence is ever pronounced; and even then, it is not always carried out, for the crown reserves to itself and exercises a right of review which frequently leads to such a change in the convict's fate as at least spares his life. This discretionary control on the part of the executive is essential in the present state of the law, which affords no means for a judicial appeal on the merits; for the very nature of the punishment, when finally executed, precludes the idea of all benefit to the sufferer, should the verdict of the jury afterwards turn out erroneous, and the innocence, instead of the guilt, of the accused be established. The law as it stands, indeed, allows a capital sentence to be reversed if technical error can be shown on the face of the judgment or other matter of record—but what avails that, after the sentence has been executed?

In Scotland, the administration of the criminal law has perhaps been, on the whole, as severe as in England. Mr. Erskine says, that 'those crimes that are in their consequences *most hurtful to society*, are punished capitally or by death,' a category that is certainly sufficiently indefinite; and anciently, it might be shown that the executions in Scotland for offences corresponding to those which were capitally punished in England, were, in proportion to the population, quite as numerous as those in the latter country. But in the more modern practice of Scotland, capital sentence was only pronounced in the four pleas of the crown—viz., murder, rape, robbery, and wilful fire-raising, to which may be added housebreaking. At present the penal system in Scotland may be said to be identical with that in England, death, as a punishment, being only inflicted in the case of convictions for murder.

With respect to the mode of executing C. P., we need not detain the reader by any account of the obsolete cruelties and tortures of former times. It may suffice to state that *hanging* and *beheading* are the two methods which now, for the most part, are practised in the different European states, indeed, with the exception of Spain, by all. In the last country, the death of the culprit is instantaneously caused by the *Garrotte* (q. v.). In England, Scotland, and Ireland, and in all the dependencies of the crown, the convict is hanged; while in France he is decapitated by the *Guillotine* (q. v.), an instrument which the old Scotch *Maiden* (q. v.) very much resembled. In Germany, beheading is the mode of execution adopted; but in Austria, criminals convicted of capital offences are hanged, as in England. Capital punishment was abolished in Switzerland, Holland, Portugal, Roumania, and about 1874 in some of the United States, as Wisconsin, Maine, and Iowa. In the latter state it was restored in 1878; in 1881 the power was conferred on the several Swiss cantons of deciding whether to restore the punishment of death or not; and some of them immediately took advantage of the permission. See EXECUTION.

See Basil Montagu *On the Punishment of Death* (1813); *Memoirs of Sir Samuel Romilly* (1840), and his writings; Bentham, *Rationale of Punishment* (1830); Beccaria, *Essay on Crimes and Punishments* (1775); Berner *Die Abschaffung des Todesstrafe* (1861); Mittermaier, *Die Todesstrafe* 1862; Eng. edition by J. M. Moir); Von Holtzendorff, *Das Verbrechen des Mordes und die Todesstrafe* (1874); Clode's *Administration of Justice under Military Law*.

CAPITAL PUNISHMENTS IN THE ARMY AND NAVY.—1. *In the Army.*—The law on this subject is covered by the Army Discipline and Regulation Act (1879), which is a consolidation of the Mutiny Act, the Articles of War, and other acts; it is kept in force by a short Continuous Act passed annually. The offences punishable with death are as follows. (1) Any officer or soldier who shall excite or join in any mutiny or sedition in any forces belonging to her Majesty's army, or Royal Marines, or who shall not use his utmost endeavors to suppress it, and knowing of it, shall not give immediate information of it to his commanding officer; or (2) who shall hold correspondence with, or give advice or intelligence to, any rebel or enemy of her Majesty; or (3) who shall treat with any rebel or enemy without her Majesty's license of the chief commander; or (4) shall misbehave himself before the enemy; or (5) shall shamefully abandon or deliver up any garrison, fortress, post, or guard committed to his charge; or (6) shall compel the governor or commanding officer to deliver up or abandon such place; or (7) shall induce others to misbehave before the enemy, or abandon or deliver up their posts; or (8) shall desert her Majesty's service; or (9) shall leave his post before being regularly relieved, or shall sleep on his post; or (10) shall strike or offer any violence to his superior officer, being in the ex-

ecution of his office, or shall disobey any lawful command of his superior officer; or (11) who, being confined in a military prison, shall offer any violence against a visitor or other his superior military officer, being in the execution of his duty.

No judgment of death by a court-martial shall pass, unless two-thirds at least of the officers present shall concur therein; and judgment of death may be commuted for penal servitude for any term not less than four years, or for imprisonment for such term as shall seem meet.

The employment of a soldier in the service subsequent to his arrest on a capital charge, may operate as a remission of the sentence of death. In 1811, a private of the 3d Buffs was sentenced to be shot, but by a mistake was permitted to serve in an engagement with the enemy, after he had been put into arrest for his crime. On this ground, the Duke of Wellington pronounced that he was under the *necessity* of *pardoning* the prisoner.

In the army, C. P. is inflicted by the offender being either shot or hanged—the latter being the more disgraceful mode of execution.

2. *In the Navy.*—These are regulated by the 22 Geo. II. c. 33, amended by the 29 and 30 Vict. c. 109, and other acts. Certain offences in the navy, whether on board ship or on shore, were punished with death absolutely, without any discretion in the court to alter or mitigate the sentence. But, by the 10 and 11 Vict., this severity is removed (excepting in the cases of murder and other unnatural offences mentioned in the act), and courts-martial are authorized to abstain from pronouncing judgment of death, if they shall think fit, and to impose such other punishment instead as the nature and degree of the offence may deserve. In this discretionary sense, the following offences are punishable, in the navy, with death: (1) The holding illegal correspondence with an enemy; (2) the not acquainting, within 12 hours after the opportunity to do so, the commander-in-chief, or other superior officer of the squadron, with any message from an enemy or rebel; (3) all spies bringing seducing letters from an enemy or rebel, or endeavoring to corrupt any one in the fleet to betray his trust; (4) the relieving an enemy or rebel in any way, directly or indirectly; (5) not preparing for fight when duty commands, or not making due preparations on likelihood of engagement, and not encouraging the inferior officers and men to fight courageously; (6) the treacherously or cowardly yielding or crying for quarter; (7) disobeying orders in time of action, or not using all possible endeavors to put the same effectually in execution; (8) being guilty of cowardice or neglect of duty in time of action; (9) through cowardice, negligence, or disaffection, forbearing to pursue the chase of an enemy, pirate, or rebel, beaten or flying, or not relieving or assisting a known friend in view to the utmost; (10) deserting to the enemy, or running away with any of her Majesty's ships or their belongings, or any pieces to the weakening of the service, or cowardly or treacherously yielding up the same; (11) deserting simply, or enticing others so to do; (12) making, or endeavoring to make, any mutinous assembly on any pretense whatever; (13) uttering words of sedition or mutiny; (14) concealing traitorous or mutinous practices or designs; (15) striking a superior officer, or offering any violence to him, being in execution of his office, on any pretense whatsoever; (16) unlawfully burning or setting fire to any ship property or furniture, not then appertaining to an enemy, pirate, or rebel; (17) neglect in steering any of her Majesty's ships, so that the same be stranded, split, or hazarded; (18) sleeping on watch, or negligently performing duty, or forsaking station; and (19) robbery.

It is stated by Mr. Prendergast, in his *Law Relating to Officers in the Army*, that a sentence of death pronounced by a court-martial does not operate as an absolute dismissal from the service; for if the offender should be pardoned, he is restored to his former position.

But though a pardon operates as a restoration to the service, the greater question still remains to be judicially decided, whether a restoration to the service operates as a pardon. This question is inseparably connected with the fate of the gallant but unfortunate Sir Walter Raleigh. He had been condemned to death for alleged participation in a treasonable plot to raise Arabella Stuart to the throne; and, after undergoing 13 years' imprisonment, he received from James I., by a commission under the Great Seal, the command of a fleet and army fitted out against the Spanish possessions in South America, with power of life and death over the king's subjects serving in the expedition. The enterprise failed; and on Sir Walter's return to England, James caused his head to be struck off, according to the sentence originally pronounced. On showing cause against his execution, Sir Walter pleaded that his commission was tantamount to a pardon, and quoted a case of a man who had been condemned for felony, having been pardoned on account of his subsequent service in the wars of Gascony. Lord Chief-Justice Montague, however, held that though an implied pardon of the kind cited might hold good in felony, that treason could only be pardoned by express words. There is the high legal authority of the late Lord Chancellor Campbell * for saying that the chief-justice declared and expounded the law soundly; and that in strictness Sir Walter's attainder, under the former judgment, could only be done away with by letters-patent under the Great Seal, expressly reciting the treason, and granting a free pardon. See, on the subject of these two articles, ARTICLES OF WAR, and MUTINY ACT.

* *Lives of the Chief-Justices*, vol. i. pp. 357, 358.

As to the mode of C. P. in the navy, the culprit where he is an officer, is shot; where he is a common seaman, he is usually hanged at the yard-arm.

CAPITALS (*majuscula*), in contradistinction to small letters (*minuscula*), are the large letters employed in writing and printing to help the eye, to relieve the uniformity of the page, to increase the facility of keeping and finding the place, to mark the beginnings of sentences, proper names, &c.—Among the ancients and during the earlier part of the middle ages, no distinction of C. and small letters was known; and after the practice had been introduced of beginning books and chapters with great letters often adorned or illustrated with much artistic ability, it was long before C. were employed in such a way as could afford much real advantage to the reader. At the present day, they are universally employed, even in the printing of Greek and Latin books.

Considerable diversity has existed at different times with regard to the employment of them, the books of the 17th and 18th c. exhibiting a much greater proportion of them than those of the present day. In German books, all substantives usually begin with a capital letter; in English and French books of the present day, they in general appear only at the beginnings of sentences and of proper names. Adjectives formed from proper names as *English*, *French*, &c., are generally begun with a capital in English books, but not in French nor in German ones.

CAPITANA'TA, or FOGGIA, a province of Italy, the *Daunia* of the ancients, is bounded N. and E. by the Adriatic, and on the S.W. by the Apennines. It stretches along the Adriatic about 70 miles in a straight line, and its average breadth is about 45 miles; but its coast-line, measuring round the great promontory of Monte Gargano, which has been called 'the spur of Italy,' is fully 100 miles, and its breadth between the extremity of that projection and the Apennines, 75 miles. Pop. (1881) 355,829. The greater part of the surface is a sandy plain sloping from the Apennines to the Adriatic, and watered only by some inconsiderable streams. The rearing and feeding of cattle form the chief occupations of the inhabitants. Wheat, wine, and fruits of various kinds are produced in quantities sufficient to admit of exportation. There are important salt-works, quarries of alabaster, and potters' clay. Foggia is the chief town.

CAPITA'TION, from the Latin *caput*, a head, means something applicable to all persons, or to the people by the head. A tax levied on all persons, without reference to property or other incidents, is called a C. tax, and sometimes a poll tax. The former term was often used in France for the tax better known as the *taille*, although this offensive impost was not imposed on all alike, the nobility enjoying many exemptions from it.

CA'PITOL, the fortress of ancient Rome, and site of the national sanctuary the temple of Jupiter, was situated on the *Mons Capitolinus*, the smallest but most famous of the seven hills on which Rome was built. The hill itself was first termed *Mons Saturninus*, afterwards *Mons Tarpeius* and *Rupes Tarpeia*, and after the foundation of the Capitol, *Mons Capitolinus*, though a particular portion of it retained its ancient name of *Rupes Tarpeia*. It was steep and abrupt in almost every part, formed a natural fortress, and was strengthened here and there by towers. The C. was founded by Tarquinius Priscus, and completed by Tarquinius Superbus, who tasked the people to work at it. The whole mount had a circumference of about 800 paces. During the civil wars under Sulla, the temple was burned (according to Tacitus, by design), and after its restoration, destroyed during the Vitellian riots. It was rebuilt by Vespasian, after whose death it was again destroyed by fire, but was once more restored by Domitian, who instituted here the Capitoline Games.

Domitian's structure lasted to a late period of the empire. Regarding the site of the C., there has been great dispute; the German scholars, for the most part, maintaining that it occupied the south-west summit of the hill, and the Italians, the north-east. The latter situation has the weight of probabilities in its favor. From that portion of the mount named the Tarpeian Rock, state criminals were thrown down. According to the description given by Dionysius of Halicarnassus, the temple of Jupiter, with its peristyle of columns, was 200 feet long by 185 feet wide, and was divided into three cellæ, separated from each other by walls, and respectively dedicated to Jupiter, Juno, and Minerva. In the spacious portico, the people feasted on triumphal occasions. The scanty ruins remaining in the present day consist of a substructure of peperino or volcanic tufa, a wall of the same materials, and some remains of the south front, together with a portion of the great flight of steps leading to the temple.

The modern C. (*Campidoglio*), built on the site, and partly on the foundation of the ancient C., was designed by Michael Angelo,

but is one of his inferior works. The main entrance, however, presents a splendid view. It is used as a kind of hotel-de-ville and museum.

Besides the great temple of Jupiter, the most important structures on the Capitoline Mount were the temple of Jupiter Tonans, built by the Emperor Augustus; and the magnificent *Tabularium*, containing archives, and, in connection with the Ærarium ('Treasury'), serving as a library and place for lectures, &c. The remains of this structure, built by Quintus Catulus, 73 B.C., have still an imposing aspect.—For the U. S. Capitol, see WASHINGTON.

CAPI'TULARIES (Lat. *capitularia*). *Capitularium* is literally a book divided into chapters; and the plural of the word was the name given to the laws issued by the kings of the first and second of the Frankish races, from Charles Martel downwards. These laws proceeded from the great assemblies of the king, nobles, and bishops, which formed the states of the kingdom, and, from their general character, were opposed to the laws issued for the separate states, which were called *leges*. They were divided into general and special C., according to the more or less general nature of the interests which they embraced, and the mode of their publication. They have by no means been all preserved. The most famous are those of Charlemagne and of St. Louis. In 827, Abbot Angesius, of Fontenelles, made a collection of the C. of Charlemagne, and of his son, Louis le Débonnaire. Other collections were made by private persons, and, in 847, one by authority of the king, but they are all very imperfect and ill arranged. After Charles the Simple, in 922, no more C. were issued, and no similar laws or statutes exist from that period till the time of Louis le Gros, in 1100. The best collections are those of Baluze (Paris, 1677 and 1780), and of Pertz, in the *Monumenta Germaniæ*.

CAPITULA'TION, a treaty consisting of several specified conditions (Lat. *capitula*, heads). In the military sense of the word, a C. is a treaty of surrender to an enemy. When a place can no longer be defended, on account of failure of ammunition or provisions, or the progress made by the besieging-party, a white flag is commonly put up, as a sign that the besieged are willing to capitulate. According to the kind and degree of peril in which the fortress is placed, so are the terms which the governor may reasonably expect from his successful opponent. Sometimes the arms and military stores are left to the besieged, but more frequently they are taken by the besiegers, except articles of private property belonging to the officers and men. The 'honors of war,' the marching out with drums beating and colors flying, are usually stipulated for, unless the conqueror exacts very severe terms. The mildest form of a C. is a *convention*, agreed to when the conqueror is not strong enough to insist on stringent conditions.

CAPI'Z, a town on the island of Panay, in the Philippine Archipelago. It is situated on a plain on the north coast, near the rivers Panay, Panitan, and Ivisan, by which it is sometimes inundated during the rainy season. It is defended by a small fort, and is the residence of a Spanish alcalde. Pop. 11,000.

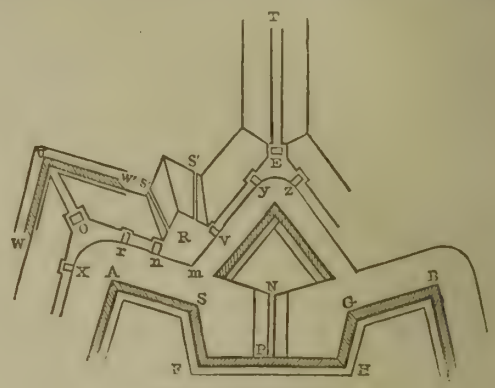
CA'PNOMANCY, a word formed from the Greek *capnos*, smoke, and *manteia*, divination. The ancients practised it in two different ways—either they threw grains of jasmine or poppy on the burning coals, and watched the motions and the density of the smoke that rose from them, or they watched the smoke of sacrifices. This latter kind of C. was most generally employed, and that to which the greatest importance was attached. If the smoke was thin, and descended in a right line, instead of being blown back by the breeze, or spreading over the altar, the augury was good. It was also believed that the inhalation of the smoke rising from the victims or from the fire which consumed them, gifted the priests with prophetic inspiration.

CA'PO D'ISTRIA, a fortified seaport town of Austria, situated on a rocky island in the Gulf of Trieste, 8 miles south-west of the city of Trieste. It is capital of the circle of Istria, with the peninsula of which it is connected by a stone causeway, nearly half a mile long. Its old buildings, ruinous walls, and narrow streets, give the town a gloomy aspect. It has a cathedral, manufactures of leather and soap, and a trade in wine, oil, and salt. Pop. (1880) 8646. In ancient times, this place was known as *Ægida*, and afterwards as *Justinopolis*, in honor of Justin II., who restored it.

CAPO D'ISTRIA, or CAPO D'ISTRIAS, JOHN ANTHONY, COUNT, president of the Greek republic from 1827 to 1831, was born in Corfu, 1780. His family had been settled in that island since the 14th c., but originally came from the Illyrian town of Capo d'Istria (q. v.), near Trieste. He devoted himself to political life, and after having held a high position in the Ionian Islands, he entered the diplomatic service of Russia. Here his diplomacy tended to the separation of Greece from Turkey. In 1827, he was elected president of Greece; and in January 1828, he landed in Greece, and entered upon the duties of his office. He was a patriot, a philanthropist, and an able diplomatist, but by no means equal to the task which he now undertook. Everything was in disorder; the people had been long enslaved, and knew not how to use their freedom; and the president had been so much imbued with the centralizing principles prevalent at the courts which he had frequented, that some of his measures, especially that restricting the liberty of the press, gave offence to the most temperate of the enlightened lovers of civil liberty. His career was cut short by his assassination in a church at Nauplia on October 9, 1831. The assassins were relatives of Peter Mauromichali, against whom he was urging on a prosecution, for alleged offences against the state.

CAPONIE'RE, or CAPONNIÈRE, in Fortification, is a parapet 8 or 10 feet high, with a superior slope, terminating in a small glacis. It is placed in the ditch of a fortified place, to cover or screen the defenders while passing from one defence-work to another. Generally, it has a banquette, on which musketeers may stand to fire over the crest. If there is a passage between two such parapets, it is a *full* caponnière; if on one side only, a *half* caponnière. Generally, the parapets are of earth, and the passage open overhead; but sometimes caponnières are vaulted galleries of brickwork, loopholed at the sides for musketry; while in field-works, palisade carponnières are occasionally thrown across the ditches of redoubts.

Reserving to the article FORTIFICATION a notice of the connecting-links between various defence works, we give, in the annexed cut, a plan of what is called a *front* of fortification, illustrating many parts already described in the *Encyclopædia*, each under its specific heading. ASF is one half of a *bastion;* BGH,



Front of Fortification.

one half of another bastion; AS, BG are *faces* of the bastions; SF, GH are the *flanks;* A and B are *salient angles;* S and G are *shoulders;* F and H are *re-entering angles;* FH is the *curtain* between two bastions; PN is the caponnière, stretching across the main ditch from the curtain to the ravelin N; the white space on which the letters XA*m*SV*yz*GB stand is the *ditch;* ORE is the *covert* or *covered-way;* R is the *place of arms;* S', S' are *sally-ports* cut through the *glacis;* X, *r*, *n*, V, *y*, and *x*, are *traverses;* W'UW' is a *flèche*, outside a salient angle of glacis; OU is a second caponnière, leading to the flèche, with a traverse at O; ET are a traverse and a caponnière leading to a redoubt supposed to be beyond the glacis; a line in the direction UA would describe the *capital* of one of the bastions.

CAPPADO'CIA, anciently, a province, and subsequently a kingdom in the west of Asia (in part the present Caramania). It was bounded by Lycaonia on the W., by Cilicia and Syria on the S., by Armenia on the E., and by Pontus on the N. During the time that it belonged to the Persian empire, however, it included Pontus, which was called Lesser Cappadocia. In 17 A.D., C. was erected into a separate province of the Roman empire, by Tiberius.

CA'PPAGH BROWN, a bituminous earth, which yields pigments of various shades of brown, the two most strongly marked being known as Light and Dark Cappagh Brown. The coloring matters are oxide of manganese and iron. The C. Browns are transparent and permanent; and when not applied too thickly, they dry well in oil. The name is derived from Cappagh, near Cork, in Ireland. C. B. is also called Encrome Mineral, and more frequently Manganese Brown.

CAPPARI'DEÆ, or CAPPARIDA'CEÆ, a natural order of exogenous plants, allied to *Cruciferæ*, and including about 350 known species, herbaceous plants, shrubs, and trees, mostly natives of tropical and sub-tropical countries. The leaves are generally alternate, stalked, undivided, or palmate; the flowers solitary or clustered; the clayx of four sepals, sometimes cohering in a tube; the corolla of four, or sometimes eight petals, sometimes wanting, the stamens generally a multiple of four, or indefinitely numerous, placed on a hemispherical or elongated disk; the ovary one-celled, the style thread-like or wanting; the ovules curved; the fruit either dry and pod-like (tribe *Cleomeæ*), or a berry (tribe *Capparæ*).—To this order belongs the well-known caper-bush.

See CAPERS. Many of the species possess stimulant properties; some are poisonous. One of the most interesting plants of the order is the Siwák (*Capparis sodata*), a bush or small tree, one of the most characteristic features of the vegetation of Africa, from the Great Desert to the Niger, the small berries of which have a pungent taste like pepper, and when dried, constitute an important ingredient in the food of the inhabitants of those regions; whilst the roots when burned yield no small quantity of salt.—*Barth's Travels*

CAPPEL, a village of Switzerland, in the canton of Zurich, and 10 miles S.S.W. of the city of that name. It is interesting as the place where the great reformer Zwinglius was killed in a conflict with troops of the Roman Catholic cantons, October 1531. A monument has been erected here to his memory.

CAPRE'RA, or CABRERA, one of a group of small islands called the Buccinari Islands, in the Strait of Bonifacio, to the east of the north point of Sardinia (q. v.). They belong to the Italian province of Sassari. C. is separated from the coast of Sardinia by a strait of little more than a mile in breadth, and by a similar narrow strait from the island of Maddalena, which lies to the west. Its greatest length, from north to south, is about six miles, and it breadth is from two to three miles. Like Maddalena and the rest of the Buccinari Isles, and the neighboring coast of Sardinia, C. is rocky, bare, and unfertile. It has no streams, and is in few places adapted either for the pasture of cattle or for the plough. In former times, it was the abode only of wild goats—whence its name (Lat. and Ital. *capra*, a goat)—and rabbits, and was occasionally visited by goat-herds and fishermen. It has of late years acquired celebrity as the ordinary residence of Garibaldi, who acquired a property and built a house here in 1854. The rest of the island was bought by friends and presented to him some years after. Here he for the most part lived, save when on his military expeditions, or discharging his functions as a member of the Italian legislature at Rome. It was to C., his own beloved home, that he was sent by the Italian government in 1867, after his unfortunate attempt to overthrow the papal government; and here, 2d June 1882, he died.

CA'PRI (the ancient *Capreæ*), a charming island in the Mediterranean, at the entrance of the Bay of Naples, about three miles from Cape Campanella, and twenty miles south of the city of Naples. On its small area of about eleven miles in circumference, it displays a rich variety of beautiful scenery, ruins of antiquity, and points of historical interest, and contains a population of about 6000 souls. The island is composed of two mountain masses, separated from each other by a depression like the seat of a saddle. That on the west, called Monte Solaro, which is the highest and largest, has an elevation of about 1900 feet. The eastern part does not attain a height of more than 860 feet above the sea. At the base of the eastern mountain is situated the town of C., built on a shelving rock, and guarded by walls, gates, and draw-bridges, with a cathedral, and a population, including the district, of about 4000. It commands a beautiful prospect, and communicates with the little town of Anacapri, on the western table-land, by a flight of 535 rude steps, cut in the face of the rock. There are only two safe landing-places on the island, and these are at C. and near it. C. was a celebrated place, in the times of Augustus and Tiberius. Ruins are still found of Roman baths and aqueducts, and of the twelve grand villas or palaces built in honor of the twelve chief deities by the Emperor Tiberius who passed the last ten years of his life here in the practice of the grossest licentiousness and cruelty.

The inhabitants now consist of fishermen, sailors, and a few traders, with vine-dressers and cultivators of olives in Anacapri. Wherever a tree can be planted, the hopeful and industrious people have prepared for it a soil by persevering toil in terrace-culture. Delicious quails, which in vast numbers alight on the island during their migrations to and from Africa, in spring and autumn, are taken in nets, and form an important item in the resources of Capri. To the west of the town of C. is situated the *Grotta Azzurra* (Blue Grotto), a remarkable cavern, entered from the sea by a narrow opening not more than three feet high. Inside, however, it is found to be of magnificent proportions, and of marvelous beauty, the gorgeous coloring being said to be produced by the reflection and refraction of the sun's rays through the water. Elliptical in form, it has a length of 165 feet, a breadth of 100 in the widest part, and a height of 40 in the loftiest, with 48 feet of water beneath.

CAPRI'CCIO (Ital.), in Art, is applied to a picture or other work which designedly violates the ordinary rules of composition. Foliated ornaments, with Cupids or other figures appearing in them in situations not strictly natural, are capriccios.

CAPRICCIO, in Music, is a species of free composition, without being subject to rule as to form or figure. Locatelli, at the beginning of the 18th c., composed capriccios for the violin. The most celebrated C. of modern times is Mendelssohn's B minor C. for pianoforte and orchestra.

CAPRICO'RNUS, the *Goat*, a southern constellation, and the tenth sign of the zodiac (q. v.); denoted by the sign ♑, representing the crooked horns of a goat. It is usually represented on the globe as having the forepart of a goat, but the hinder part of

Capricornus.

a fish (see fig.). It is one of the least striking of the zodiacal constellations. It was, however, celebrated among the ancients, who regarded it as the harbinger of good-fortune, and as marking the southern tropic or winter solstice, wherefore they called it the 'Southern Gate of the Sun.' It contains no large stars, the two largest, which are situated in the horns, being only of the third magnitude. Neither of these rises above the horizon in our latitude. See TROPICS.

CA'PRIDÆ, a family of ruminant quadrupeds, which, as defined by some naturalists, may be described as the *Sheep and Goat* family, including the Linnæan genera *Ovis* (Sheep, q. v.) and *Capra* (Goat, q. v.); but which is extended by others to include Antelopes, their persistent horns being regarded as the great distinction between them and the *Cervidæ* or Deer family. In the more restricted sense, the name designates a very natural family, yet differing from the *Bovidæ* or Ox family more in general appearance than in other characters; whilst links of connection with the Antelopes are not wanting, a very remarkable one being found in the Prong-horn of America.

CAPRIFICA'TION, a method which has long been employed in the Levant for securing and hastening the maturation of figs, and which consists in suspending fruit-bearing branches of the wild fig above or beside those of the cultivated tree. The notion once entertained, that this practice is analogous to that by which the fecundation of the female palm-tree is secured, is inconsistent with the now well-known fact, that the fig has both male and female flowers within its own receptacle; and it is therefore supposed that the effects of C. may result from the agency of a species of insect, of which the eggs have been deposited in the early wild figs, and which may promote fecundation by entering the receptacle of the cultivated fig, or perhaps by puncturing it may cause it to ripen sooner. In hope of a similar advantage, some French and English cultivators have inserted into figs straws dipped in olive-oil. But C. is scarcely practised in the western parts of Europe, and has even been discontinued as unnecessary in some parts of the east where it once prevailed.

CAPRIFOLIA'CEÆ, a natural order of exogenous plants, consisting of shrubs and herbaceous plants, which have opposite leaves without stipules, and flowers disposed in corymbs, in heads, or in whorls. The calyx is 4—5-cleft; the corolla monopetalous, tubular, or wheel-shaped, sometimes irregular. The stamens are adherent to the corolla at its base, and alternate with its lobes. The ovary is free, 1—5-celled. The fruit is generally a berry, sometimes dry, but not splitting open when ripe. The order is very nearly related to *Cinchonaceæ*, differing chiefly in the want of stipules. More than 200 species are known, chiefly natives of the temperate and colder parts of the northern hemisphere. To this order belong the Honeysuckle, Elder, Viburnum, and Snowberry. Emetic and cathartic properties are prevalent in it.

CAPRIMU'LGIDÆ, a family of birds, of the order *Insessores*, and tribe *Fissirostres*, nearly allied to the *Hirundinidæ* or Swallow tribe, but differing from them in the still greater width of gape, and in having long stiff bristles at the base of the bill. They are insectivorous birds. They have very long wings, short legs, and toes united at the base by a membrane. The European goat-sucker may be said to be the type of the family, which includes also the Whip-poor-will and Night-hawk of America, with many other species widely distributed over the globe, and now arranged by naturalists in a number of genera.

CAPRO'IC, CAPRY'LIC, AND CAPRIC ACIDS are represented by the formulæ $C_{12}H_{12}O_4$, $C_{16}H_{16}O_4$, and $C_{20}H_{20}O_4$, and are members of the acetic or fatty-acid series. They derive their names from *capra*, a goat, in consequence of their more or less resembling in smell the odor of that animal. They may all be obtained from butter by pressing out the portion which remains liquid at 60°, saponifying this oil, and distilling the soap which is thus formed with sulphuric acid. The liquid which passes over contains these three acids, together with butyric acid, which, by being converted into baryta salts, are separable from one another. All three of these acids are also obtained by the oxidation of oleic acid by nitric acid; and capric acid is also obtained by acting upon oil of rue with fuming nitric acid; hence it is frequently called *rutic acid*.

CAPSA'LI, a seaport town of the Ionian Islands, capital of Cerigo, or Cythera, is built upon a narrow ridge, terminating in a precipitous rock near the south end of the island. It has an old castle and a good harbor. Pop. 2000.

CA'PSICINE, an alkaloid, is the active principle in capsicum or Cayenne pepper, and can be obtained from it. It is a thick liquid, of a reddish color, and possessing such acrid properties, that half a grain diffused through a large room causes every one therein to sneeze violently.

CA'PSICUM, a genus of plants of the natural order *Solanaceæ*, having a wheel-shaped corolla, projecting and converging stamens, and a dry berry. The species are all of a shrubby, bushy appearance, and have more or less woody stems, although they are annual or biennial plants. The number of species is very uncertain, some botanists distinguishing many, whilst others regard them as mere varieties of a few. They are natives of the warm parts of America and of Asia, have simple leaves, and rather inconspicuous flowers, and some of them are in very general cultivation in tropical and sub-tropical countries for their fruit, which is extremely pungent and stimulant, and is employed in sauces, mixed pickles, &c., often under its Mexican name of *Chillies*; and when dried and ground, forms the spice called *Cayenne Pepper*. As a condiment, it improves the flavor of food, aids digestion, and prevents flatulence. In tropical countries, it counteracts the enervating influence of external heat. In medicine, it is used as a stimulant, rubefacient, and vesicant; is often administered in combination with cinchona; and is particularly valuable both internally administered and as a gargle, not only in relaxed conditions of the throat, but in some of those diseases in which the throat is most dangerously affected. As a medicine, C. is administered in *pills* mixed with bread; in the form of *tincture*, obtained by digesting the bruised C. in alcohol; or of an *infusion*, procured by digestion in water, with varying proportions of salt and vinegar. A gargle of C. is prepared by infusing it in water, along with candy-sugar and vinegar, and thereafter adding a little infusion of roses. It has no narcotic properties. It owes its power chiefly to *Capsicine* (q. v.). The fruits of the different species of C. differ in form, being round, oval, conical, heart-shaped, &c.; they vary from half an inch to four inches in length, and are sometimes of a bright red, sometimes of a yellow color. In all, the dry berry has an inflated appearance, and contains numerous whitish flattened seeds, which are even more pungent than the leathery epidermis, or the spongy pulp. Cayenne pepper consists chiefly of the ground seeds. *C. annuum*, sometimes called Common C., or Chilly Pepper, is perhaps the most common species in cultivation; and in the southern parts of Britain, if raised on a hotbead as a tender annual, it produces fruit in the open border. There are several varieties of it. *C. frutescens*, sometimes called Goat Pepper, and *C. baccatum*, sometimes called Bird Pepper, have greater pungency, and the former is generally described as the true Cayenne Pepper. *C. cerasiforme*, with a small cherry-like fruit, and therefore called Cherry Pepper, and *C. grossum*, with a large, oblong, or ovate fruit, known as Bell Pepper, are frequently cultivated.—The fruit is used either ripe or unripe, except for making Cayenne Pepper, for which ripe fruit is employed. The fruit brought from south America is sometimes sold by druggists under the name *Guinea Pepper*.

CA'PSTAN, on shipboard, is a ponderous mass of timber, whose uses are to heave the anchor, hoist up masts and guns, take in and discharge cargo, &c. It has very firm supports on the deck underneath it. It comprises a *barrel*, round which a rope or a chain coils; *whelps*, or pieces of timber, which enlarge the diameter without greatly increasing the weight; the *drum-head*, a polygonal flat piece of timber at the top, pierced laterally with holes; the *step*, or lowest part, which rests upon and is bolted to the beams; the *saucer*, an iron socket let into the top of the step; the *pivot* or *spindle*, which, resting on the saucer, forms the axis around which the C. turns; the *pawls*, short bars of iron, to prevent the re-action of the C.; *bars*, which enter the holes, and are the levers for enabling the sailors to work the C.; *pins*, placed vertically through the drum-head, for temporarily retaining the bars in their places; and the *shifter*, a rope connecting the outer ends of the bars. Among many improvements made in the arrangement and actions of capstans is Wardill's, for increasing the bite or holding of a chain-cable around the circumference. In large vessels they are generally worked by steam.

CA'PSULE, in Botany, a dry fruit, *syncarpous* (or formed of several carpels united together into one), and opening either by valves, as in the fox-glove, primrose, and rhododendron, or by pores near the summit, which some regard as a sort of valves, and of which beautiful examples may be seen in the poppy and snap-dragon. Capsules are either one-celled or many-celled. The *Pyxidium* is a variety of C., which opens as if cut around near the summit, presenting the appearance of a cup with a lid, of which a very beautiful example may be seen in the *Anagallis*, or Pimpernel; and another in the great woody fruit of the different species of *Lecythis*, and other *Lecythidaceæ*.

CA'PTAIN, MILITARY, is perhaps the most general designation given to an officer of land forces; something equivalent to it being found in most European languages. As a word, it simply means a *head* or *leader*, and may be applied to a chief over any number of men. *Captain-general* is in some countries a very high command. In the time of Queen Elizabeth, there was, among other high military officers, a Captain-general of footmen. In the organization of the British army at the present day, there is one C. to every *company* of infantry, and every *troop* of cavalry. Formerly every battery of artillery had two captains—a first and a second, the latter being called C.-lieutenant. Now, the first in command has the title of major, and the second that of C. The first in command of a battery of artillery, even when styled C., was considered higher than a C. of infantry or cavalry, and was privileged to be mentioned by name in military despatches like colonels and majors.

The duty of the C. is to see to the men of his company in everything that relates to the discipline, exercises, billeting, pay, settlement of accounts, mess, kit, clothing, arms, ammunition, accoutrements, stores, barracks, cooking, &c.; to receive orders concerning these matters from the major, and to enforce these orders among the men. He is responsible to the major, and is assisted in his duties by the lieutenant and sub-lieutenant. The number of captains on the peace establishment of the British army, in its several branches, are about 250 captains of cavalry, 1250 of infantry, 250 of artillery, 120 of engineers, and 30 for colonial corps—some 1950 in all, in full commission. For the former value of a C.'s commission, and its purchase, see COMMISSIONS, ARMY; PURCHASE SYSTEM.

CAPTAIN, NAVAL, is the general designation for the commander of a ship. It is not universal, for some vessels of war are commanded by officers lower in rank than C.; while the chief officer of a merchant-vessel is often called *master*. The commanders of all rated ships are captains. The captains rise to the command of larger and larger ships, with increase of pay, according to length of service. The C. is responsible for everything on shipboard, in discipline, navigation, equipment—all, in short, that concerns the *personnel* or the *matériel* of the ship. If his ship belongs to a particular fleet or naval station, he is responsible to some admiral or commodore; if not, he is directly responsible to the Admiralty. The C. of that particular ship in a fleet which carries the admiral is called *flag*-C., and is for the moment higher in rank than others. A naval officer is always on half-pay, except when attached to a ship in actual commission; and thus in times of peace there have been always more naval captains on half than on full pay; but recent measures have been adopted to assuage this evil. The number of captains in the naval service during peace are about 83 in commission on full-pay. About 142 are on half-pay, under the designation of the *active* list; these are eligible for re-employment; while on the *reserved* list and the *retired* list there are 426 more. They rank in dignity with lieutenant-colonels in the army, and with colonels, after three years' service.

The word C. is used in other ways also in the navy. The *C. of the Fleet* is a temporary officer in large fleets; he promulgates the admiral's orders, and receives all the reports and returns, filling, in short, a post equivalent to that of *Chief of the Staff* in an army. Among the seamen on board a ship, the chief of each gang is called C.; such as the *C.* of the after-guard, of the forecastle, of the hold, of the main-top, of each gun, &c.

CA'PTION, in the practice of the law of England, may be defined as that part of a legal instrument which shows the authority under which it is executed, or taken, as the word implies. It also states the time and place of the execution. The word C. is also improperly used in England to signify an arrest—a meaning which it strictly and technically bears in Scotland, where, until the passing of the 1 and 2 Vict. c. 114, called the Personal Diligence Act, which authorizes more simple forms of legal process, it was the only recognized civil warrant for the apprehension of a debtor or obligee. This word is also used in Scotland to denote a summary warrant of imprisonment, granted on the application of the clerk of court, for the purpose of forcing back the pleadings and other

papers in a lawsuit, which had been borrowed by the party against whom the C. has issued, and by whom they are unduly and illegally retained. See on the subject of this article INDICTMENT, COMMISSION, DILIGENCE, WARRANT, HORNING.

CA'PTIVES. It is laid down by Blackstone, that, as in the goods of an enemy, so also in his person, a man may acquire a sort of qualified property in him as a captive or prisoner of war—at least till the ransom of the captive is paid. In Scotland, all legal proceedings against a captive are stopped till his liberation, although, in some cases, execution against his estate may proceed.

CA'PTURE may be simply defined as prize taken in time of war. The law on this subject is stated with precision in a paper addressed on behalf of the British government to the American ambassador at London in September 1794: 'When two powers are at war, they have a right to make prizes of the ships, goods, and effects of each other, upon the high seas. Whatever is the property of the enemy, may be acquired by capture at sea; but the property of a friend cannot be taken, provided he observes his neutrality. Hence the law of nations has established—that the goods of an enemy on board the ship of a friend may be taken—that the lawful goods of a friend on board the ship of an enemy ought to be restored—that contraband goods going to the enemy, though the property of a friend, may be taken as prize; because supplying the enemy with what enables him better to carry on the war, is a departure from neutrality.' The procedure to be adopted for determining whether the C. be or be not lawful prize, is now regulated by the 3 and 4 Vict. c. 65.

During the Russian war in 1854, there appeared in the *London Gazette*, under date the 28th March of that year, a declaration stating, *inter alia*, that her Majesty would waive the right of seizing enemy's property laden on board a neutral vessel, unless it be contraband of war, and that it was not her Majesty's intention to issue letters of marque for the commissioning of privateers. The right of seizing enemy's property on board a neutral vessel, whether contraband of war or not, had always before been maintained by England. On the re-establishment of peace with Russia, a treaty was signed, and the following declarations adopted: 1. Privateertng is and remains abolished; 2. A neutral flag covers an enemy's goods, with the exception of contraband of war; 3. Netural goods, with the exception of contraband of war, are not liable to C. under an enemy s flag; 4. Blockades, in order to be binding, must be effectual—that is to say, maintained by force sufficient to prevent effectually access to the coast of the enemy.

As to the right to property captured from the enemy, and its distribution as prize or booty of war among the officers and men of the army and navy, see BOOTY and PRIZE.

CA'PUA, a fortified city of Italy, in the province of Caserta, beautifully situated in a rich plain, on the left bank of the Volturno, about 18 miles north of the city of Naples, with which it is connected by railway. It is a military station of the first class, its defences having been greatly extended and improved by Vauban. As it is the only fortress which guards the approach to Naples from the north, it was regarded as one of the keys of the former kingdom of that name. The only objects of interest in the city are the cathedral, with some splendid granite columns from ancient *Casilinum*, upon whose site C. was built in the 9th c.; the church of the *Annunziata*, with some bas-reliefs; and the arch of the *Piazza dei Giudici*, under which many ancient inscriptions still exist. Pop. (1871) 12,174.

The ancient *Capua*, which enjoyed a reputation for wealth and population second only to Rome and Carthage, was situated about two miles south-east of the present city, where its ruins are still to be seen, its site being occupied by the modern town of Santa Maria di Capua. C. was founded by the Etruscans under the name of *Volturnum*, as early, according to some authorities, as 800 B.C., and was the chief city of the twelve said to have been founded by them in this part of Italy. Its present name was derived from the Samnites, who captured it in 423 B C. After the battle of Cannæ, 216 B.C., the popular party opened the gates to Hannibal, whose army was greatly enervated by its luxurious winter-quarters here. The Romans obtained possession of the city in 211 B.C. In the 5th c., A.D., C. was devastated by the Vandals under Genseric.

It recovered its prosperity again to some extent, but it was totally destroyed by the Saracens in 840. The citizens, who had fled to the mountains, were induced by their bishop to return some 16 years later, and found the modern Capua. From the existing remains of the walls and fortifications of ancient C., it has been estimated that it had a circumference of 5 or 6 miles. It had seven gates. Among the Roman antiquities, one of the most remarkable is the amphitheater, built of bricks, and faced with white marble. Well-preserved arches, corridors, and seats for spectators, still remain. It is calculated to have been capable of holding 60,000 persons, and must have been altogether one of the most magnificent buildings of the kind in Italy.

CA'PUCHIN MONKEY, or CAPUCHIN SAPAJOU, a name often given to *Cebus capuchinus*, and some other species of the genus *Cebus*, South American monkeys, which have the head covered with short hair, so disposed as to resemble the cowl of a capuchin, the face being almost naked, or only covered with a little down.

Capuchin Monkey (*Pithecia chiropotes*).

See CEBUS. *Pithecia chiropotes*, a South American monkey of a genus allied to *Cebus*, is also sometimes called the C. M., or Capuchin of the Orinoco.

CA'PUCHINS, a branch of the order of *Franciscans*, (q. v.) so designated from the *capuche* which is their head-dress.

CA'PUDAN-PASHA', the High Admiral of Turkey. He has the entire command of the navy, and the management of all naval affairs. The port of Pera, the Turkish islands in the Archipelago, and a number of seaports and maritime districts, are under him, even in their civil administration.

CA'PULETS AND MO'NTAGUES, the English spelling of the names of the Capelletti and Montecchi, two noble families of Northern Italy, chiefly memorable from their connection with the legend on which Shakspeare has founded his play of *Romeo and Juliet*. According to tradition, both families belonged to Verona; but this does not appear to have been the case. The Cappelletti were of Cremona, and the fact that their burying-ground and the tomb of Juliet are shown at Verona, only proves how easy it is, in a country of ruins like Italy, to connect fact with fable. It has also been asserted that one family was Guelf and the other Ghibelline; but this is disproved by a reference to them in the *Purgatorio* of Dante (canto vi. l. 106). The poet is blaming the Emperor Albert for neglecting Italy, the very garden of his domain. 'Reckless man,' he says, 'come see how the Montecchi and the Cappelletti are oppressed;' and the context shows that the Guelfs were the oppressors in both cases of these great Ghibelline families. The Emperor Albert was murdered in 1308, and this event has supplied the Veronese with a date for their legend. The first publication in which we recognize the essential incidents of Shakspeare's play is the novel *La Giulietta*, by Luigi da Porto, printed in 1535, after the death of the author. He states, in an epistle prefixed to the work, that the story was told him 'by one Perigrino, a man fifty years of age, much experienced in the art of war, a pleasant companion, and, like almost all the Veronese, a great talker.' In 1554, Bandello published in his collection of tales another Italian version of the legend. It was entitled *The unfortunate Death of two unhappy Lovers, one by Poison and the other of Grief*. Both writers fix the date of the event by saying it took place when Bartholomew dalla Scala or Scaliger ruled Verona. A French version of the tale was published by Pierre Borsteau in Belleforest's *Histoires Tragiques*. It was translated into English in 1567, and published in Painter's *Palace of Pleasure*. About the same time, Arthur Brooke published an English poem on the same subject, entitled *The Tragical History of Romeus and Juliet, written first in Italian by Bandell, and now in English*. There is evidence that an English play had appeared previously, and that before Shakspeare's time the story was so well known in England that it had supplied subjects for tapestries. Shakspeare's play seems to have been principally based on the English poem. It was Brooke who first called the Montecchi Montagues, and the Prince of Verona Escalus, instead of Scala. Wright and Cary, in translating Dante, have followed the example of Shakspeare, and render the Italian names of the *Divina Commedia* into the familiar 'Capulets and Montagues' of *Romeo and Juliet*. The historical date of the tragedy has not, however, been adopted by modern stage managers and Shakspearian critics, who very properly bring down the action from the beginning to the close of the 14th c., when commercial opulence, and the revival of arts and letters, supply accessories more in keeping with the drama

than the ruder age to which history must assign the fall of the Capulets and the Montagues.

CA'PUT MO'RTUUM VITRI'OLI, or COLCOTHAR, is the name given by the alchemists to the red powder (mainly red oxide of iron) which remains in the retorts when green vitriol or the sulphate of iron is calcined.

CAPY'BARA (*Hydrochœrus Capybara*), a quadruped of the order *Glires* or *Rodentia*, and of the family *Cavidæ*, strongly resembling the Cavy or Guinea-pig, although it is the largest existing rodent known, and aquatic in its habits. It is a native of South America, and abounds in many of the large tropical rivers. It is equal in size to a small pig. The dentition resembles that of the cavy, except that the grinding teeth are composed of numerous transverse plates, the number of the plates increasing as the animal advances in age; an interesting point of resemblance to the dentition of the elephant, and a link of connection between the rodents and the pachydermata. The C. feeds exclusively on vegetable food, browsing on the grass near the rivers, and often committing great ravages in plantations of sugar-cane. It runs badly, but swims and dives well, and has the power of remaining under water for seven or eight minutes. It is very inoffensive, and easily tamed. The flesh, except that of old males, is good, and is eaten by all classes of persons. The C. is sometimes called

Capybara (*Hydrochœrus Capybara*).

Water-hog, of which *Hydrochœrus* is a Greek translation. In Demerara, it is called Water-horse, a corruption of the Dutch *Water Haas*—i. e., water-hare.

CARA'BIDÆ, a tribe of beetles, or coleopterous insects, of the section *Pentamera* (see COLEOPTERA), corresponding with the genus *Carabus* of Linnæus, but of which the species are extremely numerous, those already known being numbered by thousands. They mostly feed on other insects, worms, &c., and are extremely voracious and active, habits which are fully shared by their larvæ. Some of them burrow in the earth; most of them live under stones, under the bark of trees, among moss, &c.; and their bodies are adapted to this mode of life, being very firm and hard. Their legs are in general pretty long, and most of them pursue their prey rather by the use of their legs than of their wings, some of them indeed being wingless, or having only rudimentary wings. Many of them exhibit much beauty of colors and metallic lustre. The largest British species is only about an inch long, but some foreign ones are much larger. Some of the species of the restricted genus *Carabus* are among the most common British insects. Their wings are not fitted for flight.—A very large and singular insect of the tribe C. is *Mormolyce phyllodes*, a native of Java, which, in consequence of the extremely depressed form of its body, resembles some of the *Mantidæ* (q. v.), and the insects known as Leaf-insects (q. v.). To this tribe belong also the Bombardier Beetles (q. v.)

Mormolyce phyllodes.

CA'RABOU. See REINDEER.

CA'RACAL (*Felis Caracal*), a species of Lynx (q. v.), found in the warmer parts of Asia, and throughout the whole of Africa; and more probably than any European species, the lynx of the ancients. It is larger than a fox, about the same height, but much more powerful; of a uniform deep brown or wine-red color, except two spots near each eye, the under parts of the body, inner parts of the legs, which are white, and tufts of long black hair which terminate the ears. The C. is powerful enough to tear a hound to pieces. It is often represented as of a very savage dis

Caracal (*Felis Caracal*).

position; but it is capable of being tamed, and has been employed in hunting.

CARACA'LLA, properly named MARCUS AURELIUS ANTONINUS BASSIANUS, a Roman emperor, the son of the Emperor Septimus Severus, was born at Lyon, 188 A.D. He was playfully named by his father Caracalla, from his long hooded tunic, made in the fashion of the Gauls, and so called in their language. After his father's death, 211 A.D., he ascended to the throne as co-regent with his brother Publius Septimius Antoninus Geta, whom he afterwards caused to be murdered. Having bribed (at enormous cost) the Prætorians to overlook this foul deed, and to make him sole emperor, C. next directed his cruelty against all the friends and adherents of Geta, of whom twenty thousand of both sexes—including the great jurist Papinianus—were put to death. Innumerable acts of oppression and robbery were employed to raise supplies for the unbounded extravagance of the despot, and to pay his soldiers. In his famous constitution, he bestowed Roman citizenship on all his free subjects not citizens—who formed the majority, especially in the provinces—but simply in order to levy a greater amount of taxes on releases and heritages, which were paid only by citizens. In his campaigns, he imitated, at one time, Alexander, at another time, Sulla; while his main object was to oppress and exhaust the provinces which had been in a great measure spared by the tyranny of former emperors. In 217 he was assassinated, at the instigation of Macrinus, prefect of the Prætorians, by one of his veterans named Martialis, on the 8th of April 217, on the way from Edessa to Carrhæ. Historians paint the life of C. in the darkest colors. Among the buildings of C. in Rome, the baths—Thermæ Caracallæ—near Porta Capena were most celebrated, and their ruins are still magnificent.

CARACARA, or CARACARA EAGLE (*Polyborus*), a genus of birds of prey peculiar to America, and regarded as a connecting link between eagles and vultures; agreeing with the former in their strongly hooked bill and claws, but with the latter in their naked face and propensity to prey on carrion. The name C. is originally Brazilian, and is derived from the peculiar hoarse cry of a common Brazilian species (*P. Braziliensis*), a bird of very fine plumage, and about 50 inches in expanse of wings, which is of frequent occurrence over a large extent of the American continent, and is sometimes to be seen even in the southern parts of the United States.

Caracara (*Polyborus Braziliensis*).

CARA'CAS, the capital of the republic of Venezuela, the most northerly state in South America, with Guiana on the E., and Colombia on the W., is situated in lat. 10° 30' N., and long. 67° 5' W., 16 miles S. of La Guayra, its port, with which it is joined by railway. It is 2880 feet above the tide-level, enjoying from this elevation a healthy air and a temperature so moderate as to average 68° and 72° F. in February and June respectively. Standing immediately above the confluence of four streams, it is well supplied with cool water, which is distributed by means of fountains, pipes, and reservoirs. The neighborhood is subject to earthquakes—12,000 citizens having, in 1812, perished from this cause. The population in 1873 amounted to 48,897. The streets are straight and regular. The most splendid edifice is the Church of Alta Gracia for the people of color, excelling the

cathedral in the richness of its decorations. C. has a university founded in 1778.

CARACAS, the province of which the foregoing city is the capital, extends in N. lat. from 7° 38′ to 10° 46′, and in W. long. from 65° 30′ to 68°, and contains 300,000 inhabitants. With a generally mountainous interior, the immediate coast is flat, presenting, besides La Guayra above mentioned, several harbors or roadsteads. The exports of the province are cocoa, coffee, dyewoods, hides, indigo, and sarsaparilla.

CARA'CCI, a celebrated family of Italian painters, the founders of the Bolognese school of painting.

CARACCI, LUDOVICO, the son of a butcher, was born at Bologna, 1555. As a student, he was so inapt that his master recommended him to abandon the pursuit; but instead of that, he went to Venice and Parma, making acquaintance with the works of the great masters there, and returned to Bologna imbued with art principles quite opposed to the superficial mannerism then prevailing in his native city. In conjunction with two of his cousins, who, instructed by him, had imbibed the same ideas, he founded, in spite of great opposition, the school which afterwards became so famous in the history of painting. The first principle of this new school was, that 'observation of nature ought to be combined with imitation of the best masters.' The allied artists found numerous pupils, to whom they gave practical instructions in drawing from natural and artistic models, with theoretical lessons on perspective, anatomy, &c. So great was their success, that, in the course of a short time, all other schools of painting were closed in Bologna. Some of the finest works of this master are preserved in the *Academia delle Belle Arte*, Bologna—among others, the 'Madonna and Child Throned,' 'Madonna and Child Standing,' the 'Transfiguration,' and the 'Nativity of St. John the Baptist.' Ludovico died in 1619.

CARACCI, AGOSTINO, cousin of Ludovico, was born (1558) in Bologna. He became a disciple of his cousin, but he was of too versatile a genius to devote himself closely to any subject, though his magnificent painting of the 'Communion of St. Jerome' proves that he might have attained to very great eminence, had he devoted his undivided attention to the art; but he was in the habit of abandoning his easel for literature, poetry, and engraving on copper. As an engraver, indeed, he holds an important position in Italian art. He accompanied his younger brother, Annibale, to Rome, and there assisted in some of the paintings in the Farnese Gallery; but his brother, who was a slave to his art, soon quarrelled with him for his inattention, and he left Rome, and went to Parma. He died in 1602.

CARACCI, ANNIBALE, brother of Agostino, was born (1560) in Bologna, where he learned, under his father, the business of a tailor, from which he was called away by Ludovico Caracci. His progress in the study of painting was rapid, and at first he took principally for his models Correggio, Titian, and Paul Veronese. His picture of 'St. Roche distributing Alms' first gained for Annibale C. a wide reputation. His fame reached Rome, and he was employed to paint the Farnese Gallery there, which is considered his greatest work, and the manner of which partakes somewhat of Raphael and Correggio. On this gallery he was employed some eight years, and he received for his work the incredibly paltry sum of 500 crowns.

In disgust and vexation, the artist threw aside his pallet. He died in Rome in 1609, where his remains were interred, close to Raphael's tomb, in the Pantheon. Annibale C. was one of the greatest followers of Correggio, and in composition approached most nearly to the style of Raphael. Ludovico had a greater talent in teaching, and Agostino had a more versatile invention, but Annibale was unquestionably the greatest artist of the three Caracci.

CARACCI, ANTONIO, natural son of Agostiono, was born at Venice, 1583, died in 1618. He was a pupil under Annibale, and painted some excellent pictures.

CARACCI, FRANCESCO (styled FRANCESCHINI), brother of Agostino and Annibale, was born in 1595, and distinguished himself as an eminent designer. He died 1622.—The best Italian masters of the 17th c.—Domenichino, Guido Reni, Albani, and others—proceeded from the school of the Caracci.

CARACCI'OLI. The name of a Neapolitan family unfortunately associated with the memory of Lord Nelson. Several members of this family were employed in political offices.—LOUIS ANTOINE DE C., born in Paris 1721, died 1803, was the author of a pseudograph, entitled *Lettres Intéressantes du Pape Clement XIV.*, which mystified many readers throughout Europe.—FRANCESCO C. a meritorious Neapolitan admiral, entered in early life the marine service, and distinguished himself at Toulon, 1793. In the year 1798, the offensive conduct of the court of Naples toward C. induced him to return from Palermo, where the court was then residing, to Naples, where he entered into the service of the republic established by the French invaders, and, with a few vessels, prevented the attempted landing of a Sicilian and British fleet. In 1799, when Ruffo took Naples, C. was arrested contrary to the terms of capitulation, sentenced to death by the junta, hanged on the mast of a frigate, and his corpse thrown into the sea. This affair, to which Lord Nelson was a consenting party, is a stain on the reputation of the English admiral.

CARA'CTACUS, a king of the Silures, who inhabited South Wales, was one of the most persistent enemies of the Romans in Britain. For nine years he warred gallantly against the invaders, but at length was completely overthrown. His wife and daughters fell into the hands of the victors, and his brothers surrendered. C. himself fled to Cartimandua, queen of the Brigantes, who delivered him up to the Romans. He was carried to Rome, 51 A. D., and exhibited to the people by the Emperor Claudius. When he approached the imperial seat, we are told, he addressed Claudius in so noble a manner, that he and his relatives were immediately pardoned. They appear, however, to have lived during the remainder of their lives in Italy.

CA'RADOC SANDSTONE AND BA'LA BEDS, a division of the Lower Silurian System, so named from their development at Caer Caradoc, in Shropshire. They consist of sandstones, grits, and slates with occasional beds of limestone. Enormous masses of contemporaneous igneous rocks are interstratified with them. They attain a thickness of 9000 feet, not including the igneous rocks. Fossils are very abundant in some beds. They consist chiefly of Trilobites (q. v.), Brachiopoda (q. v.), and Graptolites (q. v.).

The Silurian rocks in the southern districts of Ayrshire belong to this division.

CARA'GLIO, a town of Northern Italy, in the province of Coni, six miles west of the city of that name. It is situated on the Grana, and has manufactures of silk. Pop. (1872) 3379.

CARAMA'NIA. See KARAMAN.

CARA'MBOLA, an East Indian fruit, of the size and shape of a duck's egg, but with five acute angles, or longitudinal ribs. It has a yellow, thin, smooth rind, and a clear, watery pulp, in some varieties sweet, in others acid, of very agreeable flavor. It is often used in making sherbets, and in tarts and preserves; and is known to the British in India as the *Coromandel Gooseberry*. It is one of the most universally cultivated and abundant of the fruits of India. It is produced by the *Averrhoa Carrambola*, a small evergreen tree, or bush, of the natural order *Oxalidæ*. The BILIMBI, or BLIMBING, is the very acid fruit of another species of the same genus, *A. Bilimbi*, also East Indian. Both species are now much cultivated in the tropical parts of America. Both exhibit an irritability of leaf resembling that of the sensitive plant; they also display in a remarkable degree the phenomena known to physiologists as those of Sleep of Plants (q. v.).

CA'RAMEL is the name applied to the dark brown and nearly tasteless substance produced on the application of heat to sugar (q. v.). It is likewise formed during the roasting of all materials containing sugar, such as as coffee, chicory, and malt (see BEER), and is one cause of the dark color of porter and infusions of coffee. It is also employed in the coloring of whisky, wines, vinegar, &c.

CARAMNA'SSA, a river in the presidency of Bengal, which rises in lat. 24° 34′ N., and long. 83° 46′ E., and, after a course of about 150 miles, enters the Ganges from the right in lat. 25° 28′ N., and long. 83° 58′ E. It is remarkable on several grounds. Though, on issuing from its source, it is clear as crystal, it is yet said to be both nauseous and noxious—a peculiarity which the natives impute to various supernatural causes; about 50 miles from its mouth, it is crossed by a stone bridge of three wide arches, which forms part of the grand road from Calcutta to Delhi; and lastly, it is so exceptionably subject to floods, that it has been known to rise 25 feet in a night, when scarcely any rain had fallen in the adjacent plain of the Ganges itself.

CARA'NA RESIN, more commonly, but less correctly, called GUM CARANA, is a resinous substance imported from the tropical parts of America. Its properties and uses resemble those of tacamahac. It is entirely soluble in alcohol, and melts in a slight heat. It is not well known what tree produces it.

CARA'NJA, an island on the east side of the ordinary entrance of the harbor of Bombay (q. v.), separated from the mainland by a narrow and unserviceable channel of four miles in length. It is itself two miles broad, being comparatively level and fertile, with the exception of two hills—the Little Hill in the north, and the Great in the south.

CARANX. See SCAD.

CARAPA, a genus of plants of the natural order *Meliaceæ*, natives of warm climates. *C. Guianensis*, or *guareoides*, sometimes called the Anderaba, also the C. tree, is a large tree with beautiful shining pinnate leaves, which have many leaflets, a native of Guiana and the adjacent countries, where its bark has a great rep-

utation as a febrifuge, and the oil obtained from its seeds is much used for lamps. Masts of ships are made of its trunk. The oil, which is called Oil of Carapa, is thick and bitter, and is anthelmintic.—*C. Touloucouna*, or *Guineensis*, an African species, yields a similar oil, which is employed by the negroes for making soap, and for anointing their bodies, its bitterness protecting them from the bites of insects, a purpose to which the Oil of C. is also applied in South America.—These species are very similar, and are supposed by some botanists not to be essentially distinct.

CA'RAPACE, the dorsal shield or buckler of chelonian reptiles (Tortoises and Turtles), and of the *Crustacea Malacostraca* (Crabs, Lobsters, &c.). In animals so widely different, however, there is only a general similarity in the appearance of the C., and the purpose which it serves; its organic relations are very different. For notice of these, we refer to the articles CHELONIA and CRUSTACEA.

CA'RAT, the designation of the weight commonly used for weighing precious stones, and particularly diamonds. The name seems to have come through the Arabic *qirrat* from the Greek *keration*, the fruit of the Carob (q. v.) or locust tree (*Ceratonia siliqua*), used also as a weight. The origin of the word has also been sought in *kuara*, the native name of the *Erythrina Abyssinica*, or coral-tree, the seeds of which, it is said, were very equal in size, and were used for weighing gold and precious stones

Goldsmiths and assayers divide the troy pound, ounce, or any other weight, into 24 parts, and call each a C., as a means of stating the proportion of pure gold contained in any alloy of gold with other metals. Thus, the gold of our coinage and of wedding-rings, which contains $\frac{22}{24}$ of pure gold, is called '22 carats fine,' or 22 C. gold. The lower standard used for watch-cases, &c., which contains $\frac{18}{24}$ pure gold, is called 18 C., and so on. The C. used in this sense has therefore no absolute weight; it merely denotes a ratio. This, however, is not the case with the C. used for weighing diamonds, which has a fixed weight, equal to $3\frac{1}{6}$ troy grains, and is divided into quarters, or 'C. grains,' eighths, sixteenths, thirty-seconds, and sixty-fourths. These C. grains are thus less than troy grains, and therefore the jeweler has to keep a separate set of diamond weights. Even the C., with fixed weight, varies in various countries—from about 216 milligrams in Leghorn to 195 in Florence. In England it is 205·4090 milligrams; in France, 205·5000.

CARAVA'CA, a town of Spain, in the province of Murcia, about 39 miles north-west of the city of that name, is situated on the slope of a hill crowned with a fine old castle. It has a fine church, with a miracle-working cross; also manufactures of linen and woollen fabrics, soap, paper, leather, &c. Pop. (1877) 15,000.

CARAVA'GGIO, a town of Northern Italy, in the province of Bergamo, about 24 m. E. of Milan. In the principal church are some esteemed paintings by Campi; and C. is also celebrated as the birthplace of the painters, Polidoro Caldara and Michael Angelo Merighi, both surnamed Caravaggio. In the neighborhood is a sanctuary of the Madonna, built from designs of Pellegrini (1575). Pop. about 7000.

CARAVA'GGIO, MICHAEL ANGELO AMERIGHI or MERIGHI DA, a celebrated Italian painter, was born 1569, at Caravaggio in Lombardy, Northern Italy. His father, who was a mason, employed him in making paste for the fresco-painters, and in this way the artistic genius of the boy was stirred. After studying the works of the great masters in Milan and Venice, he went to Rome, where he lived for some time in very reduced circumstances. At length, a picture of his attracted the notice of Cardinal del Monte, who now patronized the young artist; but the ferocious and quarrelsome character of C. soon involved him in difficulties. Having fled from Rome to Malta, on account of manslaughter, he obtained the favor of the grand-master by painting an altar-piece in the church of St. John, and other pictures. His quarrelsome nature soon forced him to flee from Malta; and in making his way back to Rome, he was wounded, lost all his baggage, caught a violent fever, and on reaching Porto Ercole, lay down on a bank and died (1609), at the age of 40.

Trueness to nature was the object aimed at by C., who left all schools, and devoted himself to paint life as he found it in lanes, alleys, and other resorts of the lower classes. He studied no such matters as refined sentiments or elevation of realities, but gave in his paintings expression to his own wild and gloomy character. One of his best paintings, 'The Fradulent Gamblers,' is preserved in the Sciarra Gallery, at Rome. His shadows are deep, his backgrounds very obscure; in consequence of which the whole picture seems to possess a kind of mysterious greatness, that is very imposing. Even Rubens confessed that C. was his superior in chiaroscuro. When he painted sacred subjects, he remained falsely faithful to the low realities of Italian life; so that several of his pictures painted for churches, had to be removed from their places, because they could not be harmonized with sacred associations. Kugler, the German critic, has justly said of one of C.'s most celebrated works, a 'Burial of Christ,' that it appears 'like nothing better than the funeral of a gypsy-chieftain.'—An earlier Italian painter of less eminence, POLIDORO CALDARA DA CARAVAGGIO, was born in 1495, and murdered in 1543.

CA'RAVAN (from the Persian *karvan*, i. e., trader), the name given to the great assemblages of travelers which, at stated times, traverse the deserts of Asia and Africa. Many caravans are entirely for the purposes of trade, the merchants associating themselves for mutual help and protection. A C. sometimes has so many as 1000 camels, which follow each other in single file, so that it may be a mile or more in length. The most celebrated caravans are those formed by pilgrims going to Mecca, particularly those which annually assemble at Cairo and at Damascus. The latter consists of 30,000 to 50,000 pilgrims, and is under the special protection of the Turkish sultan. The caravan by which the Persians travel to Mecca starts from Bagdad, and is the vehicle of a very important trade. The great Indian caravan to Mecca, which started from Muscat, has been long given up. Mecca, upon the arrival of the caravans, bringing goods from so many different parts of the world, presents all the appearance of a vast fair. The trade between Tripoli and the interior of Africa is exclusively carried on by caravans, likewise that between Darfur and Egypt. The great trade between Russia and China is also a caravan trade. In the east, caravans in which the camels have a load of 500 to 600 pounds are called *heavy* caravans; *light* caravans are those in which the camels have only half that weight, so that the daily journeys may be longer. *Heavy* caravans travel from 17 to 18 miles a day; *light*, from 22 to 25. The caravans are generally conducted with great regularity, and assemble at and start from stated places on stated days. The leader of the Mecca-caravans is called Emir-el-Hadsch, i. e., Prince of the Pilgrims. In trade-caravans, a leader, who is called Karwan-Baschi, is elected by the merchants from their own number.

Among the knights of Malta, caravans meant the troops of knights appointed by the order to serve in garrisons, and also the cruises of their galleys against the Turks.

CA'RAWAY (*Carum carui*), a plant of the natural order *Umbelliferæ*, growing abundantly in meadows and rich pastures in the middle and south of Europe, and in some parts of Asia, naturalized in many places in Britain. In some parts of Holland and Germany, and also in the counties of Kent and Essex in England, it is extensively cultivated for its aromatic seeds—in more strict botanical language, *carpels*—which are used medicinally as a carminative and tonic, and are also very much used as an aromatic condiment, and by confectioners, distillers, and perfumers, entering into the preparation of liqueurs, cakes, sweetmeats, scented soaps, &c. They depend for their aromatic properties on a volatile oil called Oil of C., which is obtained by bruising C. seeds and distilling them with water, and is at first limpid and colorless, but becomes yellow, and subsequently brown by keeping. Oil of C. is used medicinally to relieve flatulence, and to correct the nauseating and griping tendencies of some cathartic medicines; also in the preparation of *Spirit of C.*, and *C. Water*.—Spirit of C., which may be prepared either by dissolving the oil of C. in proof-spirit, or by distilling bruised C. seeds along with proof-spirit, is much used in Russia and Germany as a liqueur (*Kümmel-branntwein*), sweetened with sugar.—C. has a branching stem 1—2 feet high, with finely divided leaves, and dense umbels of whitish flowers. The fruit is oblong, each carpel having five thread-like ribs, with a single *vitta* (see UMBELLIFERÆ) in each of the interstices. The white carrot-shaped root of C. is sometimes used like carrots or parsnips, but has a very strong flavor.—C. has a great enemy in the CARAWAY MOTH (*Hæmylis daucella*), the larva of which destroys both its stem and flowers.

Caraway.

CARAVANCES. See CHICK PEA.

CARAVA'NSARAI, or KHAN, an eastern institution, a sort of unfurnished inn to provide travelers with a shelter. Those in towns and cities, which are generally built for traders, and charged a small sum a day, are handsomer and more convenient—having doors to the apartments—than those met with on the roads or out-

side the walls of the cities. They commonly consist of a square building of four wings built round a courtyard, in which the beasts of burden may be enclosed, and where there is usually a well of water; the lodgings are small rooms, about 7 or 8 feet high, which run round the courtyard, and are bare of every article of furniture.

These caravansarais are an institution of very ancient date, being the 'inns' of Gen. xlii. 27, xliii. 21; and it was in the stable of such a place, there being no room for his parents in the lodging apartments, that our Saviour was born (Luke ii. 7). They belong either to government, to some private individual, or are the property of the church (mosques); those situated in towns or cities are charged, but not more than two or three Turkish piastres a day; those situated on the road are usually free. There are some large and very handsome caravansarais at Cairo, Damascus, Beyrout, Aleppo, &c. The steward or keeper of a C. is called a *caravanser-askier*.

CARBAZO'TIC ACID, or PI'CRIC ACID, is a substance of great importance in dyeing, which is obtained by the action of strong nitric acid and heat on many complex organic materials, such as silk, indigo, salicine, and a variety of resins. On a commercial scale, it is best obtained from the oil of tar, which distils over from crude tar between 300° and 400°, or from the resin of *Xanthorrhœa hastilis*. The hot nitric acid solution is strained from impurities, and on cooling, yellow crystals separate of C. A., which can be purified by washing with cold water. These crystals are readily soluble in alcohol and ether, and dissolve in 80 or 90 times their weight of cold water, yielding a yellow solution, which has a very bitter taste, and stains the skin yellow; and when silk which has been treated with a mordant of alum, or cream of tartar, is immersed in a solution of C. A., it is dyed of a beautiful permanent yellow color. The bitter taste of C. A. has led to its being fraudulently employed, instead of hops, in communicating a bitter taste to beer.

CA'RBIDES, formerly termed CARBURETS, are compounds of carbon with metal. None of them occur in a natural state.

CA'RBINE is a light kind of musket, named probably from the Carabins. See next article. It is now used by the cavalry, the yeomanry cavalry, the Irish constabulary, and other corps. The best carbines are now rifled. A considerable number of American carbines, rifled and breech-loading, were purchased at a high price, by the English government in 1856. This American C. has a barrel only 22 inches in length, and a total weight of 7½ lbs. It is simple in construction, has a great range, hits a mark with accuracy, may be fired with rapidity, requires little cleaning, can be loaded without a ramrod, and supplies itself with caps from a reservoir in the hammer. Among English makers, Mr. Prince has successfully applied the breech-loading principle to carbines. The Victoria Cavalry C. has a barrel 26 inches long with 0·733 inch bore; its weight is 7½ lbs., and it is fired with 2½ drachms of powder.

CARBIN'EERS, or CARABINEE'RS, are said to have derived their designation from the Arabs, among whom the *Carabins* or *Karabins* were light horsemen, stationed at outposts to harass the enemy, defend narrow passes, &c.; in action, they took the place of skirmishers. A corps under the same name was raised in France in 1560; but the designation has not been much used in that country since the introduction of Hussars and Lancers. In the English army, C. was at one time a frequent designation for cavalry; but now there is only one regiment, the 6th Dragoon Guards, known by this title; and the distinction between them and other cavalry is little more than nominal.

CARBOHY'DROGENS, or HYDROCA'RBONS, are a series of compounds belonging to organic chemistry, which are composed of carbon and hydrogen, in such proportions that the various members of the group differ from each other in definite and regular numbers of atoms of carbon and hydrogen. The best marked group of hydrocarbons commences with Methylene (C_2H_2), which may be regarded as the first step in the ladder, and by the successive addition of other two atoms of carbon and hydrogen, we obtain Ethylene or Olefiant Gas (C_4H_4), Propylene (C_6H_6), Butylene or Oil Gas (C_8H_8), Amylene ($C_{10}H_{10}$), &c. There are also series beginning with Methyl (C_2H_3), then Ethyl (C_4H_5), and with Hydride of Methyl or Marsh Gas (C_2H_4), then Hydride of Ethyl (C_4H_6). The members of these groups are likewise characterized by a gradual ascending difference in their chemical and physical properties, especially the boiling-point, which rises by a given amount.

CARBO'LIC ACID, PHE'NIC ACID, or PHE'NOL (C_6H_6O), is the principal acid obtained by the distillation of coal-tar. Its strong odor and pungent taste, and many of its other properties resemble those of Creasote (q. v.), which is similarly obtained from wood. It is a powerful poison, especially to low forms of life; and is slightly volatile. Hence it is largely used as an Antiseptic (q. v.) and Disinfectant (q. v.). It has been supposed, probably erroneously, to be present in normal urine. Its most important application is in Mr. Lister's method of dressing wounds. It is also used for rendering inoffensive Sewage (q. v.), and for preventing the spread of infectious diseases.

Chemical and Physical Properties.—At ordinary temperatures a solid, in acicular crystals slightly volatile, it becomes at 95° F. an oily liquid, specific gravity, 1·065; boiling-point, 370° F. It does not affect a ray of polarized light, as creasote does; does not redden litmus paper; but coagulates albumen. A slip of deal dipped into it, and afterwards into hydrochloric acid, and then allowed to dry in the air, acquires a greenish-blue color. With ⅛ to ¼ its own volume of water, or fifteen times that volume or more, a solution is formed at ordinary temperatures; but between these limits a stronger solution separates from a weaker in oil-like globules. It is freely soluble in alcohol, ether, chloroform, glycerine, olive oil, and volatile oils.

Physiological Properties.—In *man*, when applied locally in dilute form, it acts as an irritant; in concentrated form, as a caustic; but it has also an anæsthetic action. When present in the blood in poisonous doses, it produces disturbances of the circulation and respiration, insensibility, collapse, and death. Half an ounce has proved fatal. Dangerous symptoms sometimes occur when it is very largely used in surgical dressings, owing to its absorption through wounds or through the skin, the first warning of which is an olive-green or black discoloration of the urine. Its medical uses, dependent on its action on the human tissues, are of comparatively little importance. On *microscopic organisms* which cause putrefaction, &c. (see ANTISEPTICS; GERM THEORY), it acts as a speedy poison. Hence it is used as an inhalation in consumption and other lung-diseases where these are present, as a local application in treating offensive discharges, as a disinfectant in infectious diseases. But its most important use is in the treatment of wounds first practised by Lister.

Listerism, or the Antiseptic Method in Surgery.—The credit due to Lister depends, not on the use of carbolic acid, which had been previously applied to the treatment of wounds by Lemaire, Déclat, and others; but on his clear appreciation of the connection between putrefaction in wounds on the one hand, and Pyæmia (q. v.), septicæmia, hospital gangrene, &c., on the other, and on his making a systematic attempt to exclude or eradicate the causes of putrefaction from wounds. Carbolic acid is not essential to his method; many other antiseptics have been employed in accordance with the principles he laid down; e. g., salicylic acid, iodoform, thymol, oil of eucalyptus, &c.; but carbolic acid is still, in spite of many disadvantages, the one which has hitherto proved most satisfactory and reliable in the hands of the most successful surgeons.

Method of Operating and of Dressing Operation-wounds.—The skin of the part, the hands of the operator and his assistants, and the instruments, are carefully purified with a watery solution (1 in 20) of carbolic acid. Sponges, Ligatures (q. v.), Drainage-tubes (q. v.), are kept in carbolic acid solutions. The operation is conducted in an atmosphere impregnated with carbolic acid by means of a fine spray, usually produced by steam generated in a small boiler. When the operation is completed and the wound closed, it is covered with a layer of specially prepared oil-silk (protective), to prevent constant irritation by the carbolic acid in the dressing. This consists of muslin impregnated with a mixture of carbolic acid, resin, and paraffin; it retains the carbolic acid at ordinary temperatures, but gives it off slowly at the temperature of the body, so that the dressing remains in an actively antiseptic condition for some days, till all its carbolic acid has evaporated. The first layer is wetted in carbolic acid solution (1 to 40) to destroy any germs adhering to its surface, and render it actively antiseptic at once. The remainder is applied dry, in order to soak up the discharge as it flows from the wound. A layer of water-proof cloth is usually put outside the muslin in order to prevent the discharge from coming to its surface directly. The whole is fixed by bandages. The dressing is in general not changed till discharge becomes visible at its edge. When it is changed, similar precautions with regard to spray, purification of hands, &c., must be observed.

Treatment of Wounds not Inflicted by the Surgeon.—They are washed out with a carbolic acid solution, watery, 1 to 20 if recent; alcoholic, 1 to 5 if of more than 12 or 24 hours' standing. They are then treated like operation-wounds. After 48 hours at farthest, it is not generally possible to eradicate the causes of putrefaction thoroughly.

Results.—If this treatment is thoroughly carried out: (1) no bacteria and no putrid smell are present in the discharge; (2) no pyæmia, septicæmia, hospital gangrene, or erysipelas results; and in general (3) no formation of pus takes place; (4) no pain is felt in the wound; (5) no fever follows.

Some of the most striking effects of this method on surgical practice are: (1) In many cases of injury, especially compound fractures and dislocations, a limb may now be preserved where amputation was formerly considered necessary. (2) Many oper-

ations are now fearlessly and safely performed, which formerly were either not attempted, or were frequently followed by disastrous results; especially operations on bones and joints, and opening of Chronic Abscesses (q. v.), and Serous Membranes (q. v.). (3) Mortality from injuries and operations has been greatly diminished: e. g., the death-rate after major amputations (in 1864 and 1866) fell from 45 per cent. to 15 per cent. (in 1867–69) in Lister's wards in Glasgow after he introduced his method, and to about 12 per cent. (in 1871–77) in Edinburgh, when he had farther developed it. Volkman of Halle was on the point of closing his wards in consequence of the prevalence of pyæmia and septicæmia. He tried Lister's method, and during the next five years the total mortality in his wards was less than 6 per cent. See Cheyne's *Antiseptic Surgery* (Smith, Elder, & Co., 1882), for a full discussion of the question.

CA'RBON is one of the elementary substances largely diffused in nature. It occurs uncombined in the mineral graphite or Black-lead (q. v.), and in the Diamond (q. v.), which is pure crystallized carbon. It is much more abundant, however, in a state of combination. United with oxygen, it occurs as Carbonic Acid (CO_2) (q. v.) in the atmosphere, in natural waters, in limestone, dolomite, and ironstone. In coal, it is found combined with hydrogen and oxygen; and in plants and animals, it occurs as one of the elements building up wood, starch, gum, sugar, oil, bone (gelatine), and flesh (fibrine). Indeed, there is no other element which is so characteristic of plant and animal organisms, and it ranks as the only element never absent in substances obtained from the two kingdoms of organic nature. Wood-charcoal, coke, lampblack, and animal charcoal are artifical varieties, more or less impure, of carbon. The atomic weight or equivalent of C. is 6 (new sys. 12); the specific gravity greatly varies; that of the diamond is 3·330 to 3·550 (water being 1·000), and of graphite 1·800. C., in its ordinary forms, is a good conductor of electricity; in the form of diamond, it is a non-conductor. Of heat, the lighter varieties of C., such as wood-charcoal, are very bad conductors; graphite in mass has very considerable conducting powers.

At ordinary temperatures, all the varieties of C. are extremely unalterable; so much so, that it is customary to char the ends of piles of wood which are to be driven into the ground, so as by this coating of non-decaying C. to preserve the interior wood; and with a similar object, the interior of casks and other wooden vessels intended to hold water during sea-voyages, are charred (coated with C.), to keep the wood from passing into decay, and thereby to preserve the water *sweet*. Its power of arresting odors and colors likewise varies much. See BONE-BLACK. In the simple property, even of combustion, there is a marked difference. Wood-charcoal takes fire with the greatest readiness, bone-black less so; then follow in order of difficulty of combustion—coke, anthracite, lampblack, black-lead, and the diamond. Indeed, black-lead is so non-combustible, that crucibles to withstand very high heats for prolonged periods without breakage or burning, are made of black-lead; and the diamond (q. v.) completely resists all ordinary modes of setting fire to it. In the property of hardness, C. ranges from the velvet-like lampblack to diamond, the hardest of gems. In 1879 it was announced that a method of producing pure crystallized carbon, or diamond, had been discovered in Glasgow.

Carbon for electrical purposes.—When C. is obtained of sufficient density, it is found to be a good conductor of electricity, and to make an excellent electro-negative element in a galvanic pair. Graphite displays these qualities to advantage, and so does the hard incrustation of C. that is found sublimed in gas retorts. Coke and wood-charcoal are too porous to possess them to any great extent. The scarcity of graphite, and the precarious supply of retort-C., preclude the possibility of obtaining much practical advantage from the electrical properties of C. with these substances alone. We are indebted, however, to Professor Bunsen of Heidelberg for the discovery of a process whereby a C. of the requisite density can be manufactured with great ease and economy. The carbons thus obtained for galvanic batteries rival platinum in electric energy, and they have aided in no small degree, from their cheapness, in heightening the utility of galvanic electricity. The Bunsen carbons, as manufactured in Germany, are of the form of hollow cylinders, whereas those made in France and this country are solid rectangular prisms. The following are the more important details of the process. Two parts of coke, and one of baking coal—the proportion varying to some extent with the materials—are ground to a fine powder, and passed through a sieve. The powder so got is transferred to iron-plate molds of the required shape, the seams of which are merely clasped together, and luted with clay.

No pressure is employed in filling them, other than that of shaking. When the moulds are filled, they are placed in a furnace, and kept there till all carburetted hydrogen has escaped from them. They are then taken out, and allowed to cool before the mass within is removed, which is now found to have taken a solid form, and to be so hard that it may be turned or ground to the exact size wanted. At this stage, the carbons are destitute of electrical action, and they must consequently be rendered more dense by a subsequent process. This consists in soaking them thoroughly in thick sirup, or, better still, in gas-tar thickened by boiling, and laying them aside till dry, after which they are packed with charcoal-dust in fire-proof crucibles, and exposed for a considerable time to a high heat. If one soaking and charring is not enough, the same may be repeated until sufficient density is obtained. Throughout the process, it is essential that all flaming matters be driven off, so as to leave only the C. in the mould; and care must be taken that no air be admitted to the mould when under the action of heat, otherwise there would be a loss of C. from combustion. The manufacture of these carbons may be carried on contemporaneously with that of gas. The sticks of C. used for the electric light are obtained by sawing up either C. made by this process or the C. of the gas-retorts.

CARBONA'RI (literally, 'colliers' or 'charcoal-burners'), the name of a secret political society, first, in some degree, made known in 1820. The constitution, like the precise objects of the C., still remains in a great measure secret; though they have printed instructions, catechisms, statutes, rituals, &c., for their associates. The statements respecting the high antiquity of this secret confederacy are quite fabulous. There is every reason to believe that it originated during the last French *régime* in Naples. Botta, in his *Storia d'Italia*, states that, under Murat's government, the Neapolitan republicans, equally hating the French and King Ferdinand, escaped into the wild defiles of the Abruzzi, and here, naming themselves 'C.,' formed a secret society. It is said that their leader, Capobianco, had great powers of popular eloquence, and that their motto or war-cry was, 'Vengeance for the lamb torn by the wolf!'

The peculiar phraseology of the C. is taken from the vocation of charcoal-burners. For instance, they are (or were) wont to speak of 'clearing the forest of wolves.' The 'wolves' probably meant at first foreign tyrants; but in the course of time, after the restoration of the Neapolitan Bourbons, such symbolical expressions had reference to *their* despicable misrule. Among themselves, the initiated were styled 'good cousins.' The various societies do not seem to have possessed a common center, or to have been properly organized for combined action. A place of meeting was styled 'a hut' (*baracca*); the external neighborhood, 'the forest;' and the interior of the hut was the *vendita* or 'place for selling coal.' A union of several of these huts formed a 'republic.' The superior huts (*alte vendite*) at Naples and Salerno endeavored, but without success, to effect a centralization of the Carbonari.

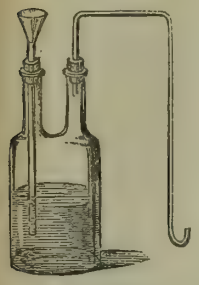
The society, soon after its institution, numbered 24,000—30,000 adherents, and increased so rapidly in Italy that, in March 1820, it is said as many as 650,000 new members were initiated, including considerable numbers of the military and the clergy. The religious and Protestant character of the order is expressed in its statutes, which include the article: 'That every Carbonaro has the natural and unalterable right of worshiping God according to his own convictions.' Though Carbonarism did not arise from the lodges of freemasons (as several have supposed), it has borrowed many forms of masonry.

After the restoration of the Bourbons, several secret political unions were formed in France, and in 1820 were confederated with the Carbonari. Paris, after the prosecutions against the secret societies of Italy, was made the head-quarters of a Carbonarism which, adopting all the symbolic phraseology, rules, and regulations of the Italian societies, received from the rapidly systematizing genius of the French, an organic character which it had never before possessed. The initiated styled themselves *bons cousins*, and spoke of the uninitiated as *pagani* (heathens). Written documents and communications were strictly prohibited by the heads of the union, and treachery was to be punished by assassination. After the close of the French and Spanish war, the C., whose activity in contriving plots had excited the terror of the French prefects, restricted its endeavors to the circulation of republican ideas, without direct attempts towards insurrection. After the July revolution, several of the leading French C. attached themselves to the new régime, and their society was gradually dissolved. In its place the new *Charbonnerie Démocratique* was founded, having for its object the establishment of a republican government, founded on the principles of Babeuf (q. v.). The endeavor of these new C. to make Paris the center of all political movements, led to the secession of the Italian refugees, who associated themselves under the title 'Young Italy.' French Carbonarism is not *known* to exist at present, and it is possible that even in Italy the triumphs of constitutional patriotism during recent times have rendered its existence no longer necessary, but it certainly was alive at the commencement of the Franco-Sardinian war with Austria; and one of the rumors of the time was, that the

French Emperor—who, in his young republican days, had been a member of this society—had entered on the war of liberation, to conciliate his old associates, who had menaced him with the fate of a traitor.

CA'RBONATED or ACI'DULOUS WATERS are those which contain a great excess of carbonic acid gas. The amount of gas in ordinary spring and well waters does not amount to more than 3—8 cubic inches in 100 cubic inches of the water; but in waters entitled to be called C., the proportion of gas to 100 cubic inches of water rises 30—60, when they are considered rich; 100—200, when they are very rich; and in the waters of St. Nectaire it is said that the proportion of gas is as high as 400 volumes to 100 of the water. These waters sparkle much when poured from one vessel to another. The carbonic acid is free, but is generally accompanied (1) by bi-carbonate of soda, when the water is called *carbonated-alkaline* or *acidulo-alkaline*, as in the Seltzer, Pyrmont, Salzbrunn, Altwasser, and Reinerz acidulous mineral springs; or (2) by carbonate of iron, when the water is named *carbonated* or *acidulous chalybeate*. See CHALYBEATE WATERS. The mineral spring at Ilkeston, near Derby, is the only water of this nature in Britain. The C. or A. W. are very refreshing and exhilarating, and are useful in certain disordered states of the stomach; they relieve nausea, and generally increase the discharge of liquid from the system. They are objectionable in the case of persons of a full and inflammatory state of body.

CARBO'NIC ACID, FIXED AIR, or CHOKE-DAMP, is a substance occurring free as a gas in the atmosphere, to the extent of one volume to 2500 of air, and also in combination with a variety of substances. It is most easily prepared for experimental purposes from chips of marble, water, and hydrochloric acid, which are placed in a gas bottle with tubes (see fig.). The hydrochloric acid (HCl) acts on the marble (CaO,CO_2), and forms chloride of calcium (CaCl), water (HO), and carbonic acid (CO_2), which escapes as gas with effervescence, and may be conducted by a proper tube under the mouths of jars filled with water and placed on a pneumatic trough. Where C. A. is required in large quantities, it is prepared in a leaden vessel from chalk (CaO,CO_2) and sulphuric acid (SO_3) diluted with water, when sulphate of lime (CaO,SO_3) is formed, and C. A. escapes as gas.



The atomic weight or equivalent of C. A. is 22; it is a clear, colorless gas, with a pleasant, acidulous smell and taste. Under great pressure and cold, it can be condensed into a liquid, and even a solid resembling snow in appearance. Under ordinary atmospheric pressure, C. A. dissolves in water to the extent of 2 volumes of gas in 3 of water; but under increased pressure, a very much larger amount of gas is taken up by the water, and in this way the various kinds of AERATED WATERS (q. v.) are prepared. The gas is more than half as heavy again as ordinary air, being 1529. It is incombustible, and a non-supporter of combustion, at once extinguishing a lighted candle, gas jet, or even a piece of burning phosphorus, when these are placed in a jar filled with the gas, or even in a mixture of C. A. and air. This power of putting out flame and fire has been turned to account in the extinguishing of burning coal-mines, where, all the openings to the mine being properly secured, C. A. in the form of the spent air from an ordinrry coal-furnace, has been passed into the mine, with the result of successfully stopping the fire. It is irrespirable in a concentrated form, producing spasm of the glottis, which prevents the admission of the gas into the system; and when mixed with air, it can be breathed without suspicion, and then acts as a narcotic poison, even when present only to the extent of 4 or 5 per cent. of the air. The deadly effects of C. A. are observed in the combustion of charcoal, coal, or *coal-gas*, in chauffers, furnaces, or in fire-places with the dampers down, when the deadly fumes of C. A. steal more or less quickly over the inmates of the room, and they almost unconsciously become its victims—thus unknowingly following the course of the Parisian suicide, who purposely lights a charcoal fire in the center of his room, and prepares for death; and in overcrowded rooms where the C. A., exhaled from the lungs of each inmate at every breath, poisons the air of the apartment, and day by day slowly but surely robs the robust of health, and ultimately of life. In such cases as the Black Hole of Calcutta (q. v.) where there was scarcely any outlet for the poisonous gas, only a few hours may be required to complete the catastrophe.

Though poisonous when inhaled by the lungs, C. A. is rather refreshing when taken into the stomach. Thus, aërated beverages of all kinds—beer, champagne, and carbonated mineral waters—owe their refreshing and invigorating qualities to the presence of C. A.; and if the gas be allowed to escape, they become almost tasteless, stale and mawkish.

Besides abounding everywhere in the atmosphere, C. A. is largely evolved from fissures in the earth, especially in volcanic districts. In the *poison or Upas valley* of Java, which is a valley of an oval form about ¾ of a mile in circumference, and 30 to 35 feet deep, the carbonic rises to a height of about 18 feet from the surface, and the whole bottom of the valley is devoid of vegetable and animal life, and is strewn here and there with the bleached bones of man and other animals that have unluckily stepped within the deadly circle. A dog thrown in, dies in 14 seconds; and birds attempting to fly across the valley, instantly drop down dead. In the neighborhood of the lake of Laach, in Rhenish Prussia, the amount of C. A. envolved every day has been estimated at 600,000 lbs. weight. In a state of combination, C. A. forms an ingredient in a great number of minerals called *carbonates*, such as chalk, limestone of various kinds (CaO,CO_2), black-band iron-stone (carbonate of iron, FeO,CO_2), malachite (carbonate of copper, $CuO,HO,+CuO,Co_2$), &c. C. A. is the principal product of combustion; the carbon of the burning substance (coal, candle, coal-gas, wood, paper, &c.) uniting with the oxygen of the atmosphere, and forming C. A. (CO_2). It is also a product of respiration (q. v.), and is evolved more or less largely by all animals, not only by the mouth, but in exhalations from the skin, and is present in blood, urine, &c. It is evolved during the fermentation (q. v.) of beer, wine, &c., and often remains in brewers' vats when the liquor has been drawn off. During the decay of vegetable and animal matters, C. A. is produced, and in explosions of fire-damp in coal mines, it is formed in large quantity, and fills the underground passages.

C. A. forms the largest ingredient in the food of vegetables, and is therefore abstracted in large quantity from the air by plants. It enters into combination with the majority of the oxides of the metals and other compounds, to form a class of salts called *carbonates*, several of which have been referred to. C. A. when present in a vessel in quantity may be recognized by the power of extinguishing a lighted candle, or by not burning itself. C. A. in the form of gas may be readily recognized in the atmosphere by exposing a little lime-water in a saucer, or other shallow vessel, when the lime (CaO) abstracting the C. A. (CO_2) from the air, a white film of carbonate of lime or chalk (CaO,CO_2) is formed on the surface of the liquid. A solution of Baryta (q. v.) in water is more delicate in its action on the C. A. of the air, and more readily indicates its presence.

CARBONIC OXIDE is a compound of one atom of carbon and one atom of oxygen, is represented by the symbol CO, and has the atomic weight 16. It does not occur naturally, but may be observed burning with a pale-blue flame in fire-places and stoves, especially in frosty weather. During the combustion of the fuel at the lower part of the grate, the oxygen of the air unites with the carbon of the fuel to form carbonic acid (CO_2); and this gas rising up through red-hot coal or carbon (C), has part of its oxygen abstracted by the carbon, and two atoms of carbonic oxide (CO) are produced, which taking fire on the top of the coals, burn with the characteristic blue flame, abstracting more oxygen from the air, and re-forming carbonic acid (CO_2). C. O. can be prepared for experimental purposes by heating a mixture of oxalic acid (HO,C_2O_3) and sulphuric acid (SO_3) in a retort, when the latter abstracts the water from the oxalic acid, and the other elements (C_2O_3) escape as carbonic acid (CO_2), and C. O. (CO). On passing the mixed gases through a solution of potash (KO), the carbonic acid is retained as carbonate of potash ($KOCO_2$), whilst the C. O. remains as gas. C. O. is a transparent, colorless gas, a little lighter than air, being 967, and has never been liquefied nor solidified. It burns with a blue flame, but is a non-supporter of combustion, and at once extinguishes a lighted candle introduced into it. It is very poisonous, and even when largely diluted with air, if inhaled, it produces a sensation of oppression and tightness of the head, and ultimately acts as a narcotic poison. It does not take part in any natural phenomena, nor is it put to any use in the arts and manufactures, and in these respects, affords a striking contrast to carbonic acid, which has so many duties to perform in nature and in the arts.

CARBONI'FEROUS SYSTEM, the name given to the strata which, in geological order, rest upon the Devonian measures, and are capped by the Permian series. They derive their designation from the amount of carbon contained in them, for to them the great coal-fields of the world belong. In an economic sense, they are the most valuable series of rocks in the earth's crust, forming the great store-house from which is obtained the chief supply of coal, iron, and lime.

The rocks of the system are composed of a vast series of beds of sandstone, limestone, shale, and coal. In some coal-fields, these are so interstratified, that it is impossible to subdivide the strata in the order of time. In the Edinburgh district, there are nearly 100 coal-seams, omitting all under six inches in thickness. Out of the whole depth of the strata, amounting to about 6300 feet, these seams occupy only 204 feet. The remainder consists of sandstone

and shale in the upper half; towards the middle, limestones appear, and these increase downwards in the number and thickness of the beds, but are still intermixed with seams of coal. The same arrangement exists in the other coal-fields of Scotland, as well as in those of the north of England. In other districts, the limestone is confined to the lower portion of the measures, and separated from the coal-bearing strata, so as to form a natural subdivision of the system into—1. *The Coal Measures*, consisting of shale, sandstone, and grit, with occasional seams of coal; and 2. *The Mountain* or *Carboniferous Limestone*, a calcareous rock, containing marine shells and corals, and devoid of coal. A coarse quartzose sandstone, passing into conglomerate, is occasionally developed to a considerable extent between these two divisions. This is a local deposit, being almost confined to England, and may be considered as one of the coal sandstones, of coarser texture than usual. Being occasionally used for millstones, it is called *Millstone grit*. It is accompanied with shales containing the usual coal plants, but generally without any true coal seams. Another locally developed series of beds, consisting of indurated shales, sandstones, and grits, occurs below the carboniferous limestone in South Wales and Ireland, and is known as the *Lower Limestone Shales*. These rest conformably on a series of yellow sandstones, which have been generally referred to the Devonian Measures, but which, from their organic contents, as well as from their stratigraphical position, seem to be basement beds of the carboniferous series. The existence and development of these various beds in the United Kingdom will be better understood by an examination of the following table. The maximum thickness of the beds is given in feet when known; the blanks show the absence of the division from the particular coal-field :

	Edinburgh.	Glasgow.	N. York.	Derby.
Coal Measures	6300	280	2000	2700
Millstone Grit			400	1600
Mountain Limestone			1659	1000
Lower Limestone Shales				
Yellow Sandstone				

	S. Wales.	Kerry.	Clare.	N. Ireland.
Coal Measures	12,000	2000	2000	2200
Millstone Grit	1,000			1800
Mountain Limestone	1,500	1500	3000	6400
Lower Limestone Shales	500	4650	150	1200
Yellow Sandstone		3000 unknown depth		2000

In the midland counties, the coal measures are the only portion of the carboniferous system present, and these rest on the Silurian or older rocks. In Devonshire, there occurs an extensive series of shales and sandstones, with a few beds of earthy anthracite or culm, associated with argillaceous rocks, probably belonging to the lower limestone shales, much indurated, and traversed by slaty cleavage.

From the great economic value of the contents of the C. S., we are better acquainted with its fossils than with any fauna or flora that flourished before the tertiary epoch. As coal is the result of the mineralization of vegetable matter, the coal measures must necessarily abound in the remains of plants. No less than 294 species have been described as found in Britain alone. Numerous impressions of plants, as well as traces of structure, are found in the seams of coal themselves; but the more distinct forms are preserved in the interstratified beds of mud and ironstone, often in great number and exquisite beauty. Such remains consist chiefly of impressions of leaves separated from their branches; of casts of trunks, more or less in a broken state; and of roots much compressed, yet occupying their original position in the clay soil now indurated into shale; with these occur pieces of wood, or remains of trees, in which the vegetable texture is to some extent preserved. The great proportion of the plants seem to have flourished in marshy swamps, and to have accumulated where they grew, like peat, the material afterwards converted into coal. Hence a stratum of shale in which are imbedded the roots of Sigillaria, Calamites, &c., is the invariable *floor* on which the coal seam rests. The chief coal plants are Lepidodendron (q. v.), Sigillaria (q. v.), Calamites (q. v.), Trigonocarpon (q. v.) and Ferns (q. v.). The existence of cone-bearing trees during this epoch, has been proved from the microscopic examination of prepared sections of fossil woods in which the small discs occur that are characteristic of and peculiar to the coniferæ.

The animal remains are as numerous and as well preserved as the vegetable. They are found chiefly in the limestone; the greater part, indeed, of this rock, is made up bodily of corels and crinoids. No other such accumulation for extent and variety is known; it has its nearest parallel in the somewhat similar formation now going on in the Southern Archipelago.

The corals and crinoids were specifically as well as individually numerous. The terebratulæ and other allied forms of bivalve shells, though belonging to a comparatively limited number of genera, were very abundant. The more highly developed mollusca were also numerous; they belonged to a great number of generic types. But the most remarkable group was the fishes. At no time were they more abundant. They belonged to the Ganoid and Placoid groups of Agassiz. The Ganoids, having their entire surface covered with scales, were numerous; some of them inhabited shallow water near the shore, and fed on crustaceans and shell-fish, for crushing which they had a formidable apparatus of conical teeth of a very complicated structure. Others were inhabitants of deep water, and were more powerful and predaceous, and more rapid in their movements. Their jaws were produced into a long snout, like the crocodile of the Ganges, and armed with a double series of enormous teeth, which were sometimes as much as four inches long by two inches broad, as in Megalichthys (q. v.), dimensions rarely attained even by the largest known reptiles. Associated with these were a great number of sharks belonging to the Cestraciontidæ (q. v.), a family of which we have only a single living representative. They were furnished with a long bony spine to strengthen the dorsal fin and thus enable them to turn speedily in the water, as they required to do in seizing their prey. These spines are often found fossil. The only remains referred to a higher division of the animal kingdom yet found belong to the saurian Archegosaurus (q. v.).

CARBON PRINTING. See POSITIVE PRINTING.

CA'RBUNCLE, a name given by lapidaries to the beautiful mineral called *Pyrope* (q. v.), by mineralogists. The C. of the ancients appears to have been either pyrope, or the deep-red variety of noble garnet (see GARNET), which is in every respect very similar to it, or probably included both.

CARBUNCLE (Lat. *carbunculus*, a little coal) derives its name from the two prominent symptoms—a glowing fiery redness, and a burning pain. It consists of an inflammation, caused by some vitiated condition of the blood, or some atmospheric influence, attacking a patch of skin on the shoulders, nape of the neck, or indeed on any part of the body. The part swells slightly, feels hard, and this hardness extends deeply into the tissues; the pain is very severe, and the patient much depressed with loss of appetite, and general derangement of the secretions. As the disease advances, the redness assumes a dark purple or livid hue, the cuticle rises in blisters, and many small specks of matter appear on its surface, which discharge, and leave apertures like those in the rose of a watering-pot; through this a thin viscid fluid escapes, and occasionally a small slough or core of the true skin which has been killed by the disease. Sometimes these apertures meet, forming large openings, and in others the whole patch of skin sloughs and comes away.

The treatment of C. consists in restoring the secreting organs to a healthy condition, the agents for which must depend on the individual case; in supporting the patient's strength by easily digested food, wine, brandy, and bark, with nitric acid; relieving pain by opiates, and encouraging suppuration with warm poultices; carrot, turnip, and yeast poultices being favorite applications in this disease. To prevent excessive loss of skin, the C. must be divided freely with a knife from one margin of the inflamed patch to the opposite one.

CA'RBURETTED HY'DROGEN is a term in chemistry applied to several compounds of carbon and hydrogen. Thus, light carburetted or mono-carburetted hydrogen (CH_4) is the gaseous compound popularly known as marsh gas and fire-damp, and is the principal constituent of coal-gas. See GAS. Heavy carburetted or bi-carburetted hydrogen (C_2H_4) is otherwise known as Olefiant Gas (q. v.).

CARCAJE'NTÉ, a town of Valencia, Spain, about 28 miles south-south-west of the city of Valencia, situated on a rich plain near the right bank of the Juncar. It is well built, with good streets, and has a palace belonging to the Marquis of Calzada. It has some manufactures of linen and woollen, and a trade in the agricultural produce of the district. Pop. about 12,000.

CA'RCANET, a jeweled chain or necklace. Venice was famous for the manufacture of carcanets in the 15th century.

CA'RCASS, in military pyrotechny, is a hollow case of iron, sometimes globular, and sometimes ovate, filled with combustibles. It is fired from a mortar. Its chief use is to ignite buildings in the enemy's quarter, and to give sufficient light to aim the shot and shells. Carcasses are said to have been first used by one of the princely ecclesiastics of Germany, the Bishop of Munster, when he fought against the Duke of Luxembourg at Groll, in 1672. The oval carcasses, being uncertain in their flight, are now nearly abandoned. The round carcasses now made are chiefly those here indicated :

Diameters.	Composition.	Weight.
13 inch.	18 lbs.	213 lbs.
10 "	7 "	100 "
8 "	3 "	51 "
5 "	19 oz.	17 "
$4\frac{2}{5}$ "	7 "	9 "

Carcasses are not intended to burst, but to send out, through

holes, a furious and inextinguishable fire, which lasts from 3 to 12 minutes. The composition, with which they are filled consists of saltpetre, sulphur, meal gunpowder, pitch, rosin, tallow, and Venice turpentine, about half being saltpetre. The composition is packed in tightly through one of the holes; and the holes are stopped with fuses adjusted to ignite the composition after a certain space of time. Sometimes old pistol barrels, loaded to the muzzle, are introduced with the composition. Compare those details with CASE-SHOT, and SHELLS.

CARCASSONNE, a town in the department of Aude, France, situated on the river Aude, and the *Canal du Midi*, about 55 miles south-east of Toulouse. It is divided into two parts, the old and new towns. The modern town is well built, with streets running at right angles to each other, squares adorned with trees, pleasant boulevards, and several marble fountains. The old town, built on a height, is much more picturesque, with its ramparts and towers, some parts of them dating from the time of the Visigoths, and the rest, with the castle, from the 11th or 12th century. This old town suffered greatly at the hands of the fierce bigot Simon de Montfort and his crusaders, who here burned 400 of the Albigenses. In the 14th c. it effectually resisted the Black Prince. The cloth manufactures are important, employing, it is said, upwards of 7000 people. C. has also manufactures of paper, leather, linen and soap. Pop. (1876), exclusive of garrison, 23,517. The ancient name of the town was Carcaso, which was a place of some note in the time of Cæsar.

CARCHA'RIAS. See SHARK.

CA'RDAMINE. See CRESS, BITTER.

CA'RDAMOMS are the capsules of certain species of plants of the natural order *Scitamineæ* (q. v.), and belonging to at least two genera, *Amomum* and *Elettaria*. They are three-celled, and contain numerous wrinkled seeds, which form an aromatic pungent spice, weaker than pepper, and with a peculiar but agreeable taste. On account of their cordial and stimulant properties they are employed in medicine, very generally to qualify other medicines; they are also used in confectionary, although not to a great extent in Britain; but in Asia they are a favorite condiment; and in the north of Germany, they are used in almost every household to flavor pastry.—The C. recognized in the British pharmacopœias, and called *True* or *Officinal C.*, also known in commerce as *Malabar C.*, are the produce of *Elettaria Cardamomum*, a native of the mountains of Malabar and Canara. They depend for their qualities on a peculiar pungent essential oil, called *Oil of Cardamom*, which may be obtained from them by distilling them with water, and when fresh is colorless. Other kinds of C. occur in commerce, but none is equal to the true C. in commercial value. The different kinds of C. differ not only in strength, but in the character of their aroma. The plants producing them have much general similarity.

CARDAN, JEROME, a celebrated mathematician, naturalist, physician, and philosopher, born at Pavia, September 24, 1501, was the illegitimate son of a physician and jurisconsult at Milan. He received his early education at home, and completed his studies in Pavia and Padua. After some years, he became professor of mathematics at Milan. Here his reputation began to grow. After a few years, he began to lecture on medicine, to the practice of which he ultimately betook himself. By 1546, his reputation had so increased, that he was invited by the king of Denmark to accept a professorship at Copenhagen, which, however, he declined; and in 1552, we find him proceeding to Scotland, on an invitation from Hamilton, primate of that country. He managed to cure the primate of an inveterate asthma, which had defied the skill of the most celebrated physicians, and returned to Milan enriched by the bounty of his patient. Here he again settled for some time. In the autumn of 1559, however, he removed to Pavia as professor of medicine, whence, again, in the same capacity, he removed to Bologna, where he continued teaching till 1570, when we find him imprisoned for debt. Having regained his liberty in 1571, he went to Rome to avoid his creditors. Here he was speedily admitted a member of the medical college, and pensioned by Pope Gregory XII. The rest of his life he spent, without public employment, in Rome, where he died, September 2, 1576, a few weeks after finishing his autobiography. Some writers assert, but on no sufficient authority, that he starved himself to death, to fulfill a prediction which he had made as to the time when he should die. It is certain, however, that he was a devoted astrologer, and cast horoscopes for himself and others. The fancifulness necessary to support the faith of an astrologer imbued all his scientific writings. These were very voluminous. A summary of his notions on physics and metaphysics is given in his two works—*De Subtilitate*, in 21 books, and *De Rerum Varietate*, in 17 books. On the whole, he wrote 122 treatises on physics, mathematics, astronomy, astrology, rhetoric, history, ethics, dialectics, natural history, music, and medicine. These, it need scarcely be said abound in incoherent paradoxes, contradictions, and capricious abstractions, more than enough to overwhelm the few profound ideas which he originated. A formula for the solution of certain kinds of cubic equations is called 'Cardan's formula,' and was published by him, as his own invention, in the *Ars Magna sive de Regulis Algebraicis* (1545); but it would appear that the formula was really the invention of one Tartalea or Tartaglia. In religion, C. was heterodox, and commonly reputed an atheist. His numerous writings were collected and edited by Charles Sphon (10 vols., Lyon, 1663).

CA'RDBOARD, or CARD, is made by pasting together several layers of paper, according to the thickness and quality required. *Bristol-board*, used by artists, is made entirely of white paper; ordinary C., of fine white paper outside, with one or more sheets of coarse cartridge-paper between. According to the number of layers, they are called *three*, *four*, *six*, or *eight sheet* boards. *Millboard*, used by bookbinders as the basis of book-covers, is made of coarse brown paper, glued and strongly pressed.

The workman arranges the paper in the order required for pasting, and the pile, called a *head*, is placed at his left hand, the paste-tub on his right. He lifts a sheet from the head with his left hand, brushes it over with paste with his right; then another is laid upon that and pasted, until he comes to the last required to complete the thickness of one board, when he removes two sheets, and only pastes the upper one, which thus forms the lower sheet of another board. This is repeated till the whole head is pasted, when it is removed to a press, and the water of the paste squeezed out at the edges. The boards are then separated, and dried by hanging them in a room artificially heated. The C., which is now rough and warped, is smoothed and flattened by making a pile consisting alternately of sheets of rough C. and copper plates, with a copper plate at top and bottom. This pile is passed between iron rollers, and the smooth surface of the copper impressed upon the C., which is thus flattened and beautifully polished.

The enamelling of address-cards is produced by brushing over the C. a mixture of *China* or *Kremnitz white* (a fine variety of white lead) and size. After drying, this surface is rubbed lightly over with a piece of flannel, previously dipped in finely powdered talc; it is then polished by rubbing vigorously with a hard close-set brush.

CA'RDIA, the upper orifice of the stomach, called, on account of its vicinity to the heart, by the same Greek name, *cardia*, and probably hardly distinguished from it in the earliest times of Greek medicine.

CA'RDIAC ME'DICINES, stomachic and stimulating remedies—cordials, so called from their action on the heart through the stomach. See CARDIA.

CARDIA'LGIA, pain of the heart or stomach (CARDIA). The name is commonly applied to the particular variety of pain called *heartburn*, arising from a disordered stomach, and accompanied with acid eructations. See INDIGESTION.

CA'RDIFF (*Caer-Taff*, Fort of the Taff), a parliamentary and municipal borough and seaport, one of the country towns of Glamorgan, South Wales, situated on the river Taff, 170 miles west of London. The pop. rose from 2000 in 1801, to 56,911 in 1871; in 1881, it was 85,378, with a floating pop. of about 5000. C., with Cowbridge and Llantrissant, returns one member to parliament. Among the public buildings are the infirmary, townhall, free library and museum, county jail, law-courts, a lunatic asylum, baths, and a theater. There is a public park. In the six years ending 1881, one hundred and forty-five new streets had been constructed. Very few of the numerous churches belong to the Church of England. In 1883 it was arranged that C. should be the seat of the new South Wales College.

The port of C. is the outlet for the large mineral and manufactured produce of the central portion of the South Wales mineral-field, in which are the populous districts of Merthyr-Tydvil, Rhymney, Aberdare, and the Rhondda Valley, with which this port is connected by the Taff Vale, the Rhymney, and the Ely Valley Railways, and the Glamorganshire Canal. The town is also one of the chief stations on the Great Western line from London to Milford-Haven. The Bute docks, east and west, with an area of 76 acres, constructed at the expense of the Bute estate, have cost upwards of a million sterling, and belong entirely to the present marquis. There are about 40 staiths on the quays of the docks with machinery of a peculiar construction for the purpose of loading vessels with coal, by which the breaking of the coal is almost entirely prevented. Each of these staiths is capable of shipping 560 tons of coal in a day of 12 hours. There is also a tidal harbor, with 7 staiths, each capable of shipping 400 tons of coal per day, and a low-water pier 1400 feet in length. Height of water at spring-tide, 31 feet 8½ inches; at neap-tide, 21 feet 7½ inches. Width of sea-gates, 55 feet; length of quays, 11,100 feet; width of dock, 300 feet southern, and 500 feet northern part; depth, 25 feet. Exports during 1880, £4,161,778; imports, £2,338,133: the exports of coal in 1881, 5,946,442 tons; iron, 124,591

tons ; coke, 17,669 tons. In 1880, 13,331 vessels, of 3,940,170 tons, entered the port, and 13,479, of 4,140,701 tons cleared it. The imports to C. include copper ore, live cattle, salted provisions, foreign fruit and vegetables, corn and flour, &c. The Penarth Docks, about three miles to the westward, form another outlet for the trade of the district. Steamers ply between the port of C. and New York, London, Liverpool, Glasgow, Bristol, Cork, White Haven, and Burnham.

The assizes (half-yearly, alternately with Swansea) and the quarter-sessions are held at the Town Hall. The ancient city of Llandaff, now a mere village, is almost connected with Cardiff. Cardiff Castle, built in the 11th c., is partly now in ruins, and partly occupied by the Marquis of Bute, to whom nearly the whole of the modern town belongs. Robert Duke of Normandy, brother of Henry I., died in the castle, after being a prisoner for 28 years. Cromwell (1648) got possession of the castle by treachery, after bombarding it three days; and he afterwards hanged the traitor, as an example to his own soldiery. This town was anciently an important one, successively under the British, Romans, and Normans.

CA'RDIGAN (anciently, *Aberteifi*, Mouth of the Teify), the county town of Cardiganshire, a parliamentary and municipal borough and seaport, in the south-west corner of the county, on the right bank of the Teify, 3 miles from its mouth, and 239 miles north by west of London. The vicinity exhibits romantic scenery on the Teify, and grand rocks on the coast. The streets, except the chief one, are narrow and steep, the houses built of slate-rock. Pop. of the municipal borough (1881), 3633; of the C. district of boroughs, 14,517. With Aberystwith, Lampeter, and Adpar, C. returns one member to parliament. In 1880, 1635 vessels, of 57,780 tons, entered and cleared the port. The general trade is confined to vessels of 20 to 100 tons. Vessels of 400 tons reach the town by spring-tides. C. became an important town about the Norman Conquest. The Normans were frequently defeated before mastering it. There are the remains of a castle on a low cliff on the Teify, which is supposed to have been founded, in 1160, by a Norman baron. The town suffered much in the struggles between the Welsh and the Normans. The Teify is said to have been the last British resort of the beaver.

CARDIGAN BAY, a semicircular bend of St. George's Channel, on the west coast of Wales, 45 miles wide from north to south, and 20 miles deep, with a sweep of coast of 110 miles. Its exterior points are Brach-y-Pwll, off which lies Bardsey Isle, in Caernarvon, and Sturm Head, in Pembroke. It receives the rivers Mawddach, Dovy, Ystwith, Yren, and Teify. It has 3 to 30 fathoms of water, with three reefs. A strong current sweeps round the bay from south to north. Almost all the harbors on the coast are obstructed by bars. A great part of C. B. is said to have been once dry land, protected, as Holland now is, by dams and dikes, and containing 16 towns, and the land is said to have been submerged about 520 A.D.

CA'RDIGANSHIRE, a maritime county in South Wales on Cardigan Bay, with an area of 675 square miles, a half being waste. The surface is hilly, interspersed with fertile valleys. A rugged, bleak range of hills runs through the middle of the county, from the south-west to the north-east, between the coast and the Teify, ending abruptly in a shelving beach in the middle of the coast, but on other parts there are rich flat tracts. The county contains little wood. The chief rivers are the Teify, which rises in a small lake near the center of the county, and runs 70 miles south-east and east along the south border of the county, the Claerwen, Ystwith and Rheidol. C. contains some romantic waterfalls, especially the Rheidol Falls and the Devil's Bridge, and above 20 small lakes or llyns, noted for their wild beauty. C. reposes on Lower Silurian slates and shales, containing few or no organic remains. Rich veins of copper, lead, zinc, and silver occur. The climate is cold and wet, but mild though wet on the coast. Snow lies long on the hills in winter. Summer is delightful in the valleys. C. is an agricultural county, and its chief branch of industry is the rearing of live-stock. The chief crops are oats, barley, and potatoes on the poor clay and peat soils of the mountains, and wheat, barley, and potatoes on the flat loams of the coast and valleys. The cattle and horses are small. There are some manufactures of coarse woollens and gloves, stockings and hats. Oats, barley, cattle, sheep, pigs, butter, slates, and woollens are exported. Cardigan is the county town; the other chief towns being Aberystwith, Lampeter, Adpar, Aberayron, Tregaron. C. sends one member to parliament. Pop. in 1871, 69,712; in 1881, 70,226. In 834, the king of C. became king of all Wales, under the title of Roderick the Great. He divided Wales among his three sons. After this, the Danes, and Normans overran Cardiganshire. The county has many remains of British and Roman camps and roads, Druidical circles, cairns, and castles. Many Welsh princes and bards were buried in the abbey of Strata Florida, 16 miles south-east of Aberystwith, as some of the records of the principality were kept here. In C. there is a curious practice of sending presents (*biddings*) to a new-married couple, which, when sold, often realize £50 or £60. C. was disturbed, 1843—1844, by the Rebecca riots.

CA'RDINAL (Lat. *cardinalis*, principal, from *cardo*, a hinge). Cardinals are the highest dignitaries in the Roman Church after the pope, whose electors and councillors they are. The title, however, had at first a more general application. The pope being the sovereign bishop over the whole Romish Church, and having, as such, many duties to fulfil inconsistent with those of a particular diocese had, from very early times, a number of bishops, priests, and deacons whom he appointed his vicars and coadjutors for the management of the diocese of Rome. The bishops exercised the episcopal function in the pope's stead, each having a peculiar church within the diocese. The priests were titular parsons of the churches in the city of Rome, and had the cure of souls. The deacons had charge of some churches and chapels of devotion, which they held as deaconries, with the additional duty of assisting the pope when he officiated in public. These three classes of ecclesiastics were called *cardinati* or *cardinales*, to denote that they were the first or chief over the rest, and that all the affairs of the diocese of Rome were under their direction. At a subsequent period, the priests and deacons of other cities of importance assumed the title of C., to distinguish them from other priests and deacons over whom they claimed supremacy; but the popes subsequently ordained that none but those whom they had chosen should be honored with that title. Amongst those whom the popes thus appointed were the seven bishops *suburbicarii*, who took their titles from places in the neighborhood of Rome. These bishops were called *hebdomadarii*, because they attended the pope for a week each in his turn. These cardinals took part with the Roman clergy in the election of the pope, who was generally chosen from their number. About the beginning of the 12th c., the popes having formed a regular court, began to bestow the rank of C. priest or C. deacon on any individual of the clergy, or even of the laity, whom they chose to select; and to each, whether Roman or foreign, they gave the title of some particular church in Rome, but without attaching to it any obligatory service. Thus the cardinals became a separate body elected for life, and the officiating priests of the Roman parishes were gradually deprived of the title. In 1159, Nicholas II. limited the right of election to the popedom to the cardinals thus appointed, leaving to the rest of the clergy and the people of Rome merely the right of approving of the election of a new pope, and to the emperor that of confirming it. Even these prerogatives, in the course of time were withdrawn.

Notwithstanding the great powers thus intrusted to them, the bishops in the great councils of the church continued to take precedence of the cardinals; and it was not till 1614 that Louis XIII. of France, in the sitting of the parliament of Paris, adjudged precedence to the cardinals over the ecclesiastical peers—bishops and abbots. The power of the popes to appoint cardinals has often been contested, and their right to precedence denied, by the other dignified ecclesiastics. In 1567, Pope Pius V. forbade any clergyman not appointed by the pope to assume the title of C.; and Sixtus V., in December 1586, fixed their number at 70—viz., the 6 bishops suburbicarii, 50 priests, and 14 deacons, and on this footing they have since remained, though the number is seldom complete, the pope generally leaving some vacancies for extraordinary cases. The number has frequently fallen greatly under 70. When Nicholas III. was chosen pope, there were but eight cardinals; and a little before the death of Alexander IV., there were but four. Sometimes before Sixtus V. the number was exceeded, as in the pontificate of Pius IV., when there were 74. The body of cardinals is styled the Sacred College. Most of the cardinals reside in Rome, and either enjoy ecclesiastical benefices, or are employed in the administration. When not so provided for, the cardinals receive an allowance of 100 dollars monthly from the papal treasury. Some cardinals belong to monastic orders and reside in their convents even after their election. The jurisdiction of the C. bishops in the place in which they are established is truly episcopal, but they are not obliged to reside. That of the C. priests and deacons is almost episcopal, but extends no further than the church and sacristy. They have there an episcopal seat under a canopy, like bishops, and they there solemnly give the people their blessing. The creation of cardinals is wholly in the pope. If the new-created C. is at Rome, he goes the same day to visit the pope, who puts the red cap on his head. The red hat, which Innocent IV. ordained that cardinals should wear, to show that they ought to expose themselves to the shedding of their blood in the cause of the church, is afterwards given in a public consistory. A number of symbolical ceremonies accompany the investiture. The cardinals that are absent, when chosen, have the cap sent them by a special messenger from the pope. The hat is given by the pope's own hands; and many cardinals who do not visit Rome, die without ever having received it. The only exception is in favor of members of royal houses, to whom the hat is sent.

Pope Urban VIII., in 1630, gave to the cardinals the title of

Eminence, which they shared with the grand-master of the Order of Malta, and the ecclesiastical electors of the German or Roman Empire. The pope often employs cardinals as ambassadors, and the individual thus employed is styled Legate *a Latere*. A C. legate acts, or recently acted, as governor of the Northern Provinces of the Papal States, which thence received the name of Legations. The chief secretary of state, the *Camerlengo* or minister of finances, the Vicar of Rome, and other leading officials, are always chosen from among the cardinals. The Council of Cardinals, when assembled under the presidency of the pope to discuss matters of church and state, is called the Consistorium. There are public consistories, which are held on great occasions, and correspond to the levees of other sovereigns; and private and secret consistories, which are the privy council of the pope. Moreri's *Dictionary voce Cardinal*, contains a list of cardinals from 1119 to 1724, with their names, countries, &c., and the dates of their election and death.

Cardinal's Hat.

CARDINAL BIRD, or RED BIRD (*Guarica cardinalis*), also called cardinal finch, cardinal grosback, and Virginian nightingale, one of the finest song-birds of America, belongs to the family of *Fringillidæ*, and differs from the true grosbacks (*Coccothraustes*) in having the beak slightly bulging. The general color of the male is red, the head being vermilion, and only a small portion of the plumage around the base of the bill being black.

The feathers of the crown are long, and erected into a conical crest, like a red cap. The C. B. abounds in Texas, Florida, and the Southern States of America generally, migrating northwards in spring, but never further than Massachusetts, where only a few stragglers are seen. Its loud, clear, sweet, and varied song is to be heard chiefly in the mornings and evenings. In size it exceeds any of the British *Fringillidæ*, being about equal to the starling.

CARDINAL FLOWER. See LOBELIA.

CARDINAL POINTS. See COMPASS, MARINERS'.

CARDINAL VIRTUES (Lat. *cardinalis*, chief, from *cardo*, a hinge). The C. V. of the ancients were Justice, Prudence, Temperance, Fortitude. They were so called because the whole of human virtue was supposed to hinge or turn upon them. In other words, they were considered as a full and comprehensive classification of man's various duties.

This mode of dividing the virtues is to be found as far back as Socrates. The ancient moralists treated under Ethics the whole sum of human duty and virtue. Thus, Aristotle considers the great problem of the science to be the determination of man's highest good, together with the means of realizing it. Hence, he includes both the social virtues and the prudential regard to the welfare of the individual in the same scheme. Of the four C. V., it will be seen that the first, Justice, is the social virtue; that Prudence (which, properly speaking, includes Temperance also) regards the wellbeing of the individual; while Fortitude is necessary to both. This last was a virtue greatly esteemed in the ancient world, each one's lot being much less secure than with us in the present day; it was impossible to say what sufferings might be in store for the most prosperously situated of men.

Dr. Whewell has made an attempt to correct the more obvious defects of the classification, and has substituted one which he deems free from those defects. The most notable omission, in the ancient scheme, judged from the modern point of view, is the absence of all reference, either expressly or by implication, to the virtue of Goodness or Benevolence. This was characteristic of the pagan moralists; for although good deeds were abundantly practised among the ancients, they did not account it a part of human virtue to flow out spontaneously in every kind of active benevolence, including the most wicked and worthless among the objects of it.

Aristotle, in discussing the various acts and outgoings of friendship, never loses sight of the *reciprocal* obligations on the other side; so that when a rich man befriends, with his wealth, one that is poor, the inequality must be made good by a greater amount of honor or respect on the part of him that is so befriended.

Accordingly, to adapt the classification to the altered point of view, Benevolence has to be added to the list. This is Dr. Whewell's first virtue; the others are Justice, Truth, Purity, and Order. But the scheme, as thus amended, is scarcely less objectionable than before. The virtue named last, Order, which means obedience to authority, cannot but contain a very large portion of all the rest; seeing that Justice, Truth, &c., are enjoined by positive law. Then, what is understood by Purity, including the control of the two powerful appetites, Hunger and Sex, is partly prudential and partly social.

The ethical discussions of modern times may be very much aided, if we divide the totality of human virtue on the following plan. There are three distinct classes of human actions, which are all approved of or accounted virtuous, but on different grounds, and in a different manner.

1. There are actions which are forbidden by society under penalties; in other words, men are punished for committing them. Such are theft, breach of bargain, slander, violence to the person, and all the offences against our fellow-men that are prohibited by the law of the land. The avoiding of all these actions is signified to be a part of our duty, by the suffering inflicted on the doers of them. The law fines, imprisons, or puts to death those who will not conform to its regulations.

The law of the land is not the only power that prescribes conduct enforced by penalties. The public opinion of the country at large forbids certain actions, and punishes transgressors by excluding them from social intercourse; such, for example, are acts of unchastity, more especially when committed by women. There are also codes enacted by particular societies, as the code of honor among gentlemen, which constitutes some actions offences that are not so by law, or by universal opinion. Cowardice is one of the qualities most obnoxious to the code of honor.

The actions prohibited by law are obviously such as could not be allowed without the entire subversion of human society. If murder and theft were to go unpunished, the principal end for which men associate together in communities—that is, protection and security—would not be attained. It is impossible that we should not disapprove of all such actions, and approve of the contrary.

2. There are some actions that are accounted virtuous, while their opposites are not punished, as in the case of those now mentioned. Doing good to persons that have no claim upon us—in other words, benevolence or philanthropy—is considered highly praiseworthy; but the neglecting of this is not usually visited with any punishment or censure; so that if it be a duty to perform acts of benevolence, it is a duty generically different from paying our debts, and respecting the person and property of our neighbor. The motives brought to bear on the two cases are widely contrasted: in the one, we *punish* for doing the action forbidden; in the other, we *reward* for doing the thing enjoined, and inflict no punishment if that is neglected. Here lies the difference between *duty*, strictly so called, and *merit*. In the bare performance of duty there is no merit; a man would not even be commended for the punctual payment of his just debts, if it were not that many people are deficient in this respect, and in the comparison with these the correct person excites in our minds a feeling of satisfaction. *Disapprobation* is the sentiment properly concerned with duty, or rather, with breach of duty; *approbation* is bestowed on all who do something over and above their duty. This distinction is known in every department of practical life; while speculative moralists habitually lose sight of it.

3. The virtues included under Prudence are in a different position from either of the foregoing classes. Bearing the common names, virtue and duty, by which they are recognized as worthy of approbation or commendation, they are nevertheless unaccompanied with the sanctions either of punishment or of reward. The imprudent man is subject to no legal penalty, unless he clearly involves other persons in his imprudence; and the prudent man is not rewarded with the praise, esteem, or other benefits conferred upon the benevolent man. It is true that the young are punished by parents or teachers for imprudences; and some governments take such a paternal care of their subjects, as to punish them for sins against themselves. Men have been sent to prison, because of their endangering their own salvation by embracing heresy; but at the present day, such a proceeding is considered beyond the function of government. Men and women, arrived at maturity, are expected to take care of their own interests; even if they do not, no one punishes them; if they do, no one rewards them. We have, it is true, a certain feeling of disesteem in the one case, and of esteem or commendation in the other; neither of which, however, attains any considerable strength until more than the individual's self is involved. In short, although we cannot divest ourselves of all sentiment as lookers on, when men behave prudently or imprudently, our rule is *non-interference;* and this constitutes a marked distinction between the self-regarding and the social vices and virtues.

Accordingly, when ethical writers are endeavoring to probe the foundations of the moral sense in man, they ought to consider separately those three different species of conduct, for the sentiment excited by each is marked by strong peculiarities. To class social duties enforced by punishment, social virtues stimulated by rewards, and prudence, which is accompanied by neither, under one common designation, and discuss them as if they were essentially the same, is to confuse, instead of clearing up, the first principles of morality.

In Roman Catholic systems of theology, there are declared to be four *cardinal virtues*—'Prudence, Fortitude, Temperance, and Justice'—from which all other 'moral' virtues are represented as flowing. But there is a prior division of virtues into the two classes of *theological* and *moral;* the theological virtues being Faith, Hope, and Charity. The distinction between these two classes is represented as consisting in this, that the theological virtues '*immediately* regard God;' and the moral virtues do not immediately regard God, but are commanded and rewarded by God, and are beneficial to ourselves.

CARDING OF COTTON, &c., the process of disentangling and arranging in parallel rows the fibres of cotton. This operation may be compared to the combing and brushing of one's hair, and the *card* combines the properties of the comb and brush, being a brush with wire teeth instead of hairs. These teeth are inserted in strips of leather, which are fixed upon the surface of a cylinder. Several such cylinders are arranged so that the ends of the teeth are nearly in contact; and the cotton being brought to them, is caught up, passed from one to the other, and combed out as the cylinders revolve in the form of beautiful films or fleeces, which are removed by a smaller drum-card, called the 'doffer,' and again from this by the 'doffing-knife.' These films, which are of the width of the drum, are next contracted to a narrow ribbon, by being passed through a funnel; and thus narrowed, are called the 'card ends' or 'slivers,' and are now ready for the next process of 'drawing' or 'doubling.' See SPINNING.

CARDI'NIA, a genus of fossil conchiferæ, containing 85 species, which extend from the Silurian to the inferior oolite. They have an oval or oblong shell, attenuated posteriorly, and marked with lines of growth, and an external ligament. They occur abundantly in the valuable layers of clay-ironstone called 'mussel-bands.' In Derbyshire, this material is wrought, like marble, into vases.

CARDI'TIS, or inflammation of the heart, a form of disease of very rare occurrence, if the term be limited in its application to cases of true acute inflammation of the muscular structure of the heart itself. C. however, was commonly understood in a wider sense, so as to include certain forms of disease of the external and internal lining membrane of the heart; and it is only since the beginning of the present century that, owing to improvements in medical pathology and diagnosis, the names of Pericarditis and Endocarditis (q. v.) have come prominently into view as indicating the most ordinary inflammatory affections of the heart. See HEART, DISEASES OF THE.

CA'RDIUM AND CARDIA'CEÆ. See COCKLE.

CARDO'NA, a town of Catalonia, Spain, about 44 miles north-west of Barcelona. It is situated on a declivity on the right bank of the Cardener, is surrounded by walls, pierced with six gates, and commanded by a castle on a height. It is celebrated on account of a mountain of salt in the vicinity, which has a height of about 500 feet, and measures a league round. When the sun shines on this gigantic mass, the effect is of the most brilliant and gorgeous description. Pop. (1877) 4360.

CARDOO'N (*Cynara Cardunculus*), a perennial plant of the same genus with the ARTICHOKE (q. v.), a native of the south of Europe and the north of Africa. It very much resembles the artichoke, but is of larger size, whilst the flowers (heads of flowers) are smaller. It has long been in cultivation, for the sake of the blanched leaf-stalks and midribs of the leaves, which are used as a salad, or more generally as a boiled vegetable during winter.

CARDS. All that we know of C., for certain, is, that they are of ancient and eastern origin. What is asserted by Count de Gebelin and the earliest writers upon the subject, that in their primary stage they constituted some sort of symbolic and even moral game, is not so well established. The Hindu and Chinese C. are, however, emblematic in a very high degree—the former illustrating the ten avatars, or incarnations of the deity Vishnu; and the so-called paper-tickets of the Chinese typifying the stars, the human virtues, and, indeed, almost anything you please. The learned Sir William Jones expresses himself convinced that the Hindu game of *Chaturaji*—the Four Rajahs or Kings—a species of highly complicated chess, was the first germ of that party-colored pasteboard which has been the ruin of so many modern fortunes. In the wardrobe accounts of Edward I., there is an item of money paid for the use of that monarch for playing at the Four Kings —'ad opus regis ad ludendum ad *quatuor regis*, viii.*s.* v.*d.*'—which is supposed to have been a game at C.; but how and when painted C. took the place of carved figures, is still but matter of conjecture.

A pack of Hindustani C., in the possession of the Royal Asiatic Society, and presented to Captain Cromline Smith in 1815 by a high-caste Brahman, was declared by the donor to be actually 1000 years old. 'Nor,' quoth the Brahman, 'can any of us now play at them, for they are not like our modern cards at all.' Neither, indeed, do they bear any remarkable resemblance to our own—the pack consisting of no less than eight suits of divers colors, the kings being mounted upon elephants, and the viziers, or second honors, upon horses, tigers, and bulls. Moreover, there are other marks by which the respective value of the common C. may be distinguished, which would puzzle our club quidnuncs not a little—such as a 'pine-apple in a shallow cup,' and 'a something like a parasol without a handle, and with two broken ribs sticking through the top.' In the Chinese dictionary, called *Ching-tsze.tung*, it is asserted that dotted C. were invented in the reign of Seun-ho (1120 A D.), and devised for the amusement of his numerous wives: there are thirty C. in each of these packs, three suits of nine C. each, and three single C. superior to all the others. The name of one of the suits is *Kew-ko-wan*—that is to say, the nine ten-thousands of kwan, strings of beads, shells, or money; and the titles of the other two suits are equally concise and significant. The Chinese C. have, however, a decided advantage over those of Hindustan in being oblong instead of circular.

C. do not appear to have been known in Europe until towards the end of the 14th century. 'In the year 1379,' writes Carelluyzo, 'was brought into Viterbo the game at cards, which comes from the country of the Saracens, and is with them called *naib*.' 'Whence afterwards,' says Mr. W. Chatto (*Origin and History of Playing Cards*, Lond. 1848), 'perhaps Jackanapes, Jack of cards.' This entry occurs in the accounts of the treasurer of Charles VI. of France, in 1393: 'Given to Jacquemin Gringonneur, painter, for three packs of cards, gilt and colored, and variously ornamented for the amusement of the king, fifty-six sols of Paris.' From the date of this year being immediately subsequent to that in which the king lost his reason, the story goes that C. were invented to divert his royal melancholy; but they were certainly of earlier use in France. The French clergy took greatly to C. about this time; we are afraid, too, it was to the ungenteel game of All-fours, since we find them specially forbidden that amuse ment by the synod of Langres, in 1404.

Card-making became a regular trade in Germany fourteen years after this, and it, as well as card-painting, seems to have been carried on for some time exclusively by females; the wood-engraving of C., however, did not begin until some time afterwards. The pips were then very prettily imagined, the suits consisting of hearts, bells, acorns, and leaves. The place of her majesty the queen was filled by a knight in those days; and it is to Italy, and not to Germany or France, that the glory of giving *place aux dames* must be conceded. There was also no ace whatever! By 1420, gambling by means of C. had grown to such a pitch, as to provoke St. Bernardin to preach against it at Bologna; and that so eloquently, as to cause his hearers to make a fire in the public Place, and throw all the C. in their possession into it—a proceeding which must have been hailed with joy by the Messrs. De la Rue of that period. The signs upon Italian C., which seem to have been the first imported into England, were cups, swords, money, and clubs; but in the third year of Edward IV., their further importation was forbidden, and the home-trade of card-making protected. C. were played by that time, we read, 'in all places of worship' in this country, by which it was meant, not in the churches, but in the houses of all the gentry. Henry VII. was a cardplayer; and there are not a few entries in that mean monarch's privy-purse account of his majesty's little losings. His daughter Margaret, at the age of fourteen, was found by James IV. of Scotland—the first time he ever saw her—in the act of playing cards; and it was most probably *écarté*, for he at once 'proposed' to her, and she 'accepted' him. There was a sum regularly allotted to the Princess, afterwards Queen Mary, as pocket-money for this especial purpose; the sums given her at a time for immediate disbursement ranging from 20*s.* to 40*s.*, but one entry being so disgracefully low (for a princess) as 'two and tuppence.' James I. likewise played a good deal, but so sleepily, that he required somebody to hold his C. for him.

About the year 1660, heraldic C. were first introduced into England, the King of Clubs being represented by the arms of the pope; of Spades, by those of the king of France; of Diamonds, by those of the king of Spain; and of Hearts, by those of the king of England. From these heraldic C., we suppose, Mr. Chatto derives the word coat-card, instead of court-card, which is certainly in more general use. In 1679, a pack was published containing the history of all the popish plots, 'excellently engraved on copper-plates, with very large descriptions under each card. Aspersers of this pack,' it is added by their disinterested publisher, 'plainly show themselves to be popishly affected.'

The French, from whom we derive our ordinary suits of diamond, heart, spade, and club—*carreau, cœur, pique*, and *trèfle*—were continually changing their court-cards, and representing on them all sorts of historical characters. In the earlier periods, their kings were David, Alexander, Cæsar, and Charlemagne, or Solomon, Augustus, Clovis, and Constantine; about all of whom, as well as their queens, Père Daniel has the most ingenious theories. Troops, says he, however brave and numerous, require to have prudent and experienced generals. The *trèfle* or clover-

plant, which abounds in the meadows of France, denotes that a chief ought always to encamp his army in a place where he may obtain forage for his cavalry; *piques* and *carreaux* signify magazines of arms, which ought ever to be well stored—the *carreau* being a sort of heavy arrow shot from a cross-bow, and which was so called from its head being squared (*carré*); *cœurs*, hearts, signified courage of both commanders and soldiers; the *ace* was the Latin *as*, and represented money, the sinews of war: and so on.

At the time of the French Revolution, the places of the card-kings were filled by four philosophers—Molière, Lafontaine, Voltaire, and Rousseau; and those of the queens by four virtues—Prudence, Justice, Temperance, and Fortitude.

Many attempts have been made to put down card-playing by the strong hand of the law; but the history of the Four Kings has nevertheless, always retained its students. Not a few enthusiastic players have absolutely died in harness, with cards in their hands, such as the great Bath player Lookup, who expired at his favorite 'Double Dumby,' not even being permitted by inexorable Death to play out the game. The Four Kings, like their flesh-and-blood originals, are likely to lose all sway over the New World; for Mr. Chatto informs us, that the court-cards, if they can be called so, of a republican pack manufactured in 1848 at New York, have neither kings nor queens; the President of Hearts being Washington; of Diamonds, John Adams; of Clubs, Franklin; and of Spades, Lafayette. One of the queens is Venus, modestly concealing her charms; and the others are respectively Fortune, Ceres, and Minerva: while the knaves are fitly represented by Indian chiefs.

The manufacture of playing-cards comprises many interesting processes. The cardboard employed for this purpose is formed of several thicknesses of paper pasted together; there are usually four such thicknesses; and the paper is so selected as to take paste, paint, and polish equally well. The sheets of paper are pasted with a brush, and are united by successive processes of cold-drying, hot-drying, and hydraulic pressure. Each sheet is large enough for forty cards. The outer surfaces of the outer sheets are prepared with a kind of flinty coating, which gives sharpness to the outline of the various colored devices. Most packs of cards are now made with colored backs. The ground-tint is laid on with a brush, and consists of distemper color, or pigments mixed with warm melted size.

The device impressed on this ground-tint is often very beautiful. Messrs. De la Rue, the leading firm in the manufacture, employ tasteful artists, and invest a large amount of capital, in the introduction of new patterns. On cards sold at moderate prices, the colors at the back are generally two—one for the ground, and one for the device; but some of the choicer specimens display several colors; and many of the designs are due to the pencil of Mr. Owen Jones. The printing of the design is done on the sheets of paper, before the pasting to form cardboard. The pips or spots on the faces of playing-cards are now *spades, clubs, hearts*, and *diamonds;* but at different times, and in different countries, there have been leaves, acorns, bells, cups, swords, fruit, heads, parasols, and other objects similarly represented. In English cards, the colors are red and black; Messrs. De la Rue once introduced red, black, green, and blue for the four suits; but the novelty was not encouraged by card-players. The same makers have also endeavored to supersede the clumsy devices of kings, queens, and knaves by something more artistic; but this, too, failed commercially for; the old patterns, like the old willow-pattern dinner-plates, are still preferred—simply because the users have become accustomed to them. Until within the last few years, the printing of cards was generally done by *stencilling*, the color being applied through perforated devices in a stencil-plate. The color employed for this purpose is mixed up with a kind of paste. When there is a device at the back, the outline of the device is printed from an engraved wood-block, and the rest filled in by stencilling. The stencilling of the front and back can be done either before or after the pasting of the sheets into cardboard. One great improvement in the manufacture, has been the substitution of oil color for paste or size color; and another, the substitution of printing for stencilling. Messrs De la Rue have expended large sums of money on these novelties; for many experiments had to be made, to determine how best to employ oil color so that the spots or pips may be equal-tinted, the outline clear and sharp, the pigment well adherent to the surface, and the drying such as to admit of polishing without stickiness. The plates for printing are engraved on copper or brass, or are produced by electrotype, or are built up with small pieces of metal or interlaced wire. The printing is done in the usual way of color-printing, with as many plates as as there are colors (usually five), and one for the outlines; it is executed on the sheets of paper, before being pasted into cardboard.

When the printing, drying, and pasting are all completed, a careful polishing is effected by means of brush-wheels, pasteboard wheels, heated plates, and heated rollers; in such a way that the polish on the back may differ from that on the face—since it is found that two equally polished surfaces do not slide quite so readily over each other. Every pack of cards made in England for home-use pays a duty of threepence, which duty is levied on the ace of spades. The makers of cards pay £1 per annum for a license, and formerly the venders had to pay 2*s.* 6*d.* per annum, but this latter tax was repealed on the 5th July 1870. The cardboard when all the printing is finished, is cut up into cards; every card is minutely examined, and placed among the 'Moguls,' 'Harrys,' or 'Highlanders,' as they are technically called, according to the degree in which they may be faultless or slightly specked; and the cards are finally made up into packs. Persons wishing the best cards should ask for 'Moguls,' the usual retail price for a pack of which is 2/3 to 3/9.

A few years ago it was estimated that about half a million packs of cards are made annually in England, by about seven or eight firms. Card-playing is not now so general in England as it was early in the century, and the number made has consequently lessened, although the quality has greatly improved. All the cards used in Russia, with a few exceptions, are made at an imperial manufactory in St. Petersburg, where the operations are conducted on a large scale, and where the number of packs made exceeds manifold the whole produce of England. The French cards are somewhat smaller and thinner than those of England.

CARDUE'LIS. See GOLDFINCH.

CA'RDUUS. See THISTLE.

CARE or CARLE SUNDAY, the Sunday before Palm Sunday, said to be so called because it was the practice in many parts of the country to eat gray peas, called carlings, fried in butter, pepper and salt on this day. This practice apparently had its more immediate origin in the custom of the Roman Catholic Church of eating hallowed beans fried at this time—these beans being described in some religious books as symbolical of confession, and their steeping before use, of meditation. It appears, however, to have been adopted by this church from a heathen custom. See Brand's *Popular Antiquities.*

CAREE'NING is the operation of heaving down a ship on one side, in order to expose the other side for cleaning by the process of *Breaming* (q. v.). C. is seldom now performed upon English ships, partly because the use of copper-sheathing lessens the fouling of the bottom, and partly because caissons and hydraulic lifts afford means for raising ships out of the water. The *Great Eastern*, in 1860, was placed upon an open scaffolding or frame, called a *gridiron*, in Milford Haven, and floated so as to render cleansing possible without the dangerous and difficult process of careening.

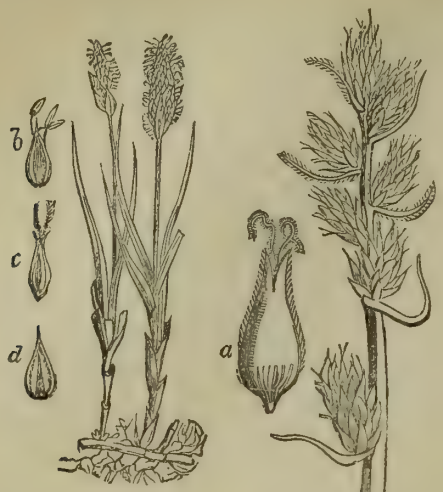
In sea-phrase, a vessel is said to 'careen' when she leans over very much through press of sail.

CA'RET (from the Latin *careo*, I am wanting), a character of this form, ∧, denoting that something has been omitted, and is interlined.

CAREW, THOMAS, a poet of the reign of Charles I., descended from an old family in Gloucestershire, was born 1589. Having been educated at Oxford, he traveled abroad for some time, and on his return was received at court, and patronized by Charles I. C. deserves mention chiefly as the precursor and representative of what may be called the courtier and conventional school of poetry, whose chief characteristic was scholarly ease and elegance, with a spice of indelicacy, and even indecency. C.'s poems, mostly lyrical, and treating of trifling subjects, are among the best of their kind, and exhibit much fancy and tenderness. He died 1639. Several editions of his poems, which first appeared in 1640, have been published.

CA'REX, a genus of plants of the natural order *Cyperaceæ*, of which the species are very numerous—more than 450—principally abounding in the temperate and colder parts of the world. More than 60 are natives of Britain. The English name SEDGE or SEG is sometimes employed as synonymous with C., but is popularly applied only to some of the species. This genus is distinguished by unisexual flowers, the male flowers with one glume, the female enclosed in a flask-shaped involucre. Some of the species are plants of the very humblest growth, others are two or three feet in height; all are of unpretending, grassy, or rush-like appearance. Some grow in wet, and others in dry situations; some are of great value in the economy of nature, as forming the principal part of the vegetation of swamps, which they gradually convert into fertile ground. The running roots, or rather *rhizomes*, of some help to bind the sands of sea-shores, particularly *C. arenaria*, which is carefully planted for this purpose on the dikes of Holland. None are valued by the agriculturist, as they are very deficient in nutritive quality, and in general they abound only in very inferior pastures, and good tillage and drainage lead to their speedy disappearance. The rhizomes of *C. arenaria*, *C. Hirta*, and *C. disticha*, are sometimes used under the name of *German Sarsa-*

parilla, as a diaphoretic and demulcent medicine—a bad substitute for sarsaparilla. The two former are common in Britain. The dried leaves of *C. sylvatica* are used by the Laplanders to cover



Carex arenaria:
a, creeping rhizome. with flowering stems and spikes of flowers; *b*, a male flower, detached; *c*, a female flower, detached: *d*, a glume.

Carex Vulpina:
a, a female flower.

their legs and hands as a protection from frost-biting and chilblains, being worn in the inside of their shoes and gloves.

CAREY, WILLIAM, D.D., a distinguished minister and missionary belonging to the Baptist body, was born at Paulersbury, a village in Northamptonshire, August 1761. He served his time as a shoemaker, but began to preach about his 20th year. A pamphlet which he published about this time, attracted the attention of his co-workers in the ministry to the subject of Foreign Missions, and ultimately a missionary society, chiefly through C.'s exertions, was formed. C. and a Mr. Thomas were chosen its first missionaries to India in 1793. From that time until his death in 1836, C. was indefatigable (under many difficulties, especially in his early years) in his efforts to spread the knowledge of the gospel among the heathen. Under his direction, the Serampore mission, of which he was the principal founder, had up to 1832 issued above 200,000 Bibles, or portions thereof, in about forty Oriental languages or dialects, besides a great number of tracts and other religious works in various languages. A great proportion of the actual literary labor involved in these undertakings was performed by C. himself, whose Sanscrit and other grammars have been highly spoken of by the late Mr. Wilson Boden, professor of Sanscrit at Oxford. C. was professor of Oriential Languages at Fort-William College, Calcutta, from 1800 to 1830.

CAREY, HENRY C., a political economist of the United States, was born at Philadelphia, 15th Dec. 1793. He early became a partner in his father's bookselling business; and when in 1835 he retired from business to devote himself to his favorite study, he was at the head of the largest publishing concern in the United States. He died 13th Oct. 1879. C.'s *Principles of Political Economy* (expanded in 1837) had a marked influence on economic speculation. In 1838, C. published *The Credit System of France, Great Britain, and the United States;* and in 1848, *The Past, the Present, and the Future*, a work marked by great vigor and originality. In 1853 appeared the *Letters on the International Copyright;* in 1858, *Principles of Social Science;* in 1867, *Review of the Decade* 1857–67; and, in 1873, *The Unity of Law*. C. was originally a free trader, but was ere long recognized as the head of a new school of political economy. According to this system free trade may be the ideal towards which we should tend, but a period of protection is an indispensable stage in the progress towards it.

CA'RGO is the general name for all the merchandise carried on board a trading-ship. Sometimes it is applied also to the invoice of the cargo. The term *deck-cargo*, is given to the commodities on deck, which are not usually included in the policy of insurance. For the security of the Customs' revenue, the master of every coasting vessel is bound to keep a *cargo-book*, recording the name of the vessel, the name of the owner, the port of departure, the port of destination, the goods taken, the names of the shippers and consignees, the time of departure, and other particulars. The Custom-house officers may demand to see this book at any time. The C. of passenger-ships is placed, in some degree, under the control of the emigration officers by an act passed in 1852.

CA'RIA, in ancient geography, the south-westernmost country of Asia Minor, bounded N. by Lydia, E. by Phrygia, S.E. by Lycia, and W. and S.W. by the Mediterranean. A large portion of what was C. is mountainous. The chief ranges were called the Cadmian and the Latmian. The most important river was the *Mœander*, famous for its windings. C. was, at an early date, governed by petty princes or kings; it afterwards became a part of the Persian empire, the former princes continuing to rule as satraps; and it subsequently came into the hands of the early Macedonian kings of Egypt; and finally, with the rest of Asia, into those of the Romans. Among the chief towns were Cnidus, Halicarnassus, and Miletus.

CARIA'CO, a seaport of Venezuela, at the mouth of a river, and at the head of a gulf of the same name. It is 40 miles to the east of Cumana, in lat. 10° 30′ N., and long. 63° 40′ W. Pop. 7000. The gulf, long and narrow, with good anchorage, and well-wooded shores, is open only on the west, and that to a portion of the Caribbean Sea, which is itself breasted by a chain of islands.

CA'RIACOU, CA'RJACOU, or VIRGI'NIAN DEER (*Cervus Virginianus*), a species of deer found in all parts of North America, from Mexico to about N. lat. 43°, and from the Atlantic to the Pacific Ocean. It is the species commonly called Deer by the Anglo-Americans. It is smaller and more elegant than the common stag; of very variable color—light reddish brown in spring, slaty blue in autumn, and dull brown in winter; the belly, throat, chin, and inner parts of the limbs white. The horns of the adult male are of moderate size, bent strongly backward, and then suddenly forward, so as to bring their tips nearly above the nose; they have several snags. The fawn is profusely decked with white spots, arranged in lines, and sometimes running into stripes. The name C. is extended generically to several nearly allied species, found in Mexico, California, &c.

ÇARIA'MA (*Microdactylus cristatus*), a bird of the order *Grallæ*, allied to the cranes, but exhibiting also points of strong resemblance to gallinaceous birds, among which it has therefore been proposed to rank it, next to the guans. It is a native of Guiana, Brazil, and Paraguay, inhabiting open plains and the outskirts of forests, where it feeds chiefly on serpents, lizards, and insects. It is larger than the common heron; the plumage is brown, finely waved with darker brown, whitish on the lower parts. When pursued, the Ç. seeks safety by running, and does not readily attempt to use its wings. Its voice resembles that of a young turkey. It is much esteemed for the table, and it is sometimes reared in a domesticated state.

CARIBBE'AN SEA, the grandest inlet of the western hemisphere—corresponding, in several respects, to the Mediterranean in the eastern—is separated from the Gulf of Mexico by Yucatan, and from the Atlantic Ocean by the great arch of the Antilles, between Cuba and Trinidad inclusive, stretching in N. lat. from about 8° to about 22°, and in W. long. from about 61° to about 89°. The C. S. forms the turning-point in the vast cycle of waters known as the GULF STREAM (q. v.), that wheels round, with the regularity of time itself, from Southern Africa to Northern Europe. It pours its waters into the Gulf of Mexico on the west, which shoots forth, on the east, the Florida Stream with the computed volume of 3000 Mississippis. To supply this enormous efflux, the C. S. draws on the Atlantic, laying under contribution nearly all the trade-wind regions of that ocean, so as literally to become the receptacle of the Amazon and the Orinoco. To the British Isles, it is, in this connection, an object of peculiar interest. Rendering still warmer the warm floods which it concentrates, it imparts to the Florida Stream that high temperature which tends, with the aid of the prevalent winds, to mitigate climate from Guernsey to Shetland. In common with the islands of its eastern boundary, the C. S. takes its name from their now extinct aborigines, the Caribs.

CA'RIBBEE BARK, or PITON BARK, is the bark of *Exostemma Caribæum*, a small tree which grows in the West Indies and in Mexico, and belongs to the natural order *Cinchonaceæ*. The genus *Exostemma* is very nearly allied to *Cinchona*, from which it differs in having the stamens exserted, whereas in *Cinchona* they are included within the corolla. *E. Caribæum* has ovate lanceolate leaves, and is known in the West Indies as the *Sea-side Beech*. C. B. has a very bitter taste, and a very faint smell. It contains none of the characteristic alkaloids of cinchona, yet very much resembles it in some of its properties, and is one of the barks sometimes substituted for the true cinchona barks.

CA'RICA. See PAPAW.

CARICATU'RE (Ital. *caricatura*, from *caricare*, to load or overcharge). The etymology of this word indicates its meaning very distinctly, which is that of a representation of a face, form, or character, in which the salient features are exaggerated or overloaded, to the extent of producing a ludicrous effect, without entirely, or even essentially destroying the resemblance. C. may be regarded as the opposite of idealization; the former consisting in

a disproportionate development of some, very frequently of one only, of the characteristics of the subjects treated, the latter in a proportionate elevation of them all. Nay, further, the destruction of harmony is essential to C., and where harmony is the prevailing quality of its subject, the required effect may frequently be produced by this means alone; whereas harmony belongs of necessity to idealization, and where its absence was the characteristic defect of the object as a real existence, an ideal of a humble kind may frequently be produced by simply restoring it.

When used with reference to sensible representation, C. stands, to the genuine productions of the plastic and pictorial arts, in the same relation in which farce stands to the legitimate drama. Both C. and farce are thus degenerate forms of art; and though requiring much cleverness for their successful execution, and often affording lively satisfaction to the spectator, can scarcely be said in general to have an elevating object, or any other tendency than to amuse. When used as ancillary to well-directed and merited satire, C. assumes a nobler character, and it is to the credit of our nation that it is so frequently thus employed in our ephemeral literature. The best examples of C. which have ever appeared in the literature of any people, are to be found in the pages of *Punch*.

CA'RIES (*rottenness*) is a disease of bone analogous to the ulceration of soft tissues. It is characterized by a gradual loss of substance, from the particles of bone being absorbed, or being cast off and washed away in a purulent discharge. It begins as an unhealthy inflammation, followed by exudation of new materials, and softening of the part affected. On examination, the bone-cells are found filled with a reddish glairy fluid, and in scrofulous patients, deposits of tubercle. After C. has existed for some time, an abscess forms, and bursts; its aperture remains open, discharging a thin fluid, which contains particles of the bone. If a probe be passed through this opening, it will be felt to sink into some soft gritty substance; this is the carious bone, which, if removed, and well washed, will be found to resemble in whiteness and fragility loaf-sugar softening in hot water.

C. may attack any bone, but it usually selects the vertebræ, those of the wrist and foot, and the soft ends of long bones forming joints. To this terrible disease most deformities, not congenital, are owing. The carious vertebræ yield under the weight of the trunk, and the spine curves forwards, or to one side. In the joint-ends of bones, the part enlarges, the cartilages become affected, matter forms, and amputation of the limb, or excision of the joint, is frequently necessary to save the patient's life. Too often the disease recurs with night-sweats, hectic, and death.

The causes of C. are constitutional, though it may be accidentally determined to some particular part of the body by any irritation, such as a blow, or exposure to atmospheric changes. Scrofulous persons, and those who have syphilis or mercury in excess at any period of their lives, are more subject to it than others. If affecting a small bone, the latter may be entirely removed; and if the disease is strictly limited to the ends of bones forming a joint, these may be excised. Within the last thirty years great advances have been made in this department of surgery, and C. of the joints is but seldom counted a sufficient reason for amputation; the knee, hip, shoulder, elbow, ankle, and wrists joints have all been repeatedly excised successfully in this country. In situations where the part cannot be reached by instruments, lotions of dilute acid may be injected, with the view of stimulating the carious surface to assume a healing action.

The treatment of C. consists in supporting the patient's strength by judicious change of air, and tonics, with the administration of medicines, such as cod-liver oil in scrofula, which appear to combat the constitutional predisposition to the disease. In those parts where the diseased bone can be reached, it should be gouged or scraped away, so as to leave a healthy surface of bone, which may granulate up, and heal.

CARIES OF THE TEETH depends, it is supposed, on an original faulty formation of their substance, when, after any depressing cause, especially in scrofulous and ill-nourished persons, they soften and crumble away, at last laying open the cavity which contains the nervous pulp of the tooth, and producing toothache. *Treatment.*—The carious surface should be removed, and, as a substitute for the lost substance, gold or some other substance should be stuffed into the cavity. If the pulp be exposed, the hole should be stuffed with some softer material, till the parts are somewhat hardened; for this, Mr. Tomes of London recommends a plug of cotton-wool dipped in a mixture of mastich, a drachm, and rectified spirit or Eau-de-Cologne, an ounce and a half; or of gutta-percha dissolved in chloroform.

CARIGNA'NO, a town of Piedmont in the province of Turin, about 11 miles south of the city of that name. It is situated near the left bank of the Po, in the midst of a most beautiful country; has some fine churches, manufactures of silk-twist, and a population of 7712. This town gives name to a branch of the House of Savoy.

CA'RILLON. See BELL.

CARIMA'TA, a name applied to the passage between Borneo and Billiton; also to a cluster of islets in the same passage; and lastly, to the principal member of the group, whose highest point, a peak of 2000 feet, is in lat. 1° 36′ S., and long. 108° 54′ E.

CARINA'RIA, a remarkable and interesting genus of gasteropodous mollusks, of the order called *Heteropoda* or *Nucleobranchiata*, having a thin shell, in form somewhat like that of a limpet, which, however, only covers the visceral sac (heart, gills, &c.), leaving the greater part of the animal exposed. The shells of some of the species have been sometimes denominated *Venus's Slipper* and *Glass Nautilus*. The body is gelatinous, and so transparent that much of its interior organization can be seen. Nearly opposite to the part of the back occupied by the shell is a sort of vertical fin, answering to the foot of the other gasteropods. The species of C. are all marine, are found only in the seas of the warmer latitudes, and generally swim with the back downward. Closely allied to C. is the genus *Firola*, in which there is no shell at all.

CARI'NI, a town of Sicily, in the province of Palermo, and 12 miles west-north-west of the city of that name. It has an old castle; and a population of 9600, chiefly engaged in fishing.

CARINO'LA, a town of South Italy in the province of Casserta, 20 miles south-east of Gaeta. It has a cathedral, and a Franciscan convent. The district produces excellent wine. Pop. 6620.

CARI'NTHIA (Ger. *Kärnthen*), a crown-land of the Austrian empire, formerly part of the old kingdom of Illyria, with an area of 3958 square miles, and a population, in 1880, of 348,730, which is rather less than what it was in 1854. The principal river is the Drave, which passes through the country from west to east, in a course of almost 150 miles. The general aspect of the country is mountainous, with long deep valleys, that of the Drave widening at Villach and Klagenfurt into a great plain. The valley of the Drave divides the *Noric* from the *Carinthian Alps*. Agriculture is carried on to a limited extent, owing to the mountainous character of the country, great part of which is occupied in pasture, or covered with brush-wood. Many horses and cattle are reared and exported. The principal products are mineral.

One of the principal branches of industry is the manufacture of hardware; the other manufactures include woollens, silk stuffs, and cottons. The capital is Klagenfurt.—The ancient inhabitants were the *Carni*, who derived their name from the Celtic word *carn* or *corn*, Lat. *cornu*, Eng. *horn*—an allusion to the craggy, horn-like pinnacles of their hills. Before the time of Augustus, it belonged to Noricum, afterwards to the Roman empire. By and by the Carni were swept away in the deluge of immigration from the east, and Slaves settled in the country. After some time the Slaves themselves were so heavily oppressed by the Avari, that they called to their assistance a Frank, named Samo, who founded the kingdom of Carantania, which included much more than the present C., but fell to pieces after his death. Finally it came into the possession of Austria (q. v.). Only about two-sevenths of the present population is Slavic (Slovenians), the remainder being Germans.

CARI'PE, a town of Venezuela, South America, 50 miles south-east of Cumana. The valley of C. is noted for a cavern frequented by the remarkable bird called Guacharo (q. v.). Pop. of town and valley, 5000.

CARI'SSA, a genus of plants of the natural order *Apocynaceæ*. *C. Carandas* is a thorny shrub, much used for fences in India; and the fruit, called carandas—a berry about the size of a small plum—for tarts and preserves.

CARLEN, EMILIE, a well-known Swedish novel-writer, was born 8th August, 1807, at Strömstad, near the frontier of Norway. She was the youngest of 14 children of a merchant named Smith. During childhood her talent in imaginative fiction was remarked by her friends; but it was not till 1838 that her first novel, *Waldemar Klein*, was given to the world. She was then a widow, having been married, in 1827, to Dr. Flygare. In 1841, she was again married to J. G. Carlen, a lawyer, and known as a poet, in Stockholm. Her literary productiveness has been very remarkable, her fictions being chiefly founded on the characteristics of the lower orders in Sweden; and, although faulty in many respects, they are especially rich and striking in incident; and her characters, without exhibiting any very deep insight or subtle analytic power, are yet intelligible and consistent. Among her many works, which have been translated into English, are *The Rose of Thistleland, The Birthright, the Hermit, The Events of a Year, The Lover's Stratagem, Gustavus Lindurm, The Maiden's Tower, Woman's Life*, &c. Her works are largely circulated both in Europe and in America.

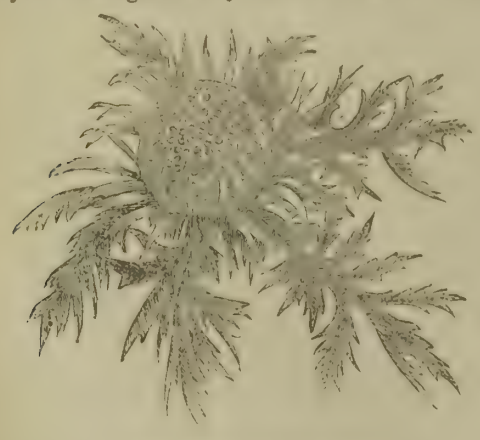
CARLETON, WILLIAM, one of the most popular writers of tales describing Irish life and manners, was born, 1798, at Prillisk, in the county of Tyrone, Ireland. Bred and educated among

the peasantry, he passed through the common sufferings and privations of Irish poverty, and after receiving some scanty instruction in a hedge-school, he, in his 17th year, went to an academy which a relative had opened at Glasslough, where he remained two years.

Afterwards, a vague ambition led him to Dublin, where he arrived with only some three shillings in his pocket, and where, in 1830, he published his *Traits and Stories of the Irish Peasantry*. Their freshness of style pleased the public, and won the favor of critics. A second series, issued in 1832, was also well received; and, in 1839, he published a powerful story, entitled *Fardorougha the Miser*, in several passages of which, however, his humor becomes extravagant. Subsequently, C. published a series of tales (3 vols., Dub. 1841), mostly of pathetic interest, but including a very genial and humorous sketch of the *Misfortunes of Barney Branagan*, which proved a great favorite. The story of *Valentine M'Clutchy* is half-political and half-religious in its tendency, defending the Irish Catholic priesthood, and advocating repeal of the Union; it appeared in 1845. Other narratives—*Rody the Rover*, 1846; *The Black Prophet*, 1847; and *The Tithe Proctor*, 1849—contain many proofs of the author's genius. *Willey Reilly*, 3 vols., appeared in 1855, and *The Evil Eye* in 1860. C. is the true historian of the Irish people. Sharing in their qualities of mind and temperament, he has a true sympathy with all their joys and sorrows, and a graphic and picturesque pen with which to describe them. In consideration of his literary services, he enjoyed a goverment pension of £200 a year, and on his death in January 1869, the queen granted a pension of £100 to his widow.

CARLI, Giovanni Rinaldo, a distinguished Italian economist and archæologist, was born at Capo d'Istria, April 1720. Educated at home and at Flambro in the Friuli, he was, in his 24th year, appointed professor of astronomy and navigation at Padua. In 1754, he published the first volume of his great work *On the History of the Coins and Currency and on the Institution of the Mints of Italy*, the fourth and last volume of which appeared six years later. The book treats of the monetary history of Italy from the fall of the Western Empire until the 17th c., and is profusely illustrated with representations of coins, national and foreign, circulating in Italy during the various ages; and their value as compared with the price of provisions at different periods is also calculated. His merits as a financier were not overlooked. He was made President of the Council of Commerce and Public Economy at Milan, and afterwards President of the New Council of Finances, into which branch of administration he introduced many admirable reforms. The inhabitants were also indebted to his influence for the abolition of the Inquisitional Tribunal. He also wrote some valuable works on Istrian and other antiquities; dissertations on classical subjects; against sorcery; against Rousseau's theory of natural religion, &c. He died February 1795. His works, exclusive of his *Italian Antiquities*, were published in 19 vols. 8vo (Milan, 1784—1794).

CA'RLINE THI'STLE (*Carli'na*), a genus of plants of the natural order *Compositæ*, closely allied to the true Thistles, from which they are distinguished by the inner scales of the involucre



Carline Thistle (*Carlina acaulis*).

spreading like rays, and being colored and shining. These involucral scales are remarkably hygrometric, expanding in dry and closing together in wet weather, and this property they retain for a long time; the heads of flowers are therefore often nailed on cottage-doors in many parts of Europe, to indicate the weather. The name C. T. is derived from a legend, that an angel showed the root of one of the species to Charlemagne as a remedy for a plague. This species, *C. acaulis*, grows on hills and mountains, especially in calcareous soils in the middle latitudes of Europe. It has a very short stem, and very large heads of flowers, and was formerly in high repute for the medicinal virtues of its root—which is in large doses a drastic purgative—but its use is now almost confined to veterinary practice.—The only British species is the common C. T. (*C. vulgaris*), not unfrequent in England and some parts of Scotland, and sometimes rather a troublesome weed, but always indicative of a poor soil. It has a stem about a foot high; and many purplish heads of flowers set amidst straw-colored rays.

CA'RLINGS, in ship-building, are small beams laid fore and aft, and resting upon the main or deck beams. These, with other pieces called *leges*, laid at right angles to them, form a framework by which the deck is supported.

CARLI'SLE, in Pennsylvania, U. S., 18 miles south by west of Harrisburg, the center of a rich agricultural country; seat of Dickinson College, a Methodist institution. C. has machine shops, railcar factory, and barracks. It was shelled by the Confederates, July 1, 1863. Pop. (1870) 6650; (1880) 6209.

CA'RLISLE, a parliamentary and municipal borough, episcopal city, and ancient town in North Cumberland, the capital of the county, 12 miles east of the Solway Firth, 300 miles north-west-by-north of London, 101 miles south of Edinburgh, and 60 west-south-west of Newcastle. It is a chief station on the west railway route from London to Edinburgh, and is the terminus of seven different lines of railway. It stands on an eminence in a wide plain at the confluence of, and nearly surrounded by, the Eden, Caldew, and Peteril. Many fine new streets and buildings have been lately added to the city. The court house and county jail is a handsome pile; a public hall was opened in 1875; the fine Carlisle Bank was built in 1876. The chief branches of industry are cotton, gingham, chintz, check, and hat manufactures; and fancy biscuits are largely made. There is salmon fishing in the Eden. The castle was founded in 1092, and is now a barrack; the remains of the keep form a massive lofty tower, with a very deep well. Mary Queen of Scots was confined in the castle after the battle of Langside. There was formerly a canal of 11 miles, from Bowness on the Solway Firth to C.; but its bed was some years ago converted into a railway, from which a line also branches to the newly formed port of Silloth (q. v.), on the Solway. Pop. (1763) 4000; (1801) 10,221; (1851) 26,310; (1871) 31,049; (1881) 35,866. C. returns two members to parliament. In 1880, 654 vessels entered the port of C., of 115,971 tons burden; and 660 cleared, of 115,482 tons. Roman remains have been found here—coins, altars, inscriptions, brass incense vases, &c. Being near the west end of Hadrian's Wall, C. was probably a Roman station. It was the seat of the ancient kings of Cumbria. The Picts and Scots ravaged it. About 900, it was destroyed by the Danes, after which it remained desolate for 200 years. Thence to the union of England and Scotland, it was closely connected with the border wars, and underwent many sieges. To its being long a fortified border town it owed much of its importance and privileges, but it declined much after the union. The C. corporation, in 1745, proclaimed Prince Charles king of Great Britain. The Duke of Cumberland afterwards took the city, and punished the chief actors with death, and the inhabitants with other cruelties. In 1133, Henry I. made C. a bishopric.—The C. Tables of Mortality, based on the deaths which occurred in C. 1779—1787, were drawn up by Dr. Heysham, and have been ever since much used by life-insurance offices, as being nearest the average.

Carlisle Cathedral was commenced about 1092 by Walter, a Norman. It was founded by William Rufus, and dedicated in 1101 by Henry I.; and in 1133, was made the cathedral church of the newly formed diocese. A great part of the original Norman building was destroyed by fire in 1292. The new edifice contains specimens of all the styles of early English—simple pointed, geometric, and flowing. Two-thirds of the fine Norman nave, originally 141 feet long, were destroyed by Cromwell; the portion that was left has long been used as a parish church. In 1853, the restoration was commenced. The choir is one of the finest in England, 138 feet long, and 72 high, and consists of 8 pointed arches. The east window, consisting of 9 lights, is considered the finest decorated window in England. The tower is very low, rising but one story above the choir. It formerly supported a timber spire, which was removed in 1661. This cathedral has four canons.

CARLISLE, George William Frederick Howard, Earl of, K.G., was born April 18, 1802. Educated at Eton and Oxford, he, in 1821, obtained the Chancellor and Newdegate prizes for his Latin and English poems. He entered the public service in 1826 as an attaché. In 1830, he (then Lord Morpeth), along with Henry (afterwards Lord) Brougham, was elected one of the representatives of the important constituency of Yorkshire, and after the Reform Bill for the West Riding, a position which he held in the liberal interest for several years. Under the administration of Lord Melbourne, he held the office of chief secretary for Ireland (1835—1841), and his impartial distribution of patronage made him very popular in Dublin. Rejected in 1841 by the West Riding, he was again elected in 1846, and remained one of its representatives

until the death of his father (1848) called him to the House of Lords. Under Lord John Russell's ministry (1846—1852), he was Chief Commissioner of Woods and Forests, and afterwards Chancellor of the Duchy of Lancaster. When Lord Palmerston was made prime minister in 1855, C. was appointed Lord Lieutenant of Ireland, a post which he held until the advent of the Earl of Derby's government in 1858; and he succeeded to the same office again when Lord Palmerston was reinstated in 1859. C. obtained some reputation as a literary man, chiefly by his lectures on his travels in the United States, on the life and writings of Pope, and his *Diary in Turkish and Greek Waters*. He died in 1864.

CARLOS, Don, Infante of Spain, born July 3, 1545, at Valladolid, was the son of Philip II. After his recognition as heir to the throne, in 1560, Don C. was sent to study at the university of Alcala de Henares; where, however, he profited so little, that the king, regarding him as unqualified to reign, invited a nephew, the Archduke Rudolf, to Spain, intending to make him heir to the throne. Excluded from all participation in the government, Don C. conceived a strong aversion toward the king's confidants, and especially was unwilling that the Duke of Alva should have the government of Flanders. In confession to a priest, on Christmas eve 1567, he betrayed his purpose to assassinate a certain person; and as the king was believed to be the intended victim, this confession was divulged. The papers of Don C. were seized, and being tried, he was found guilty of conspiring against the life of the king, and of traitorously endeavoring to raise an insurrection in Flanders. The sentence was left for the king to pronounce. Philip declared that he could make no exception in favor of such an unworthy son; but sentence of death was not formally recorded. Shortly afterwards, he died, July 24, 1568, and was interred in the Dominican monastery, El-Real, at Madrid. The suspicion that he was poisoned or strangled, has no valid evidence to support it. Schiller, in his tragedy *Don Carlos*, has widely departed from historical testimonies.

CA'RLOS, San, a town of Venezuela, South America, 120 miles south-west of Caracas. The town is handsome and well laid out. The pop. was formerly 10,000, but is now considerably less. The inhabitants are engaged chiefly in the rearing of cattle, and the cultivation of indigo, cotton, and coffee, of which there are still considerable plantations in the neighboring savannahs.

CARLOS DE BOURBON, Don Maria Isidor, born March 29, 1788, was the second son of Charles IV. of Spain, and was educated chiefly by priests. After the expulsion of the French from Spain, his brother, Ferdinand VII., reascended the throne; but having married thrice without issue, Don C. began to cherish the hope of succeeding his brother. An insurrection in his interest broke out in 1825, in Catalonia; but was put down, Don C. himself not participating in it. A fourth time, however, the indefatigable Ferdinand married, and the result was a daughter, the Infanta Maria Isabella (late queen of Spain), born October 10, 1830. Now, as the Salique Law, excluding females from succession to the throne, had been abrogated, the hopes of the Carlists, as the followers of Don C. were called, were destroyed. During the illness of the king, in September 1832, the Carlists succeeded so far as to win from him a re-institution of the Salique Law; but he revoked it again as soon as he had partially recovered, and thus Don C. was again disappointed. As he still continued his agitation, he was banished, in 1833, to Portugal, and, soon afterwards, was commanded to reside in the Papal States. But before C. had embarked for Italy, King Ferdinand VII. died, September 29, 1833. Don C. was now recognized as heir to the throne of Spain, not only by the Carlists but also by Dom Miguel in Portugal; and having refused to obey the queen-regent's order for his deportation to Italy, he was declared a rebel, October 16, 1833. By the quadruple alliance of Spain, Portugal, England, and France, both C. and Dom Miguel were banished from Portugal, and in June 1834, the former embarked for England. In the following month, he returned to the continent, passed in disguise through France into Spain, where he excited an insurrection in the northern provinces, but was ultimately compelled to escape into France. In 1836, his claims to the throne were unanimously rejected by the Constituent Cortes. In 1844, he abdicated in favor of his eldest son; and died at Trieste, March 10, 1855.—Don Carlos, his son, born 1818, was better known as the Count de Montemolin. This second pretender made an attempt, in 1849, to pass under a disguise through France into Spain, but failed. In 1860, a Carlist insurrection was once more attempted, in consequence of which the Count de Montemolin and his brother were arrested, but liberated after the former had signed a renunciation of all his claims to the Spanish throne. He died in 1861. The present representative of his pretensions is his nephew, Don Carlos, son of his brother Juan, born 1848. On his behalf, Carlist risings—speedily repressed—took place in 1869, 1870, and 1872; but the insurrection headed by Don Carlos, after the abdication of King Amadeo in 1873, proved much more formidable, and kept the northern provinces of Spain in great confusion till the beginning of 1876, when it was crushed.

CARLOVI'NGIANS, the second dynasty of Frankish kings. The origin of the family is traced to Arnulph, Bishop of Metz, who died in 631. His son, Anségise, married a daughter of Pepin, of Landen, in Austrasias. His sons, Martin and Pepin d'Heristall (q. v.), as the greatest territorial lords in Austrasia, were called to the office of Mayor of the Palace. Martin was assassinated; Pepin, by force of arms, compelled the weak Merovingian king, Theodoric III., to invest him with the office of Mayor of the Palace in all the three Frankish states, Neustria, Austrasia, and Burgundy. Pepin allowed the Merovingian kings to remain upon the throne, but they were kings only in name. He died on 17th December 714, and left as his successor, his young grandson, Theodoald; but Charles Martel (q. v.), a natural son of Pepin, was made Mayor of the Palace by the Austrasians, and in this capacity subjected the three states to his power. He died in 741. His two sons, Carloman and Pepin le Bref, divided the kingdom, although for a time the nominal Merovingian dynasty still subsisted; but Pepin at last formally assumed the royal power, and was crowned King of the Franks on 3d May 752. This is the formal commencement of the Carlovingian dynasty. Pepin began the conquest of Italy. His sons, Carloman and Charles the Great or Charlemagne (q. v.), succeeded him, of whom the latter soon reigned alone, and prodigiously extended his dominions. In 800, Pope Leo III. set upon his head the crown of the Western Roman Empire. He divided his dominions amongst his sons, of whom, however, only one, Louis le Débonnaire, survived him, who, in the list of the kings of France, appears as Louis I., but who was properly Emperor and King of the Franks. With Charlemagne, however, the high abilities of his family suddenly disappeared, and his successors showed much weakness of character. Family feuds broke out during the life of Louis le Débonnaire, who had divided his dominions in part amongst his sons, and he terminated an inglorious reign in 840. By a treaty concluded in August 843, Lotharius I., the eldest son of Louis, obtained the imperial crown and the kingdom of Italy, with Lorraine, Franche Comté, Provence, and the Lyonnois; Louis, his brother, called Louis the German, obtained the German part of his father's dominions; and Charles the Bald, the son of a second marriage, obtained Neustria, Aquitania, and the *Spanish Mark*, and may also be regarded as the founder of the French monarchy.

The Emperor Lotharius I. died in 855, and his dominions were again divided—his eldest son, Louis II., being Emperor and King of Italy, and his two other sons kings of Lorraine and of Provence, but their kingdoms reverted to the emperor.—Charles the Fat, a son of Louis the German, having become emperor, was elected by the French nobles to be their king in 882; and being previously in possession of Italy and Germany, united under his sway great part of Charlemagne's empire. But he was a weak monarch, and was deposed in 887. The imperial dignity passed by the marriage of the daughter of the Emperor Arnulph with Fritzlar, Count of Franconia, to another family. The French dynasty, of which Charles the Bald may be deemed the founder, continued in a succession of weak monarchs for about a century, till it terminated with the reign of Louis V., on whose death, Hugh Capet, the most powerful nobleman in France, seized the crown in 987. The Carlovingian kings had for some time previous possessed no real power. A subsequent marriage, however, connected their family with that of the Capets, and enabled the kings of France to trace their descent from Charlemagne.

The Carlovingian dynasty figures in the early history of France as the ally of the church. It aided the popes against the Lombards; made war on the Aquitanians, who pillaged and despoiled the churches; established the temporal power of the successors of St. Peter; subdued and converted the still pagan Saxons; and fought the Mohammedans in Spain. Nor, on the other hand, do we find the church ungrateful: it sanctioned, by benediction and prayer, the conquests of this powerful family; in various ways impressed its sacred stamp of approbation upon it; and for its sake resuscitated the imposing idea of an empire of the west. But this alliance, which was advantageous to the policy of kings like Pepin le Bref and his son Charlemagne, because they had genius, vigor, and design, became at a later period, under their feeble successors, a chief cause of the overthrow of the dynasty, for the clergy after 814 grew stronger and more exacting every day, and forced the monarchs to new concessions.

(The word Carlovingians is formed on a false analogy from Merovingians (q. v.) or Merwings; it should be *Carolings* or *Karlings*, and means descendants of Karl the Great, or Charlemagne.)

CARLO'VITZ, or KARLO'WITZ (in England usually called *Ca'rlovitz*, however), a town of the Austrian empire, in the 'kingdom' or province of Slavonia. It is situated on the right bank of the Danube, about 8 miles south-south-east of Peterwardein, and is noted for its excellent wine, and for the treaty concluded here in 1699. The wine—especially the red variety—ranks with the best and strongest obtained in Hungary, and is largely exported.

Pop. 5000. The important treaty or peace of C. was concluded, in 1699, between the allies Austria, Russia, Poland, and Venice on one side, and the Porte on the other, and provided that Austria should repossess the territories captured by the Turks during two centuries, including Hungary, Slavonia, &c.; that Venice should hold the Morea; that Poland should take back Podolia and part of the Ukraine; and that Russia should have the territory of Azov.

CA'RLOW, the capital town of Carlow county, Ireland, situated at the confluence of the Burren and the Barrow, 56 miles south-west of Dublin by rail. It is a well-built town, with two principal streets, from which branch many smaller ones, and a suburb, Graigue, in Queen's County, on the opposite side of the river, with which it is connected by a bridge. It has a Roman Catholic cathedral and divinity college. C. has extensive flour-mills, and is the emporium for the agricultural produce of the district, largely exported from this place. Pop. (1881) 7185. It returns one member to parliament. There are here the remains of a castle, picturesquely situated on an eminence on the Barrow, founded in 1180 by Sir Hugh de Lacy. In 1361 the Duke of Clarence established the Exchequer of the kingdom in this place. It constituted one of the boundaries of the PALE, beyond which the king's writ was not recognized by the 'Irishry.' Its first charter was granted in the 13th c. by William Marshall, Earl of Pembroke. The town grew up around this castle, which was several times besieged by, and alternately in the possession of, the English and Irish. The castle (one of great extent) was in the possession of the insurgents in 1650, when it was closely invested by General Ireton and the republican army. The garrison surrendered on conditions to Sir Hardress Waller, whom Ireton had left to conduct the siege. It was then dismantled; and about one-half of this once stately castle now remains a picturesque ruin. In the Irish insurrection of 1798, the insurgents attacked the town, but were repulsed by the garrison and yeomanry, and 600 of them killed. The Barrow is here navigable for small-craft to its junction with the Grand Canal at Athy.

CARLOW, a small inland county of Ireland, in Leinster province, with an area of about 346 square miles, of which $\frac{9}{10}$ths are arable. C., except in the southern extremity, where it is hilly, is a triangular fertile level, or gently undulating plain, between the Wicklow and Wexford range of hills on the east, and the highlands beyond the Barrow on the west. The chief rivers are the Barrow and Slaney. C. consists chiefly of granite, covered in the middle plain, or richer tracts, by limestone gravel, on which are fine loams and pasture. In the uplands, the soil is gravelly. Lower, carboniferous limestone crops out in the valley of the Barrow. On the west side of the county begins the great coal district of Leinster. In 1880, 77,844 acres were under crop, the chief crops being oats, potatoes, barley, and wheat. There are many dairies on the plains. The chief exports are corn, flour, meal, butter, &c. Along the Barrow, which falls above a foot per mile, are a great many extensive corn-mills. Pop. (1841) 86,228; (1871) 51,472; (1881) 46,508. It returns three members to parliament—two for the county at large, and one for the borough of Carlow. The chief towns are Carlow, Tullow, and Bagenalstown. At Old Leighlin a synod was held in 630, to settle the time of Easter. Several engagements occurred in the county during the Irish rebellion of 1798. The chief antiquities of C. are cromlechs, castles, and the cathedral church of Old Leighlin. A cromlech near Carlow town has a covering stone 23 feet long, and of nearly 90 tons.

CA'RLSBAD, or KAISER-KARLSBAD, a town in Bohemia, much celebrated for its hot mineral springs, and frequented in summer by visitors of the most aristocratic character from all parts of Europe. The permanent population does not amount to more than about 10,000, who are very industrious, making carpets, knives, scissors, needles, woodwork, and articles of Bohemian glass, such as are likely to induce visitors to purchase. The visitors in a season, which usually lasts from 15th June to 15th Aug., amount to 15,000 or 18,000. The wells have been frequented from a very early period, but have been of great celebrity since the 14th c. The scenery is extremely beautiful. The town is well built, the accommodation for guests good, and the place free from some of the abuses too common at other German spas. No gaming-houses exist here. The temperature of the hot springs varies from 117° to 165° Fahrenheit. The principal spring, the Sprudel, has a very large volume, and is forced up to a height of 3 feet from the ground. Altogether, the daily flow of the springs of C. is estimated at 2,000,000 gallons. The principal ingredient in the water is sulphate of soda. The whole town of C. appears to stand on a vast caldron of boiling water, which is kept from bursting only by the safety-valves the springs provide. On one occasion, after an explosion, poles of 30 fathoms in length, thrust into the aperture, did not reach the bottom. A congress of German powers was held here in August 1819 in which various resolutions, denunciatory of a free press and liberal opinions, were arrived at, and measures of repression determined on.

CA'RLSBURG, or KARLSBURG, a town of Transylvania, situated on the right bank of the Maros, here crossed by a bridge some 200 yards in length, 48 miles south of Klausenburg. It is built partly on a hill, and partly in a valley, is fortified, and has a citadel surrounded by walls with bastions. Gold and silver, obtained from the mines of Transylvania, are purified and coined here. The only manufacture of importance is saltpetre. Maros Porto, the chief shipping-place for Transylvanian rock-salt, is within half a mile of the town. C. occupies the site of the ancient *Apulum*, remains of which are still found. Pop. (1880), 7955.

CARLSCRO'NA, capital of the province of the same name in Sweden, is situated on the rocky island of Trotsö, and its adjoining islets in the Baltic, which are connected by bridges, in lat. 56° 9′ N., long. 15° 35′ E. The town was built in 1680 by Charles XI., who gave it his own name, and conferred upon it several important privileges, besides making it the great naval station and arsenal of Sweden, instead of Stockholm. It has a magnificent harbor, with a sufficient depth of water to float the largest vessels. The only practicable entrance for large ships is defended by two strong forts. The dry docks, blasted out of the granite rock at vast expense, are an attraction to strangers. The inhabitants are chiefly employed in connection with the arsenal. Pop. (1880) 18,300.

The province of C. or Blekinge is situated in the south of Sweden, in lat. 56°—56° 30′ N., long. 14° 30—16° E. It has the Baltic on its south and east margins. It has an area of about 1120 square miles, with a population of 131,812. It is hilly without being mountainous, and generally fertile, yielding rye and potatoes abundantly, and also wheat, oats, and peas. The fisheries employ a considerable number of the inhabitants.

CA'RLSHAMN, a fortified town on the south coast of Sweden, about 30 miles west of Carlscrona, at the end of a beautiful valley. The harbor is small but secure, and a considerable trade in iron, timber, pitch, and tar is carried on. There are manufactures of sail-cloth, tobacco, hats, soap, and leather; there are also dye-works and ship-building yards. Pop. (1880) 6402.

CARLSRU'HE, the capital of the grand duchy of Baden, is situated a few miles eastward from the Rhine. It was founded by the Markgraf Charles-William of Baden-Durlach, in 1715, and built on a curious and regular plan in connection with the palace, which constitutes the center point from which the streets, so far as constructed, diverge in the shape of an extended fan. The streets are wide and well paved. There are a number of fine buildings; flourishing educational institutions; the Court Library contains 80,000 vols.; a public library, 90,000; and there are valuable collections of antiquities, objects of natural history, &c. An aqueduct from the Durlach supplies the town with water. In the market-place, which is the finest of the public squares, a stone pyramid encloses the remains of the founder of the city. The manufactures include machines of various sorts, engines, locomotives, railway carriages and wagons, jewelry, carpets, chemical products, and cloth. C. is generally spelt *Karlsruhe*. Pop. (1880) 49,283.

CA'RLSTAD, a town of Sweden, on the island of Tingvalla, in Lake Wenern, about 160 miles west of Stockholm. It is connected with the mainland by two bridges, one of which is a large and very handsome structure. The town is well built, has a cathedral, cabinet of natural history, &c., and commands extensive views of the most beautiful scenery. Its trade is large, consisting in exports of iron, copper, timber, and corn. Pop. (1880) 7772.

CARLSTADT, a town of Croatia, in Austria, situated in a rich plain, 33 miles S. W. of Agram, and on the navigable river Kulpa. It has a fortress, and is the seat of a Greek bishopric. There is a transit trade in wine, corn, and flour. Pop. 5300.

CARLTON CLUB, in Pall Mall, London, the recognized headquarters of the Conservative party. It was established in 1832, and had in 1882, 1633 members. The entrance fee is £20, and the annual subscription 10 guineas. Of less importance are the Junior Carlton Club, established in 1864, with 2000 members; and the City Carlton Club, established in 1868, with about 1000 members.

CARLU'KE, a municipal burgh in the middle of Lanarkshire, near the right bank of the Clyde, 6 miles N.W. of Lanark. Pop. (1881) 3867. The neighborhood is rich in coal, iron, and limestone, and mining is the chief industry of the place. The orchards around cover 130 acres. Not far off is Lee, the seat of the Lockharts, where is preserved the famous Lee Penny, noticed by Sir W. Scott in the *Talisman*. Roman coins have been found here. General Roy, the antiquary, author of the *Military Antiquities of the Romans in North Britain*, was a native of Carluke.

CARLYLE, THOMAS, was born 4th December 1795, in the village of Ecclefechan, parish of Hoddam, Dumfriesshire, Scotland. Educated first at the village school, and afterwards at Annan Grammar School, he passed to Edinburgh University, with a view to entering the Scottish Church, in his 14th year. Here he studied irregularly, but with amazing avidity, and in very various fields. The views he came to adopt precluded him from becoming a minister; and for a time he taught a school at Kirkcaldy. He also began the study of law; but after a period of work as a private tutor (having the brilliant Charles Buller as pupil), he embraced literature as a profession. His first efforts were contributions to Brewster's *Encyclopædia*. In 1824, he published a translation of Legendre's *Geometry*, to which he prefixed an Essay on Proportion, mathematics having, during his college years, been a favorite study with him. In 1823—1824 had appeared in the *London Magazine* his *Life of Schiller*, and, during the same year, his translation of Goethe's *Wilhelm Meister*. In 1825, the *Life of Schiller* was recast, and published in a separate form. It was very highly praised; indeed, one can discern in the criticisms of the book certain indications of the genius of Carlyle. The translation of *Wilhelm Meister* met with a somewhat different fate. De Quincey, in one of his acrid and capricious moods, fell foul both of Goethe and his translator; while Lord Jeffrey, in the *Edinbargh Review*, admitting C.'s abilities, dealt severely with Goethe's book. In 1826, C. married Miss Welsh, a lineal descendant of John Knox, and, during the same year, appeared his *Specimens of German Romance* (4 vols.). He began to write for the *Edinburgh Review* in 1827, and was also a contributor to the *Foregin* and *Foreign Quarterly Reviews*. He was an unsuccessful candidate for the professorial chairs of Moral Philosophy at St. Andrews, of Rhetoric in University College, London, and of Astronomy at Edinburgh. From 1828 to 1834, he resided chiefly at Craigenputtock, a small property in Dumfriesshire, belonging to his wife—the 'loneliest nook in Britain,' as he himself says. Here C. revolved in his mind the great questions in philosophy, literature, social life, and politics, to the elucidation of which—after his own singular fashion—he earnestly dedicated his whole life. Here also he commenced to write the splendid series of critical and biographical essays which first familiarized Englishmen with the riches of modern German thought. For this work he was incomparably better fitted than any man then living; and he was inspired by the conviction, that the literature of Germany in depth, truthfulness, sincerity, and earnestness of purpose, was greatly superior to what was admired and relished at home. Gifted, moreover, in a degree altogether unexampled, with a talent for portraiture, he soon painted in ineffaceable colors on the British memory, the images of Schiller, Fichte, Jean Paul Richter, and other foreign magnates, until then almost unheard of.

Gradually, educated circles awoke to the fact, that a literary Columbus had appeared among them, who had discovered a 'New World' of letters, the freshness and grandeur of which were sure to attract, sooner or later, multitudes of adventurous spirits. One of his most beautiful, eloquent, and solid essays written at Craigenputtock, was that on *Burns* (*Edinburgh Review*, 1828). It has given the tone to all subsequent criticism on the Scottish poet. The article on *German Literature*, in the same periodical, is a masterly review of a subject, the importance of which C. at length succeeded in compelling his countrymen to acknowledge. But his *chef-d'œuvre*, written on his moorland farm was *Sartor Resartus* ('The Tailor done over,' the title of an old Scottish song). This work, like all his after-productions, an indescribable mixture of the sublime and the grotesque, was offered to various London firms, and rejected on the advice of their sapient 'tasters,' and at length published in successive portions in *Fraser's Magazine* (1833—1834). It professes to be a history or biography of a certain Herr Teufelsdröckh ('Devil's Dirt'), professor in the university of Weissnichtwo ('Kennaquhair'), and contains the manifold opinions, speculations, inward agonies, and trials of that strange personage—or rather of C. himself. The whole book quivers with tragic pathos, solemn aspirations, of riotous humor. In 1834, C. removed permanently to Chelsea. In 1837 appeared the first work which bore the author's name. *The French Revolution, a History*. Nothing can be more gorgeous than the style of this 'prose epic.' A fiery enthusiasm pervades it, now softened with tenderness, and again darkened with grim mockery, making it throughout the most wonderful image of that wild epoch. C. looks upon the explosion of national wrath as a work of the divine Nemesis, who 'in the fulness of times' destroys, with sacred fury, the accumulated falsehoods of centuries. To him, therefore, the Revolution is a 'truth clad in hell-fire.' During the same year, he delivered in London a series of lectures on *German Literature;* in 1838, anothes series on *The History of Literature, or the Successive Periods of European Culture;* in 1839, another on *The Revolutions of Modern Europe;* and a fourth in 1840, on *Heroes, Hero-worship, and the Heroic in History;* of these only the last has been published. Meanwhile, the first edition of his *Miscellanies* (contributions to the reviews) had appeared in 1838, and his *Chartism* in 1839. In 1843 followed *Past and Present*, which, like its predecessor, showed the deep anxious sorrowful interest C. was taking in the actual condition of his countrymen.

In 1845, he published what is by many considered his masterpiece—*Oliver Cromwell's Letters and Speeches with Elucidations and a Connecting Narrative*. The research displayed in this book is something marvelous, but the author has been nobly rewarded for his toil, inasmuch as his vindication of the Protector's character is most triumphant. To C. has thus fallen the unspeakable honor of replacing in the Pantheon of English history the statue of England's greatest ruler. In 1850, the *Latter-day Pamphlets*, the fiercest, most sardonic, most furious of all his writings, came out. The violence of the language in these pamphlets offended many. Next year (1851) appeared the *Life of John Sterling*—a biography of intense fascination for the younger intellects of the age. In 1858—1860, C. published *The History of Frederick the Great*, which sketches the history of Germany from the middle ages, and throws a flood of light on the politics and condition of all Europe in Frederick's time. As Rector of the Edinburgh University, he delivered, in 1866, a memorable address to the students. C.'s last published work contains a brief sketch of *The Early Kings of Norway*, and discusses the credibility of *The Portraits of John Knox*. His views on the Franco-German war and on the Eastern Question were made plain in letters to the *Times*, published in 1870 and 1876. In 1873, he received the Prussian order *Pour le Mérite;* and in 1875, he refused the offer of the Order of the Bath. In the latter year, on his 80th birthday, an address was presented to C. from above a hundred representative men and women in literature, science, and art, with a memorial gold medal; German scholars joining in a like tribute. At his death, which took place at Chelsea, 5th Feb. 1881, C. had long been recognized as one of the greatest of modern literary men. He was fitted rather to awaken and stimulate, than to guide. He was intolerant and strong in his prejudices; his judgments seem often perverse; and his political maxims may be disputed. But none will deny his genius or fail to see in his writings the fervid earnestness, prophetic fire, which made him one of the great moral forces of the 19th century. His style was not less remarkable for its power and graphic effect than for its abruptness, ruggedness, and eccentricity. By his own wish, C.'s remains were buried in the churchyard of his native village. His excellent wife died in 1866, and so, as he said 'the light of his life had gone out.' A few weeks after his death, Mr. Froude published two volumes of *Reminiscences* by C., containing many sharp personal criticisms, which provoked much comment. In *T. C.: a History of the First Forty Years of his Life* (1881), Mr. Froude continued the task of showing us C. without partiality, not sparing his weakness of temper; he subsequently published a collection of Mrs. Carlyle's letters (3 vols., 1883); and he had promised to complete C.'s biography by a further work on his later years.

CARMAGNO'LA, a town of North Italy, about 16 miles south of Turin. The *condottiere*, Francesco Bussone, afterwards Conte di Carmagnola, was born here about 1390. Pop. of C., 12,512.

CA'RMAGNOLE, the name of a popular song and dance, which was notorious as the accompaniment of many excesses in the French Revolution. It was sung and danced with wild enthusiasm by the crowds in the streets. Every verse had the refrain:

Dansons la Carmagnole—vive le son—du canon !

Littré thinks the name was given to the air from the fact of its being sung by persons wearing the jacket known as *carmagnole*, popular during the Revolution. From the air the name passed to bombastic reports of republican victories.

CARMARTHEN. See CAERMARTHEN.

CARMEL is a mountain at the end of a limestone-ridge, 6 miles long, forming the only great promontory on the low coast of Palestine. It is about 1500 feet high. On the east is the river Kishon, and the Plain of Esdraelon. Trees still grow abundantly on the mountain. The name C. means, *The garden of God*, or 'a very fruitful region.' Mount C., the scene of Elijah's sacrifice, is renowned in Jewish history, and is often alluded to in the imagery of the prophets. On Mount C. there is a monastery, the monks in which are Carmelites (q. v.). The mountain's usual modern name, *Mar Elyas*, indicates its connection in the popular mind with the life of the great prophet.

CARMEL, KNIGHTS OF THE ORDER OF OUR LADY OF MOUNT, were instituted by Henry IV. of France, and incorporated with the Order of the Knights of St. Lazarus of Jerusalem. The order of Mount C. constituted of 100 gentlemen, all French, who were to attend the king in his wars, and had considerable revenues assigned to them. The order was confirmed by bull by Pope Paul V. in 1607.

CA'RMELITES, or ORDER OF OUR LADY OF MOUNT CARMEL, a monastic order probably founded as an association of hermits on Mount Carmel by Berthold, Count of Limoges,

about 1156. A legend, however, ascribes the foundation of the order to the prophet Elijah; and another makes the Virgin Mary to have been a Carmelite nun. Driven out by the Saracens in the 13th c. the C. wandered over Europe; and Simon Stoch, their general changed them into a mendicant order in 1247. From that time, they shared in the usual vices of the mendicant orders. They subsequently divided into several branches, more or less rigid in their rules, one distinguished by walking barefooted. They exist at the present day in many Roman Catholic countries.—The order of *Carmelitesses* or *Carmelite Nuns*, was instituted in 1452, and is very numerous in Italy.

CARMI'NATIVES (from Lat. *carmen*, a charm), medicines to relieve flatulence and pain in the bowels, such as cardamons, peppermint, ginger, and other stimulating aromatics.

CA'RMINE, or CA'RMIN (Arabic, *kermes*), is a beautiful red pigment obtained from cochineal, and which is employed in the manufacture of the finer red inks, in the dyeing of silk, in coloring artificial flowers, and in miniature and water-color painting. It was first prepared by a Franciscan monk at Pisa, who discovered it accidentally, while compounding some medicine containing cochineal; and in 1656, it began to be manufactured. It is the finest red color known, and was more largely used formerly than now for imparting a healthy aspect to the cheek of beauty. One process for its preparation is to digest 1 lb. of cochineal in 3 gallons of water, for 15 minutes; then add 1 ounce of cream of tartar; heat gently for 10 minutes; add half an ounce of alum; boil for 2 or 3 minutes; and after allowing any impurities to settle, the clear liquid is placed in clean glass pans, when the C. is slowly deposited. After a time, the liquid is drained off, and the C. dried in the shade. In the preparation of C., much depends on a clear atmosphere and a bright sunny day, as the pretty color of the C. is never nearly so good when it has been prepared in dull weather, and this accounts in great part for the superiority of French C. over that prepared in England. The great expense of pure C. has led to the fabrication and vending of substitutes. The *rouge* of the theaters is made from red sandal-wood, Brazil wood, benzoin, and alum, which are boiled in brandy or vinegar till a paint of an intense red color remains. A more harmless material is obtained by evaporating the mixture till the liquid is driven off, and making up the red residue with balm of Mecca, spermaceti, or butter of cacao. The depth of the red tint may be lessened by the addition of chalk. The little color-saucers called *rouge dishes*, obtained from Portugal, contain pure C.; but imitations are made in London. *Spanish wool* and *Oriental wool*, which are impregnated with red paint, intended for use on the cheek for improving the complexion, are seldom genuine.

CA'RMOÉ, or KARMOE, an island of Norway, at the entrance of the Bukke Fiord, in the North Sea, and 20 miles north-west of Stavanger, in lat. 59° 20′ N., long. 5° 15′ E. A strait 2 miles in width separates it from the mainland. With a length of 21 miles, and average breadth of 5, it has a population of 6400, who are principally engaged in the fisheries, and in cattle-rearing.

CARMO'NA, a town of Andalusia, Spain, 20 miles north-east of Seville. It is situated on an elevated ridge, and has some manufactures. Pop. (1877) 17,421.

CARNAC, a village in the department of Morbihan, France, 20 miles sout-east of Lorient. Pop. (1876) 636. It is remarkable on account of the great stone monument situated about three-quarters of a mile from the village, on a wide desolate plain near the seashore. The monument consists of 1000 or more rude broken obelisks of granite, resting with their smaller ends in the ground, rising, many of them, to a height of 18 feet, though a large proportion does not exceed 3 feet, and arranged in 11 parallel rows, forming 10 avenues, extending from east to west, and having at one end a curved row of 18 stones, the extremities of which touch the outer horizontal rows. The origin and object of the monument remain a mystery; whether they are Celtic or pre-Celtic in date, and whether designed for religious uses or for celebration of a military exploit. There is also a large dolmen and a cairn of loose stones here. Similar but smaller structures are found to the west of C., at Erdeven and St. Barbe. See Lubbock's *Prehistoric Times;* Miln's *Excavations at C.* (1881).

CARNAHUBA PALM, or CARANAIBA PALM (*Copernicia cerifera*), a very beautiful species of palm, which abounds in the northern parts of Brazil, in some places forming vast forests. It attains a height of only 20 to 40 feet; but its timber is valuable, and is imported into Britain for veneering. The fruit is black, and about the size of an olive; it is sweet, and is eaten. Scales of wax cover the under side of the leaves, and drop off when the fallen and withered leaves are shaken. This wax is melted into masses; and bees' wax is often adulterated with it. It has been imported into Britain, and used in the manufacture of candles.

CARNARVON. See CAERNARVON.

CARNARVON, HENRY HOWARD MOLYNEUX HERBERT, fourth Earl of, born in Grosvenor Square, 1831. His family is a branch of the House of Herbert, Earls of Pembroke, springing from Major-general the Hon. W. Herbert, whose son, Henry, was created in 1870, Baron Porchester of Highclere, Hampshire, and advanced to the earldom of Carnarvon in 1793. The present earl was educated at Christ Church, Oxford, where he was first-class in classics in 1852. His father, dying before he was of age to sit in the House of Commons, he lost the advantage of the training in public speaking and statesmanship which the sons of peers usually enjoy during the lifetime of their parents, in the Lower House. He took his seat on the Conservative benches, and soon showed himself ambitious of parliamentary distinction. His earlier speeches in the House of Lords were not thought to exhibit much vigor and grasp of intellect, and were marred by a simpering and affected delivery. He was appointed governor of Carnarvon Castle in 1854. In 1858, he became Under-secretary of State for the Colonies, in the administration of the Earl of Derby. In 1859, he received the degree of D.C.L., and was elected High Steward of the University of Oxford.

He resigned office with the Conservative ministry in 1859, and availed himself of the period of leisure thus obtained to visit the East. The feuds of the tribes in the Lebanon had broken out in a massacre of the Christians; and the Earl of C. gave the world the benefit of his investigations, in an interesting work, entitled the *Druses* (q. v.) *of the Lebanon*. On his return, he delivered lectures in the country, and speeches in the House of Lords, on prison-discipline, education, and other social subjects. When the Conservatives again returned to power in 1866, C. accepted from Lord Derby the office of Secretary of State for the Colonies, with a seat in the cabinet. In this he obtained for his colonial administration a large share of public confidence. He censured in calm and measured language the misconduct of the courts-martial during the Jamaica insurrection, and especially the trial and execution of Mr. Gordon; and the pacification of the colony satisfactorily progressed under his instructions. During the recess, he developed and framed a plan for the confederation of the British North American colonies; and when parliament met in 1867, he explained the provisions of the measure in an elaborate speech. The bill met with general approval in both Houses, and it passed; but before it obtained the royal assent, C. had, with two other colleagues in the cabinet, resigned office upon the Reform Bill of the Derby government, which he regarded as democratic in its operation, and dangerous in its results. When the Reform Bill came before the House of Lords, C., in an animated speech, vindicated his consistency at the expense of his colleagues; and in the discussions in committee, he addressed the House with great vigor and argumentative ability. He edited in 1869 a work by his father, who was an accomplished scholar. It is entitled *Reminiscences of Athens and the Morea; Extracts from a Journal of Travels in Greece during* 1839, *by the late Earl of Carnarvon*. He has also published one or two of his lectures. On Mr. Disraeli's return to power in 1874, Lord C. resumed office as Secretary of State for the Colonies; but resigned in January 1878, in consequence of the sending of the British fleet to the Dardanelles. Lord C. married, in 1861, the only daughter of the sixth Earl of Chesterfield.

CARNA'TIC, a region on the east or Coromandel coast of India, extending inland to the Eastern Ghauts, and lengthwise from Cape Comorin to 16° north. (The name *Karnataka* was originally applied by its Mohammedan conquerors to Mysore and the country *above* the Ghauts.) The C. is no longer an administrative division, but is memorable as the theater of the struggle of last century between France and England for supremacy in India.

CARNATION, one of the finest of florists's flowers, a double-flowering variety of the Clove Pink (*Dianthus caryophyllus*, see PINK), and existing only in a state of cultivation. The stem is about three feet high, and generally receives support. The taller *Tree Carnations* are not esteemed by florists. The flowers are often three inches or more in diameter. Scarlet, purple, and pink are the prevailing colors; but whatever are the colors of a C., it is of no value in the eyes of a florist, unless they are perfectly distinct. Fulness and perfect regularity are also deemed essential. The varieties are extremely numerous: those which have only two colors, disposed in large stripes through the petals, are called *Flake Carnations;* those which have three shades of color, also in stripes, *Bizarre Carnations;* and those which have the flowers spotted with different colors, and the petals serrated or fringed, receive the name of *Picotees*. Carnations are propagated in summer either by layers or by *pipings*, which are short cuttings of shoots that have not yet flowered, each having two joints.

CARNE'ADES, a Greek philosopher, born at Cyrene, in Africa, about 213 B.C. He studied logic at Athens under Diogenes, but became a partisan of the Academy, and an enemy of the Stoics, whose stern and almost dogmatic ethics did not suit his sceptical predilections. He was in fact one of the most important of the ancient sceptics, and held that no criterion of truth exists in man. He was founder of the Third or New Academy. In 155 B.C., along with Diogenes and Critolaus, he was sent as ambassa-

dor to Rome, where he delivered two orations on justice, in the first of which he eulogized the virtue, and in the second proved that it did not exist. Honest Cato, who had no relish for intellectual jugglery, and thought it a knavish excellence at the best, moved the senate to send the philosopher home to his school, lest the Roman youth should be demoralized. C. died at Athens, 129 B.C.

CARNE'LIAN, or CORNELIAN, in Mineralogy, the name given to some of the finer varieties of Chalcedony (q. v.). The color is blood red or flesh color, reddish brown, reddish white or yellow, more rarely milk white. The fracture is in the common C. perfectly conchoidal, but there is a variety of a somewhat fibrous structure with a splintery fracture. C. is found in pieces of irregular form and in lamellar concretions. The finest specimens are brought from the East, but it is found in Scotland and in many parts of Europe and America. It is much used by the lapidary, and in the East it is prized beyond every other stone, the gems excepted. Bright red C. of unmixed color is most highly valued, but a mass of considerable size is seldom found with the color equal throughout.

CARNIO'LA (Ger. *Krain*), a crown-land of the Austrian empire, has an area of 3850 square miles; pop. (1880) 481,243, of whom 30,000 are Germans, 16,000 Croats, the rest being Slavs of the Slovenian branch. A continuation of the Carinthian Alps passes through it in the north, and the Julian Alps in the south. The scenery of the country abounds in interesting and singular features, amongst which one of the most notable is the rock-bridge of St. Kanzian, 130 feet high, and 160 feet broad, with a perfect arch 62 feet high, and 154 feet long. The Save (q. v.) is the principal river. The singular lake of Zirknitz (q. v.) is in Carniola. The climate of C. is in general mild, except in the high mountainous parts. The country does not produce corn or cattle enough to supply the wants of its inhabitants, and millet, pulse, and wild-fruits are principal articles of food of many. Some districts yield excellent wines and much fine fruit. Flax, silk, maize, and honey are produced. The chief minerals are iron, quicksilver, and brown coal; the quicksilver mines of Idria are about the most important in Europe. Linen-weaving and the manufacture of a coarse lace are practised. Laibach is the capital.

C. received its present name after the settlement here of the Slavonic Wends or Slovenians. Charlemagne conquered it. From 972 it had markgraves of its own. Part of the territory passed to the Dukes of Austria in the 13th c., and the remainder was acquired by them in the 14th.

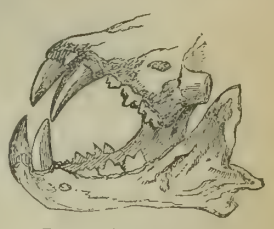
CA'RNIVAL (Ital. *Carnovale;* from Lat. *caro*, flesh, and either *vale*, farewell, or *levamen*, solace), a festival which originally began on the feast of the Epiphany, and continued to Ash-Wednesday, when the fast of Lent made an end of the preceding feasting, masquerading, and buffoonery. In later times, the C. was limited to the time of from three to eight days before Ash-Wednesday. Without doubt, the forms and customs still preserved in the celebration of the C. originated in the heathen festivals of springtime; and they still remind us partly of the Lupercalia and Bacchanalia of Southern Europe, and partly of the Yule-feast among northern peoples. Banquets of rich meats and drinking-bouts were the chief attractions of the C. during the middle ages.

Shrovetide (q. v.), or Shrove-Tuesday, called also Fasten-Even or Pancake-Tuesday, was a relic of the English C., and formerly a season of extraordinary sport and feasting. The rich commenced the festive time at the feast of Epiphany, or on 'Three Kings' Day;' but the middle classes restricted their days of revelry to the week immediately preceding Lent; while the poor indulged in only a few days of mad mirth. The several chief days of C. had distinct names, such as 'fat' or 'greasy Sunday,' 'blue Monday' (or 'fool's consecration'), &c. The Tuesday before the beginning of Lent was especially styled C.—the *Fastnacht* of the German people. In most countries, especially where Protestantism prevails, the celebration is confined to wearing of masks, processions in costume, and masked balls. But in Italy, especially the cities, it is still a popular festival of universal observance. Venice used to be pre-eminent for the splendor of its observances; the C. of Rome is now the best known, though Milan and Naples vie with it. At Rome, races of riderless horses along the crowded Corso are one of the chief items in its celebration; as also the throwing of plaster confections from the windows and balconies on the occupants of the carriages and processional cars, and a return fire from below. In Germany the C. is observed not merely in Catholic towns like Munich and Cologne, but in Leipzig, Hamburg, and Berlin.

CARNI'VORA. This great order of Mammalia (q. v.) is very naturally separated into two great divisions: (1) the *Fissipedia*, including all the land carnivores, and (2) the *Pinnipedia*, or aquatic forms. The former exhibit marked affinities to the Insectivora and even to the Marsupialia, while the more highly specialized Pinnipedes lead directly towards that extreme modification of the carnivorous type which we find in the Cetacea.

The Fissipede carnivores have the usual number of incisor teeth—six in each jaw. The digits are free and provided with powerful claws, and the terminal phalanx which bears the claw is retracted upon the middle phalanx by an elastic ligament when the flexor muscle of the digits is not in action, and the claw is thus protected from wear in walking. This arrangement is best developed in the most finely carnivorous forms—the feline alliance. The cerebral hemispheres are long and well convoluted, and the olfactory lobes are large.

The bones are comparatively slender, yet of great strength and extremely close texture, while the skull is characterized not merely by its density, but by the great shortening of the jaws, the transverse elongation and narrowing of the condyles to admit only of an up and down cutting movement, as well as by the development of large bony ridges upon the top and sides of the skull for the attachment of the enormous jaw muscles. The teeth, too, are more or less completely modified for cutting and mincing the flesh of their victims, and the higher carnivores are thus very strongly contrasted with the herbivores, whose long weak jaws and ridged teeth are as completely adapted for the slow and prolonged grinding of their less nutritious food. The stomach is always simple, and the alimentary canal is short—sometimes, as in the lion, not more than three times the length of the body, while that of vegetable feeders may vary from twelve to thirty times their own length. The body is thus comparatively light and slender, an advantage of the greatest importance in chasing or springing upon prey.



Jaws and Teeth of Lion.

The most familiar carnivores, the dog, bear, and cat, may conveniently be taken as types of the three great sections of land carnivores—the *Cynoidea*, *Arctoidea*, and *Ailuroidea*—which are distinguished by numerous important characters, chiefly of osteological detail. The Cynoidea include the species of *Canis* (dog, wolf, jackal, fox, &c., q. v.), together with a few aberrant forms, such as the long-eared fox (*Megalotis*) and hyæna-dog (*Lycaon*) of Southern Africa, and are undoubtedly the least differentiated group. They are all digitigrade, and possess an almost typical dental formula; only two upper molars above three lower being, however, present. The Ailuroidea include five families; (1) *Viverridæ* (civet, ichneumon, &c., q. v.); (2) *Protelidæ*, including only the Aard-wolf (*Proteles*), intermediate between civets and hyænas; (3) Cryptoproctidæ, also monotypic, including only the *Cryptoprocta* of Madagascar, intermediate between civets and cats; (4) *Hyænidæ* (Hyæna, q. v.); and (5) *Felidæ* (cat, lion, tiger, leopard, puma, lynx, cheetah, &c., q. v.). These are considerably specialized above the canine type, being mostly digitigrade, with full retractile claws, having the molar series more and more reduced, so that in the cats and hyænas only one remains above and below; and the last upper pre-molar and first lower molar always forming the *Carnassial* teeth, which cut like powerful scissors.

The Arctoidea contain three important families: (1) *Ursidæ*, including the numerous species of bears (q. v.); (2) *Procyonidæ* (the racoon, kinkajou, &c., (q. v.); and (3) the vast heterogeneous group of *Mustelidæ*, including the marten and sable (*Mustela*), the weasel, ermine, pole-cat, and ferret (*Putorius*), as well as the ratel, glutton, badger, otter, and sea-otter (q. v.). The Artoidea are plantigrade, their skulls comparatively long, and their teeth more or less tuberculated, some of the bears being indeed almost completely herbivorous. The otter and sea-otter (*Enhydri*) exhibit a most distinct transition to the seals, the habit being aquatic and the feet webbed; while in the latter genus the hind feet are permanently directed backwards, the base of the skull too thin, and the dentition reduced.

The palæontology of the carnivora is of the greatest interest, for not only do the three great families run back to such perfectly intermediate and apparently ancestral forms as the Eocene 'bear-dog,' *Arctocyon*, but many genera occur which not only break down the divisions between the existing families, but link these closely to the marsupials.

The *Pinnipedia* are divided into three families—the *Otaridæ*, eared-seals or sea-lions (*Otaria*); the *Trichechidæ*, including only the walrus (*Trichechus*); and the *Phocidæ*, or true seals (*Phoca*, &c.).

See Huxley, *Comp. Anat. of Verteb. Anim.*, and Cassell's *Natural History*, vol. ii.

CARNIVOROUS PLANTS. See DIONÆA, SUNDEW.

CARNOT, LAZARE NICOLAS MARGUERITE, born May 13, 1753, at Nolay, Burgundy, gained fame as a military engineer. In 1791, he became a member of the Legislative Assembly, and in the Convention voted for the death or Louis XVI. After taking the command of the army of the north, and gaining the victory of Wattignies, he was elected into the Committee of Public Safety,

in which he was intrusted with the chief direction of military affairs, and greatly contributed to the successes of the French army. Though he endeavored to restrict the power of Robespierre, he was accused, with others, after the Reign of Terror; but the charge was dismissed. In 1797, having opposed the extreme measures of Barras, his collegue in the Directory, C., as a suspected royalist, was sentenced to deportation. He escaped into Germany, where he wrote his defence, which conduced to the overthrow of his colleagues in 1799.

The 18th Brumaire brought him back to Paris, where he was made Minister of War, 1800; and by his energy, skill, and fertility of administrative resource, helped to achieve the brilliant results of the Italian and Rhenish campaigns. He retired, however, from his office when he understood the ambitious plans of the emperor, but hastened, when he witnessed the reverses of the empire, to offer his services to Napoleon, who gave him the command of Antwerp in 1814, which he heroically defended. During the Hundred Days, he held office as Minister of the Interior; and after the second restoration, retired first to Warsaw, and next to Magdeburg, where he died, August 2, 1823. Among C.'s numerous writings on mathematics and military tactics, &c., we may notice his *Essai sur les Machines en Général* (1786), *Réflexions sur la Métaphysique du Calcul Infinitésimal* (1797), and the *Géométre de Position* (1813).—His son, LAZARE HIPPOLYTE CARNOT, born at St. Omer, April 6, 1801, one of the leaders of the French democracy, was in early life a disciple of St. Simon, but, like others, left that school on account of the lax morals advocated by Enfantin—protesting against 'the organization of adultery'—and devoted himself to the inculcation of a more orthodox and virtuous socialism in various periodicals. In 1847, he declared himself a republican in his brochure, *Les Radicaux et la Charte*; and, after the February Revolution, was appointed Minister of Public Instruction, but soon resigned. In 1863, he entered the Corps Législatif, and the National Assembly in 1871. He was elected a senator for life in 1875. He has written an *Exposé* of St. Simonianism and *Mémoires* of Henri Gregoire and of Barrère.

CA'ROB, A'LGAROBA, or LOCUST-TREE (*Ceratonia siliqua*), a tree of the natural order *Leguminosæ*, sub-order *Cæsalpiniæ*, a native of the countries around the Mediterranean Sea, in size and manner of growth much resembling the apple-tree, but with abruptly pinnate dark evergreen leaves, which have about two or three pair of large oval leaflets. The flowers are destitute of corolla; the fruit is a brown leathery pod, 4—8 inches long, a little curved, and containing a fleshy and at last spongy and mealy pulp, of an agreeable sweet taste, in which lie a number of shining brown seeds, somewhat resembling small flattened beans. The seeds are bitter and of no use, but the sweet pulp renders the pods an important article of food to the poorer classes of the countries in which the tree grows. They are very much used by Moors and Arabs. They are also valuable as food for horses, for which they are much employed in the south of Europe, and have of late years begun to be extensively imported into Britain, under the name of *Locust Beans*, which name and that of *St. John's Bread* they have received in consequence of an ancient opinion or tradition, that they are the 'locusts' which formed the food of John the Baptist in the wilderness. It seems probable that they are the 'husks' (*keration*) of the parable of the Prodigal Son.—The Arabs make of the pulp of the C. a preserve like tamarinds, which is gently aperient.—The C. tree is too tender for the climate of Britain.

Dr. Royle thinks its introduction into the north of India would be an important addition to the resources of that country, and a valuable safeguard against famine. The produce is extremely abundant, some trees yielding as much as 800 or 900 lbs. of pods. The wood is hard, and much valued, and the bark and leaves are used for tanning.—The LOCUST-TREE (q. v.) of America is quite distinct from this.

CAROLI'NA, NORTH, an Atlantic state of the American Union, having South Carolina and Georgia on the S., Tennessee on the W., and Virginia on the N.; in lat. 33° 53'—36° 33' N., and long. 75° 25'—84° 30' W., being about 450 miles long, and about 180 broad, with an area of about 50,704 square miles. Pop. (1870) 1,071,361; (1880) 1,399,750, of whom 531,277 were colored persons, and 1230 were taxed Indians. North Carolina was restored to a place in the Union in 1868, after a new constitution had been adopted by the state government, and approved by Congress. It sends 8 members to the Lower House of Congress, returning also, in common with every other state, 2 senators to the Upper. The public debt of North C., in 1881, was 27,120,228 dollars, and its valuation of property was about 150,000,000 dollars. The state receipts for two years were above 1,000,000 dollars. Of railways, there were, in the year 1880, in actual operation, above 1400 miles. The principal rivers are the Chowan, Roanoke, Tar, Neuse, and Cape Fear. Of these, the first four divide themselves equally between Albemarle and Pamlico Sounds—inlets which, besides being shallow and difficult in themselves, are almost entirely cut off from the sea by a nearly continuous series of low islands—and the last of the five, though it does fall into the open ocean, is yet not materially superior to the others, never showing more than 14 feet of water on the bar. With this insular breast-work, the mainland is geologically connected to a depth of about 60 miles, being everywhere alluvial, and in many places swampy. To the west of this belt, the country, after undulating into hills, is traversed by the ridges of the Alleghanies, which, culminating in Mount Mitchell to an elevation of 6470 feet, bear aloft between them a table-land of fully one-third of that altitude. Through the maritime tract, and even beyond it, the rivers are generally practicable for steamboats. Among the productions, the most characteristic is the pitch-pine of the lower levels; so that, in the matter of naval stores, this state surpasses all the rest of the Union taken together. In mineral resources, also, North C. has a share, more especially in gold, copper, iron, and coal. In 1880, it stood fifth in order of the tobacco-producing states, and eighth in respect of the amount of cotton produced.

The manufactures of the census year were worth 20,085,000 dollars. The chief towns are Raleigh, the capital, near the Neuse; Wilmington on the Cape Fear River, the principal seaport and by far the largest city of the state; New Berne, and Charlotte. North C. was first permanently colonized from Virginia in 1653. Down to 1693, it continued to form one province along with South Carolina, the two being frequently still called the Carolinas. In a local declaration of independence of May 1775, 14 months before the 4th of July 1776, North C. first demanded a separation from Great Britain.

CAROLINA, SOUTH, an Atlantic state of the American Union, of a triangular form, with North Carolina and Georgia on its inland sides. It extends between 32° and 35° 10' N. lat., and 78° 25' and 83° 20' W. long., having an area of 34,000 square miles. In 1870, the total population of South C. was 750,606; in 1880, it had increased to 995,577, of whom 604,332 were colored persons, including 131 Indians. The total population in 1800 was 345,591. South C. formerly differed from all the other states in appointing its presidential electors, and its executive, not by the popular suffrage, but by the joint vote of two branches of the local legislature, being thus pre-eminent in the aristocracy of its constitution. In 1868, however, in the reconstruction of the Southern States, South C. was restored to a place in the Union, with a new constitution adopted by a majority of voters, and approved by Congress. It is represented in Congress by 5 members in the Lower House, besides the 2 senators while each state possesses alike. Physically a continuation of its northern neighbor, South C., behind a breast-work of islets, presents a low belt, generally swampy, of about 100 miles in depth, rising backward through an undulating region to a height of 4000 feet in the Alleghanies. With such a range of soil and climate, the productions are very various—cotton, rice, tobacco, indigo, sugar, silk, maize, and wheat. In the first two articles, South C. stands pre-eminent, yielding nearly as much rice as all the other states together, and more cotton, in proportion to area, than any other state. Its mineral treasures are chiefly granite, sienite, marble, and gneiss, from the primitive formations of the state, for building; along with gold, lead, and iron: it is probable that no coal will be found. The public indebtedness of South C. in 1881 was 6,642,322 dollars, and the assessed value of property was 124,867,085 dollars.

Since the reconstruction of the state, public institutions have made great progress. With not much more than 50 miles of canal, South C. has 1400 of railway. The chief rivers, each the receptacle of considerable affluents, are the Great Pedee, Santee, and Edisto, and also the Savannah, as common to Georgia, and South C., the whole being said to furnish an inland navigation of 2400 miles. The cotton product of South C in 1866 amounted to 112,273 bales; in 1882, to 616,000 bales. South C. stands sixth in order of the cotton-producing states and first in respect of the quantity of rice produced (52,000,000 lbs. in 1880). The chief towns are Charleston, Columbia (the capital), and Greenville.

CAROLINA PINK. See SPIGELIA.

CA'ROLINE, AMELIA ELIZABETH, wife of George IV. of Great Britain, was the second daughter of Charles William Ferdinand, Duke of Brunswick Wolfenbüttel, and of the Princess Augusta of Britain. She was born on 17th May 1768, and spent her youth under great restraint at her father's court. In 1795, she was married to the Prince of Wales. The marriage was disagreeable to him, and although she bare him a daughter, the Princess Charlotte, he separated from her immediately on her recovery from childbed; and she lived by herself in a country residence at Blackheath, the object of much sympathy, the people regarding her as the victim of her husband's love of vice. Reports to her discredit, led the king in 1808, to cause investigation to be made into her conduct, which was found to be imprudent, but not criminal. In 1814, she obtained leave to visit Brunswick, and afterwards to make a further tour. She visited the coast of the Mediterranean, and lived for some time on the Lake of Como, an

Italian, by name Bergami, being all the while in her company. When her husband ascended the throne in 1820, she was offered an annuity of £50,000 sterling to renounce the title of queen, and live abroad; but she refused, and made a triumphal entry into London, whereupon the government instituted proceedings against her for adultery. Much that was very offensive was proved as to her conduct; but the manner in which she had been used by her husband, and the splendid defence of Brougham, caused such a general feeling in her favor, that the ministry were obliged to give up the Divorce Bill, after it had passed the House of Lords. She now fully assumed the rank of royalty, but was refused coronation, and turned away from the door of Westminster Abbey on the day of the coronation of her husband. She died on 7th August 1821.

CARO'RA, a town of Venezuela, South America, in the province of Caro, 210 miles west-south-west of Caracas, and 60 miles east of Lake Maracaybo, on the Tocuyo. The town is well built, has a handsome parish church, convent, hermitage, &c. There are manufactures of leather, ropes, and fine hammocks from the fibre of the *Agave fœtida*. A trade is carried on in agricultural produce, and in the aromatic balsams, resins, gums, and wild cochineal for which the district is famous. The pop., which was formerly much larger, is now about 6000.

CARO'TID A'RTERY. The great artery which on each side distributes blood to the different parts of the head, appears to have derived its name either from Gr. *kara*, the head, or, more probably, from Gr. *karos*, sleep, there being an old idea, which the researches of Dr. Alexander Fleming have shown to be correct, that there was some connection between deep sleep and compression of these vessels.

Each C. A. consists of the primitive or common carotid, which at the upper margin of the larynx or organ of voice, separates into two great divisions, of nearly equal size—the external and the internal carotid. The external carotid supplies the larynx, tongue, face, and scalp with blood; its principal branches being the superior thyroid, the lingual, the facial, the occipital, the posterior aural, the internal maxillary, and the temporal. The last-named artery is occasionally opened by the surgeon in preference to a vein, as, for example, in certain cases of cerebral apoplexy. The internal carotid enters the cavity of the cranium through a somewhat tortuous canal in the temporal bone, and after perforating the dura mater, or fibrous membrane of the brain, separates into the anterior and middle cerebral arteries, which are the principal arteries of the brain; while in its course through the dura mater, it gives off the ophthalmic artery, which subdivides into several small branches that supply the eye and surrounding parts. See CIRCULATION.

Surgery.—Wounds of the carotid trunks are generally from stabs. Suicides have a vague desire to cut them, but rarely cut sufficiently deep by the side of the windpipe. Of course, should either vessel be wounded, death results almost immediately. Punctured wounds, however, may not be immediately fatal; they may heal, or a false Aneurism (q. v.) may result. Such an occurrence happened about twenty years ago in Scotland. A young man was stabbed close to the root of the neck; a pulsating tumor formed, which rapidly increased, and would undoubtedly have burst before long, had not Professor Syme of Edinburgh cut into it, and, by an operation requiring extraordinary courage and dexterity, tied the common C. A. above and below the part stabbed; thereby saving not only the life of the patient, but that of the man who had inflicted the wound, and who was then in prison awaiting his trial.

Sir Astley Cooper was the first to tie the common carotid for spontaneous aneurism, in November 1805; and since then, the operation has been successfully performed in a number of cases. Owing to the numerous interchange of branches between vessels of both sides of the head, cutting off the supply of blood through one carotid is seldom followed by affections of the brain. Such have, however, occurred in a few instances; but Dr. Mussey of America tied both carotids within twelve days of each other without any such result.

The common carotid in the horse is the termination of the right arteria innominata. It is a large vessel, about an inch long, which emerges from the chest below the windpipe, and divides into the *right* and *left* carotids. These bend upward, having the windpipe between them, gradually inclining inwards at the upper part, where each divides into external and internal carotid, and a large anastomosing branch arising from between these two.

CAROUGE, a town of Switzerland, in the canton and about one mile south of Geneva, on the left bank of the Arve. It is beautifully situated, regularly built, and surrounded by villas, orchards, and meadows. It has a handsome Roman Catholic and a Protestant church. There are manufactures of thread, clay pipes, leather, watches, and pottery. There is a bridge across the Arve connecting the town with Geneva. Pop. (1880) 5889.

CARP (*Cyprinus carpio*), a fish of the family *Cyprinidæ* (q. v.), of which, indeed, it may be regarded as the type, a native of the central countries of Europe, and corresponding latitudes in Asia, but on account of its value as an article of food, long naturalized in many countries in which it is not indigenous. No fish, indeed, except its congener the goldfish, has been so much transported by man from one place to another; and this has been the more easily and successfully accomplished, that the C. can subsist longer than most fishes out of the water, if only kept moist. The C. is said not to be originally a native of England, but the statements some-

Carp (*Cyprinus carpio*).

times made as to the time of its introduction are untrustworthy; it certainly existed in England before the 16th century. It is mentioned in the famous Boke of St. Albans, in 1496, by Dame Juliana Barnes, as a 'dayntous fysshe, but scarce.' The C. spawns in May, and is out of condition until July. It does not succeed so well in Scotland, of which country it is certainly not a native, as in the south of England; and in northern countries generally, it neither increases so rapidly in size, nor exhibits so great fecundity, as in more congenial climates. Its fecundity, in favorable circumstances, is prodigious; more than 700,000 eggs have been found in the ovaries of a single C. of moderate size. The C. is rather an inhabitant of lakes and ponds than of rivers, in which, if it is found, it shows a preference for the stillest parts.

It feeds chiefly on aquatic plants, and may be fattened on lettuces and similar soft vegetables, for which its teeth are remarkably adapted, being few, mostly large, flat, and situated on the pharynx very far back in the mouth; worms, mollusks, and insects, however, form part of its food. It deposits its spawn on weeds. It is said to live to a great age, even 150 or 200 years; its scales, 'like the productions of the cuticle in some other animals, becoming gray and white with age.' It is known to attain the weight of 3 lbs. when six years old. A C. of 18 or 19 lbs. weight is deemed of extraordinary size in England, but one of 70 lbs. weight, and nearly 9 feet long, was taken near Frankfort-on-the-Oder, and 30 or 40 lbs. is not an unusual size in some of the German lakes. In Austria and Prussia, many lakes and ponds are let at a high rent for the C. which they contain.—Of the other species of the genus *Cyprinus*, as now restricted, which are found in Britain, none belong to the section having barbules at the angles of the mouth. See CRUCIAN, GIBEL, and GOLDFISH.

To the angler, the C. is not a very valuable fish, as he is by no means a free biter. When hooked, however, he runs strongly, and fights with considerable determination and cunning. In still water, the best means of fishing for C. is with a very light quill-float. A small piece of dead rush will answer the purpose equally well, or better. The float should be fixed on the line so that the bait may be *upon* the bottom, and if that be clear of weeds (the angler must take care that it is so), the C. will easily see and pick up the bait. It is advisable, however, in fishing for C., to use two rods, and the float to one of these should be so placed that the bait may be just *off* the bottom. The former tackle should be baited with well-scoured red worms, gentles, or grubs of some sort; the latter with a green pea, boiled wheat, or paste. Gentles, wasp grubs, flies, and other insects, worms, or caterpillars, may all, at times, take carp.

CARPACCIO, VITTORE, one of the most notable painters of the early Venetian school, whose work dates from the end of the 15th c. and the beginning of the 16th. He was a pupil and rival of the two Bellinis (q. v.). He had rich invention, and had great power of dramatically representing action; his work is marked more by grace and harmony than by richness of color. He frequently painted subjects in series; thus there are eight pictures illustrating the life of St. Ursula (all at Venice), and five on the history of St. Stephen (at Milan, Paris, and Berlin). He was industrious and successful in his art till 1515, when his power declined. Mr. Ruskin has sought to awaken interest in C.'s art.

CARPA'THIAN MOUNTAINS, the mountains which enclose Hungary and Transylvania on the north, east, and south in a great semicircle, extending over a space of 800 miles from Presburg on the Danube to Orsova on the same river. The C. M. form part of the great mountain system of Central Europe, separated from the mountains of Silesia and Moravia by the Valley of the March, and from the Alps and Mount Hæmus by the Valley of the Danube. Almost the whole of the C. M. lie within the Aus-

trian dominions. They form two great masses, one in Hungary to the north-west, and one in Transylvania to the south-east, with ranges of lower and wooded mountains between. The highest group of the Hungarian Carpathians is that of *Tatra* or the *Carpat*, in the very north of Hungary, a majestic mass of granite mountains, exhibiting much grandeur in its naked precipices, and in some of its peaks rising to the height of more than 8000 feet, the Lomnitz peak being 8133 feet high. On the northern declivity of the Eisthal peak exists the only glacier in the Carpathians. The Tatra group is penetrated by no valleys, but only by wild ravines, and is separated from the rest of the range by deep depressions. There is a great difference of climate between its southern and northern sides. These higher mountains yield few minerals, but the lower Carpathians of Hungary, which stretch around them in groups and ranges, abound in minerals of various kinds. The mines of Schemnitz (q. v.) are of great celebrity. Many of the Hungarian mountains are of limestone. The mountains of Transylvania are mostly of primitive rocks. On the eastern and southern borders, they reach the height of 9000 feet and upwards. Mount Butschetje, the culminating peak, has an elevation of 9528 feet above the sea. The C. M. are generally clothed with wood to a height of more than 4000 feet—in some parts, forests are found at 5500 feet—and with steep precipices, narrow ravines, extinct craters, and cones of volcanic origin, they exhibit scenes of grandeur rarely exceeded. The lower parts of the mountains are beautifully clothed with vineyards, walnut groves, &c., above which ascend forests of cherry, beech, and pine. The ranges which connect the high mountains of Hungary with those of Transylvania are in great part composed of sandstone, have an unfruitful soil, and comparatively little population or cultivation.

CA'RPEL (Gr. *karpos*, fruit), in Botany, a modified leaf forming the whole or part of the pistil of a flower. The number of ovaries and stigmas in the pistil depends on the number of carpels of which it is composed, but sometimes several are so intimately united that they appear as one. It is the upper surface of the leaf which forms the inner surface of the carpel. At its margins, the ovules are developed, like the buds formed on true leaves of some kinds of plants. The fruit, as well as the pistil, may therefore be said to be composed of one or more carpels.

CARPENTA'RIA, Gulf of, a broad and deep indentation of the north coast of Australia, stretching from 11° to 17° 30' S. lat., and from 136° to 142° E. long. It is said to have been named from Carpenter, a Dutchman, who discovered and partly explored it in 1627. The Gulf of C. contains many islands. The shores of the mainland are generally low; and, in the rainy season, the floods are such as materially to freshen the sea.

CARPENTER, Mary, daughter of the Rev. Dr. Lant Carpenter of Bristol, and sister of Dr. William Carpenter (b. 1807, d. 1877). She took an active part in the movement for the reformation of neglected children, and besides advocating their cause in her writings, she founded several reformatories for girls, one of which, the Redhedge Reformatory, she superintended. In the prosecution of her philanthropic labors she visited India three times, and in 1871 instituted the National Indian Association, whose journal she edited. Besides her reformatory writings she published *Our Convicts* (1864), a book which drew public attention to the treatment of young criminals; *The Last Days of the Rajah Rammohun Roy*; and *Six Months in India*. See *Mary Carpenter*, by J. E. Carpenter (1879).

CARPENTER, William Benjamin, M.D., LL.D., F.R.S., F.L.S., F.G.S., one of the most distinguished physiologists and writers on physiology of the present day. Soon after his graduation in Edinburgh in 1839, he published his *Principles of General and Comparative Physiology*, which was one of the earliest works giving a general view of the science of life. As the treatise grew in size in successive editions, it was divided into two—*The Principles of Comparative Physiology*, and *The Principles of General Physiology*. These works, together with *The Principles of Human Physiology*, which originally appeared in 1846, and reached a fourth edition in 1853, and *The Principles of Mental Physiology* (Lond. 1874), form a perfect cyclopædia of biological science. C. has likewise published *A Manual of Physiology; The Microscope, its Revelations and its Uses;* a prize essay upon *The Use and Abuse of Alcoholic Liquors;* and numerous memoirs on various departments of Physiology, Microscopical Anatomy, and Natural History, in the *Philosophical Transactions*, &c. His most important original researches are *On the Structure of Shells; On the Development of Purpura Lapillus*; and *On the Structure, Functions, and General History of the Foraminifera*.

For several years he edited *The British and Foreign Medico-Chirurgical Review*, and he was one of the editors of *The Natural History Review*. In 1848, he was appointed Professor of Medical Jurisprudence at University College, and soon afterwards Examiner in Physiology and Comparative Anatomy in the university of London; but he resigned these offices on his appointment, in 1856, as Registrar to that university. In 1861, the Royal Medal was awarded to him by the Royal Society; and in 1873, he was elected a corresponding member of the Institute of France. He took a chief part in the government expeditions sent out in 1868–69–70 for deep-sea exploration in the North Atlantic; and since then he has contributed largely to the discussion of the vexed question of ocean-circulation in the Journal of the Royal Geographical Society and other periodicals. In the art. Atlantic in the *Ency. Brit.*, 9th ed., his views will be found summarized. He advocates the doctrine of a *vertical circulation* sustained by opposition of temperature only, independent of and distinct from the *horizontal* currents produced by winds; see Gulf Stream. This doctrine was first advanced by Professor Lenz of St. Petersburg in 1845; but Dr. C. was ignorant of this, when the deep-sea observations begun in 1868 led him to an identical theory. Dr. C. has written largely on another controverted subject—that of spiritualism, which he maintains to be a delusion. He entered this field as early as 1853, in an article on Animal Magnetism in the *Quarterly Review;* a late contribution to the controversy is *Mesmerism, Spiritualism, &c., historically and scientifically considered* (Longmans & Co., 1877).

CARPENTER BEE, a name given to those bees that excavate their nests in wood. One of these, *Xylocopa violacea*, has been

Carpenter Bee (*Xylocopa*):
Showing the Cells for Eggs and Larvæ, excavated in dead wood.

already noticed, and its nest briefly described, in the article Bee (q. v.).

CARPENTRAS, a town of France, in the department of Vaucluse, is situated on the left bank of the Auzon, about 15 miles north-east of Avignon. This town was known to the Romans as *Carpentoracte*, and among other remains, a triumphal arch attests their former presence here. C. has manufactures of cottons, woollens, and leather; brandy distilleries, dye-works, &c. It is the entrepôt for the products of the district. Pop. (1872) 7857.

CA'RPENTRY is the art of framing timber for architectural and other purposes. Technically, the term is restricted to the framing of heavy work, such as the roofs, floorings, partitions, and all the wood-work concerned in maintaining the stability of an edifice, while the minor and ornamental fittings are called Joinery; but popularly the workmen who does either kind of work is called a carpenter.

The present article will be confined to a popular description of the most useful methods of framing timber and smaller wood-work.

The preliminary preparation of timber is the work of the sawyer, who, by the saw-mill or pit-saw, divides the trunks of trees into planks, &c.; these are further divided by the carpenter, who uses hand-saws of various kinds, according to the work. For dividing wood into separate pieces in the direction of the fibre, the *ripping-saw* is used; for cross cutting, or sawing thin pieces in the direction of their length, the common *hand-saw* or the finer toothed *panel-saw;* for making an incision of a given depth, and for cutting small pieces across the fibre, the *tenon-saw*, the *sash-saw*, or *dovetail-saw* is used. These are thin saws, stiffened by a strong piece of metal at the back to prevent crippling. When a curved cut is to be made, a very narrow saw without a back, called a *compass-saw* or a *keyhole-saw*, is used. The general name for these is *turning-saws;* they have their plates thin and narrow towards the bottom, and each succeeding tooth finer, and the teeth are not bent on contrary sides of the plate for clearing, as in broad saws.

The surface of wood is smoothed by planing. According to the work, different kinds of planes are used: the *jack-plane*, which is large and rough, for taking away the rough of the saw; the *trying-plane*, for bringing the surface perfectly level and true, or the *long-plane* for the same purpose, where the work is of great length,

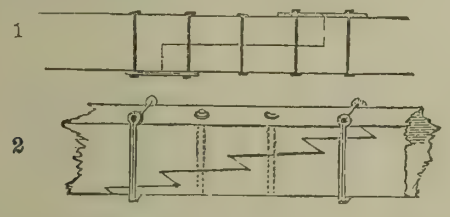
as for the joining edges of long boards to be glued together. The *smoothing-plane*, which is much smaller than these, gives the smooth finished surface. The *spoke-shave*, a sort of plane with a double handle, is used for paring and smoothing rounded work.

Ornamental mouldings are cut by means of moulding-planes which have their cutting edges curved to the required pattern. A good stock of these is one of the most expensive items of the tool-chest.

The paring of wood, and the cutting of rectangular or prismatic cavities, notches, &c., are done by means of *chisels*. Those for cutting across the fibre are called *firmers* or *paring-chisels;* those for cutting deep and narrow cavities, *mortise-chisels*, which are made very thick and narrow, and fitted in the handles with a strong flange, to bear heavy blows with the mallet. Chisels for paring concave surfaces are called *gouges*. For boring holes, *bradawls*, *gimlets*, *centerbits*, and *gouges* are used—the two latter are fixed in a *stock* or revolving handle, and are used for large holes. When it is required to ascertain if an angle be square, or if any given inclination, the *square*, or the *bevel* set to the required angle, is applied to test the work as it proceeds.

When parallel edges are required, the *marking gauge* is used to draw the line to be worked to. When a simple straight line is required for working to, a piece of string is chalked, then stretched tightly over the wood and lifted in the middle, when, by its recoil, it strikes the wood and leaves a straight chalked line. The *straight-edge*, a strip of wood with one of its edges perfectly straight, is applied to detect superficial irregularities. The operation of planing the edge of a board straight is called *shooting*, and such edges are said to be *shot*. When the joiner requires to ascertain whether the surface of a piece of wood is all in one plane, he takes two slips of wood with edges perfectly straight and parallel, and of equal width; these slips, called *winding-sticks*, are placed edge upwards, one at each end, across the board, and the workman looks in the longitudinal direction of the board over the upper edges, and, if the two edges be not in the same plane, the board is planed down at the elevated parts until it is *out of wind*. For setting work level, a spirit-level, set in a wooden frame, or a plumb-level is used. For further description of the tools alluded to above, and in the rest of this article, see the special articles.

When two pieces of timber have to be united at their ends, as in lengthening the beams for roofing, partitions, the masts and keels



of ships, &c., the operation is called *scarfing*, and the joint a *scarf*. The methods of scarfing are very numerous; those figured below will serve to illustrate the principle.

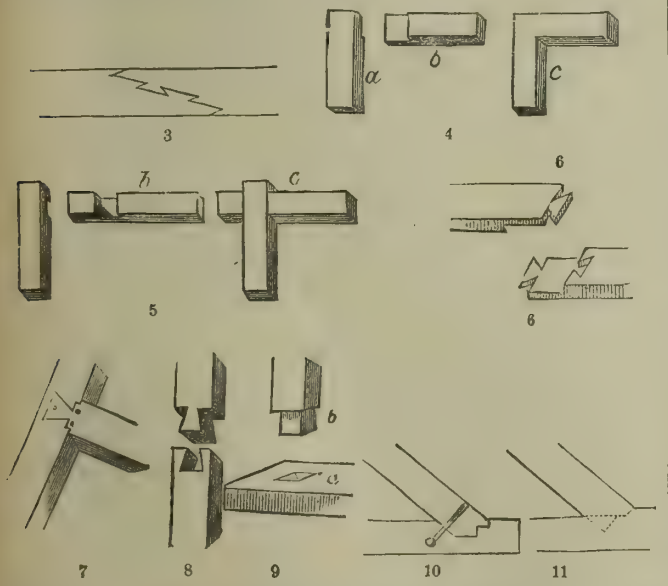
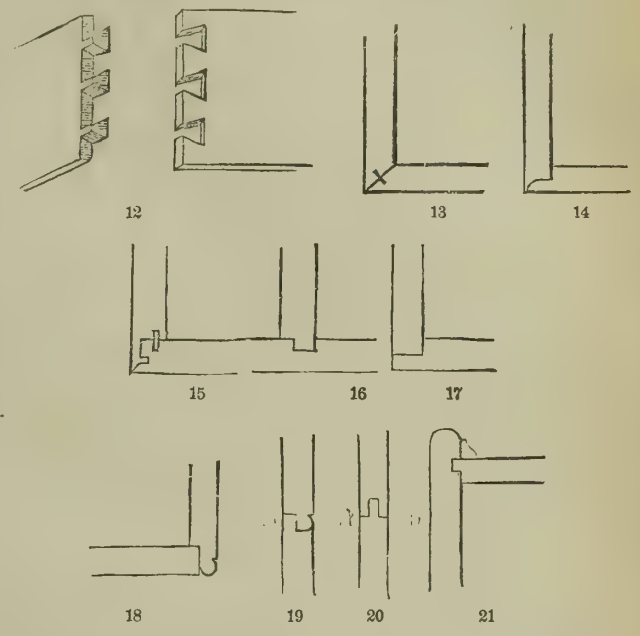


Fig. 1 is a section showing the common or single step scarf, with plates, and the bolts passing through. Fig. 2 is the French scarf, called *traits de Jupiter*, or Jupiter's lightnings, with the straps and bolts shown. In these the scarf itself gives no resistance to the longitudinal strain. Fig. 3. shows a scarf in which the resistance of the wood to splitting is made available.

The following are the principal rules for scarfing as stated by Tredgold.

The length of the scarf should be, if bolts are not used—in oak, ash, or elm, six times the depth of the beam; in fir, twelve times the depth of the beam. If bolts and indents are combined, the length of the scarf should be—in oak, ash, or elm, twice the depth of the beam; in fir, four times the depth. In scarfing beams to resist transverse strains, straps driven on tight are better than bolts. The sum of the areas of the bolts should not be less than one-fifth the area of the beam, when a longitudinal strain is to be borne. No joint should be used in which shrinking or expansion can tend to tear the timbers. No joint can be made so strong as the timber itself. When two pieces of timber are connected so that the joint runs parallel with the fibres of both, it is called a *longitudinal joint;* but when the place of the joint is at right angles to the fibres of both, an *abutting joint*.

Fig. 4 is an example of common and simple joint, for connect-



ing timbers at right or other angles. It is called a *notched joint*, and requires bolting. Fig. 5 is a notched joint for crossing timbers. In both figures, *a* and *b* represent the pieces before joining, and *c* when united. Timbers may be joined end to end by a simple notching, or by dove-tailed notching, as fig. 6. Other applications of dove-tailing timbers are shown in figs. 7 and 8. Tie-beams, connected to wall-plates as in fig. 7, are said to be cogged or cocked, whether dove-tailed or simply notched.

The mortoise and tenon joint is shown in fig. 9; the cavity in *a* is the mortise, the projection on *b* the tenon. A very short tenon is called a *stub tenon*. When a second minor tenon is made projecting from the principal tenon, it is called a *tusk tenon*.

Figs. 10 and 11 show methods of framing a rafter foot into a girder.

The above joints are some of those used in heavy work, or carpentry proper. For lighter joiner's work, similar methods of framing are used, only adapted to the work—to boards generally instead of beams; thus, for example, the mortise and tenon joint, made oblong instead of square, is used in framing doors, shutters, drawing-boards, or any other kind of extended superficial work liable to warping. An outside frame or skeletion is made with a panel or panels in the middle, and each piece of the frame has the grain at right angles to the piece into which it is mortised, in order that they shall eventually correct the warping.

Dove-tailing is extensively used for connecting boards at right or other angles, as in making boxes, drawers, &c. The common dove-tail is shown in fig. 12; the common mitre, fig. 13; the lapped mitre, fig. 14; and the lapped and tongued mitre, fig. 15.

Modes of notching for boards are shown in figs. 16, 17, and 18. Fig. 16 is called a *nosing*, also shown at fig. 21, in its common application for fixing the *risers* to the *treads* of staircases. Common dove-tailing is usually glued. Nails or pins and glue are used with the mitre and other notched joints.

Boards may be united at their edges to form an extended surface, as a flat plank partition, &c., either by simple gluing of the shot edges, by a *rebate* (fig. 19), or by a ploughed groove and a corresponding projection. The rebate is cut by means of a rebating plane; that in the figure is combined with a bead, the usual joint

for wooden partitions. The groove, fig. 20, a sort of extended mortise, is cut by a plane with a projecting iron called the *plough*.

In all cases where glue is used in joints, it should be applied to both surfaces, which should be rubbed and pressed together until nearly all the glue is forced out, then kept pressed by a cramp or weights. White lead is used for outside joints.

Special departments of this subject, such as Roofs, Staircases, &c., will be treated under their respective heads.

CA'RPETS. Woven C., such as are now so common in this country, were first used in the east, where the custom of sitting cross-legged on the floor still renders them especially useful. Our rude forefathers covered the floors of their houses with rushes, hair, or straw; and in Norwegian farmhouses, where so many of our ancient customs still exist, the floor of the best room is commonly strewed with juniper twigs. The first step towards a woven carpet was made by plaiting rushes to form a matting.

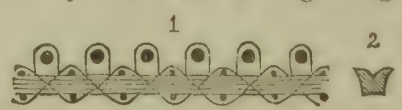
The principal varieties of C. now in use are the Turkey, the Axminster, the Brussels, the Wilton, the Venetian, the Dutch, the Kidderminster or Scotch, Whytock's Tapestry and Velvet Pile, and the Printed Felt Carpet.

The real Turkey carpet is made in one piece; those manufactured for the Orientals are usually too small for use in this country. The patterns consist merely of curved and angular strips, of variegated but dark and unobtrusive colors. The warp is of strong linen or cotton, to which bunches or tufts of colored worsted are tied according to the pattern, a drawing of which is placed before the weaver to copy. The surface is afterwards shorn level. Rugs are made in a similar manner; the colored worsteds are tied very rapidly by young girls.

The *Axminster Carpet* is merely the English-made Turkey carpet, formerly manufactured as above at Axminster, in Devonshire. They are usually made to order, and of the size required for the room; from the tedious nature of the process of manufacture, they are very expensive.

Templeton's Patent Axminster Carpet is a very beautiful fabric, very much resembling that from which it derives its name, but it is wrought on the chenille principle.

The *Brussels Carpet* is a mixture of linen and worsted, but, like the Turkey carpet, the worsted only is shown on the upper surface. The basis or cloth is a coarse linen fabric, and between the upper and under threads of the weft, several (usually five) worsted threads of different colors are firmly bound in. The pattern is produced by drawing to the surface, between each reticulation of the cloth basis, a portion of the worsted thread of the color required at that spot to produce the pattern; these updrawn portions are formed into loops, by being turned over wires, which are afterwards withdrawn, and the loops thus left standing above the basis form the figured surface of the carpet. This will be better understood by reference to the diagram fig. 1, which is a



Carpet Weaving.

slightly magnified section of a Brussels carpet, cut across the wires and the threads of the weft. The large dots above are the sections of the wire; the smaller dots, those of the weft or shoot threads; the waved lines, the warp; the parallel lines, the five colored worsted threads; and the loops over the large dots are the updrawn worsted threads forming the surface of the carpet. The machinery and processes by which this arrangement is produced are rather complex, and require to be seen to be fully understood.

The *Wilton Carpet* is made like the Brussels, but the wire has a groove in its upper surface, fig. 2, and instead of being drawn out, it is liberated by passing a sharp knife through the worsted loop into this groove, and thus making a velvet pile surface instead of the looped thread.

The *Venetian Carpet* is produced in a common loom, and the pattern is all in the warp, which alone is visible, as it encloses the weft between its upper and under surfaces. The patterns are generally checks or stripes; the latter are chiefly used for stair carpets.

The *Dutch Carpet* is a coarser and cheaper variety of plain Venetian, sometimes made wholly of hemp, or of a mixture of coarse wool and cow-hair.

The *Kidderminster* or *Scotch Carpet* has usually a worsted warp and woollen weft, and the pattern is made by the combination of the colors of each. Three-ply C. of this kind are made especially in Kilmarnock. This is the most durable of the moderate-priced C., the patterns are not so brilliant as those of the Brussels or the Tapestry, but, being ingrained and woollen throughout, they retain their character until worn through. This, and the three immediately preceding descriptions of carpet, exhibit their patterns nearly similar on both sides, and are therefore reversible.

Whytock's Tapestry and Velvet Pile Carpet, as it is now frequently called, is becoming very extensively used as a cheap substitute for Brussels and Wilton, which it is made to resemble very closely in the brilliancy and variety of pattern. The manufacture of this carpet is very curious and ingenious. Instead of five colored yarns, only one of which is drawn to the surface at any one place, while the other four remain buried between the upper and under threads of the cloth basis, a single colored yarn is used, and the variety of color produced by dyeing it of various colors at intervals of its length. The yarn is coiled upon a drum, and printed by means of rollers in such a manner that when the threads that encompass the roller shall be uncoiled and laid in lines side by side, they shall present an elongated printing of the pattern, so that a rose, for example, the outline of which should be nearly circular, will be an oval, with length equal to four times its breadth. When, however, the thread is looped over the wire, four inches of yarn being used for an inch of the carpet pattern, this elongation is exactly compensated, and the rose appears in its proper proportions. The machinery required for this is, of course, much simpler than that for the Brussels, only one yarn having to be looped, and that always in the same manner.

The *Printed Felt C.* are, as the name implies, simply made by printing colors on felt. These are chiefly used for bedroom carpets.

A very beautiful fabric has also been introduced, called the *Patent Wool Mosaic*, formed by cementing a velvet pile upon plain cloth. It is used for rugs, &c. The pile is formed by stretching lengths of woollen yarn between plates of finely perforated zinc, placed several yards apart, the colors of the threads being arranged so that their ends shall show the pattern. The mass of yarn is then enclosed in a case, open at both ends, and compressed without deranging the fibres; and by means of a piston or ram at one end, a portion of this mass of yarn is forced forwards, the ends thus projecting are glued to the plain cloth, and when dried, are cut off to the length required for the pile. In this manner, several hundred slices are made from one setting of the yarn mosaic, and as many rugs produced.

CA'RPI, a town of Northern Italy, 10 miles north of the city of Modena. It is surrounded by walls, defended by a citadel, has a cathedral, and manufactures of silk and straw hats. Pop. 5000.—CARPI is also the name of a town of Venetia, in the province of Verona, 28 miles south-east of Verona, celebrated for the victory obtained here by Prince Eugene over the French in 1701. Pop. 1200.

CARPINI, JOHANNES DE PLANO, a celebrated Franciscan monk, born in Capitanata, Naples, about 1210; was one of the six friars selected by Pope Innocent IV. to proceed to the court of the emperor of the Mongols, whose warlike advances in 1246 threw Christendom into consternation, in order to pacify the terrible nomadic warriors, and, if possible, convert them to Christianity. The mission, accomplished under dreadful hardships, though without results so far as its main objects were concerned, was nevertheless far from unfruitful. Prior to this, the most monstrous fables had prevailed regarding the Tatars; and C.'s narrative, which gave a truthful and striking picture of their numbers, character, and civilization, was the first to bring these myths into discredit. In this book he also argued, with great good sense, for a union amongst Christian princes, as the only means of resisting those fierce hordes in their progress westward. As a book of travels, its accuracy has been attested by modern travelers. Hakluyt copied most of this work, at second-hand, into his first volume of *Navigations and Discoveries*. The date of C.'s death is not certainly known.

CARPI'NO, a town of Southern Italy, in the province of Foggia, 22 miles north-east of San Severo, with a population of about 6000.

CARPO'CRATES, or CARPOCRAS, flourished under Hadrian (130 A.D.) at Alexandria, where he founded the Gnostic sect of Carpocratians. According to him, the essence of true religion consisted in the union of the soul with the Monas or highest God, by means of contemplation, which elevated it above the superstitions of the popular faith, and liberated it from the necessity of submitting to the common laws of society. He only is to be reckoned wise who attains to this. Among those who have done so, are Jesus, Pythagoras, Plato, and Aristotle. The cosmogony of C. was of the usual Gnostic character, the central peculiarity of which was the belief that the worlds were created by angels. C. also held the doctrine of the transmigration of souls. His followers existed down to the 6th century. Whether or not they were guilty of the abominations ascribed to them, is more than we can positively affirm; our only information concerning them being derived from *orthodox* writers, who were in the habit of slandering heretics.

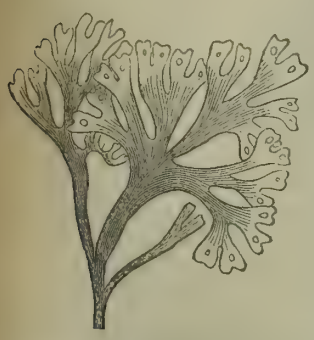
CA'RPOLITES, a generic term applied to fossil fruits, which in the present state of our knowledge, it is impossible to refer

more precisely to their place in the vegetable kingdom. Of 100 species described, 70 belong to the carboniferous system.

CA'RPUS, CARPAL BONES. See HAND, FOOT, SKELETON.

CARRA'CA, LA, a town of Andalusia, Spain, one of the chief naval arsenals of the kingdom, is situated 4 miles east-south-east of Cadiz. It has been completely isolated from the mainland by artificial means; and so low is its situation, that it was necessary to erect the buildings on piles. It is defended by four forts, and is altogether very complete as an arsenal.

CA'RRAGEEN, often incorrectly called C. Moss, or IRISH MOSS, a sea-weed (natural order, *Algæ*; sub-order, *Ceramiaceæ*), or rather several species of sea-weed, now used to a considerable extent both medicinally and as an article of food. The name C. is originally Irish; and the use of these sea-weeds appears to have been entirely confined to the peasantry of the coasts of Ireland, until about thirty years since they were recommended to general notice, and their medicinal virtues proclaimed by Mr. Todhunter, of Dublin. They are, however, found on the rocky sea-shores of most parts of Europe, and of the eastern coasts of North America. The species which principally constitutes the C. of commerce is *Chondrus crispus*, of which the varieties are remarkably numerous. It is 2—12 inches long, branched by repeated forking, cartilaginous, flexible, reddish-brown.



Carrageen Moss (*Chondrus crispus*).

C. mamillosus also frequently occurs. C., after being collected, is washed, bleached by exposure to the sun, dried, and packed up for the market. Its composition is as follows:

Vegetable jelly (carrageenin)	79·1
Mucus	9·5
Two resins	0·7
Ash	2·0
Fibre and water	8·7
	100·0

When treated for ten minutes with cold water, in the proportion of half an ounce of C. to three pints of water, and then boiled and strained, it yields, with or without spices, a very pleasant drink. With a larger proportion of C., a thickish liquid or *mucilage* is obtained; and on boiling down this strong decoction, and cooling, a stiff *jelly* is procured. Milk may be employed, instead of water, in the preparation of the various decoctions; and with the stronger one, along with sugar and spices, when thrown into a mould, a kind of *blanc mange* is obtained. C. is valued on account of its emollient and demulcent properties, and is likely to be found useful in most of those cases in which iodine might be exhibited; but its value seems to depend not a little on its being at once nutritious, a pleasant article of food, and easy of digestion. See GELATINE. It has been much recommended in pulmonary consumption. In some parts of Ireland, C. boiled with water (mucilage) is used instead of size for mixing with the more common colors in house-painting.

CARRAPA'TO, a species of Tick (q. v.) of the genus *Ixodes*, which infests dry bushy places in the interior of Brazil, hanging in clusters of many hundreds on very slender twigs, and ready to attach itself to any quadruped or man that passes, instantly burying its beak in the skin, from which it cannot be detached without considerable force. Horses and oxen suffer very much from the attacks of the C., of which in dry seasons the numbers are so great, that whole herds of cattle are destroyed by the exhaustion which they produce.

CARRA'RA, a town of northern Italy, 60 miles south-west of Modena. It is situated on the Avenza, near its mouth in the Mediterranean, and is surrounded by the marble hills which have made its celebrity. Many of the principal buildings are wholly or partially constructed of the inferior kinds of white marble. There are upwards of 30 marble quarries in the vicinity of the town, but not more than 6 or 7 furnish the marble used for statuary. Extensive works, fitted up with English machinery for sawing the marble have been established near the town, in which are several shops for the sale of marble ornaments. Many foreign artists have set up their studious here, in order to save the expense which the export of the marble in its rough state entails. C. has a fine collegiate church of the 13th and 15th centuries, with some good sculptures, an academy of fine arts, and a pop., in 1879, of 26,577. The quarries have been worked for more than 2000 years, and yield £75,000 worth of marble yearly.

The famous CARRARA MARBLE is a white saccharine limestone, which derives its value to the sculptor from its texture and purity. It was formerly supposed to belong to the Primitive rocks, but is now known to be a limestone of the Oolitic period, highly altered by plutonic action.

CARREL, ARMAND, a celebrated French publicist and republican leader, was born at Rouen in 1800, and was educated in the military school of St. Cyr. After serving for some years in the army, he went to Paris, and devoted his attention to political and historical studies. In 1830, in connection with Thiers and Mignet, he became editor of the *National*, the most spirited and able of the journals opposed to the government of Charles X. C.'s colleagues being employed by the new government, he was left to conduct the *National* himself, which he did with a spirit and a freedom such as had not been witnessed in France for a long time—which on more than one occasion checked the arbitrary power government attempted to exercise, and gained for him the high admiration and esteem of the popular party. Government prosecutions of course followed his outspokenness, and heavy fines were decreed against him; but these were paid by public subscription, and each conviction only made his journal more famous. C., however, dreaded revolution as much as he hated despotism, and had no sympathy with many of those who looked up to him as a leader. Provoked into a duel with Emile de Girardin, by an attack on his personal character, C. was mortally wounded, and died July 24, 1836. His funeral was attended by many of the most distinguished men in France.

CARRIAGE. See COACH, CART, WAGON.

CA'RRIAGE DEPARTMENT, ROYAL, at Woolwich, is one of the great national manufacturing establishments maintained for warlike armaments—its duty being the construction of gun-carriages, for army and navy, military wagons, and vehicles of all kinds, and the joinery of the army generally. The department was organized as a distinct establishment in 1803, and has been undergoing gradual enlargement ever since. Since the recent introduction of iron carriages for heavy guns, the department has had a new section added for ironwork. Until 1855, the Board of Ordnance had the direction of this department, but in that year it passed under the direct control of the Secretary for War, who, since 1869, administers it through the Surveyor-general of the Ordnance. The works, store-rooms, and yards are of vast size, often employing from 2000 to 3000 hands. There are many steam-engines in various parts of the establishment; and the iron and wood cutting and shaping machines are of the highest order of excellence. The internal communications are carried on by locomotives on a tramway of 18 inches gauge. See GUN-CARRIAGE.

CARRICAL, or KARIKAL, a French port within the limits of Tanjore, a district of the presidency of Madras. It stands in lat. 10° 55′ N., and long. 79° 53′ E., on the estuary of a small branch of the Cauvery, a tributary of the Bay of Bengal. C. is accessible from the sea only after the periodical rains, and then only for coasting craft. The town and territory contain 63 square miles, and about 50,000 inhabitants. The settlement, originally ceded to France by a native grant in 1759, and subsequently subdued by the British, was restored in 1814, on condition of being neither fortified nor garrisoned.

CARRICKFE'RGUS, a seaport town of Ireland, is situated on the Lough of Belfast, about 10 miles distant from the town of that name. Though locally within the county of Antrim, it forms a county of itself. C. extends nearly a mile along the north-western shore of the Lough. Its chief feature is its castle, a fine picturesque object, supposed to have been erected by De Courcy in the 12th century. It is situated on a rock about 30 feet high, projecting boldly into the sea, by which it is surrounded on three sides. The ballium or keep is 90 feet in height. From the top of the keep a splendid view is obtained, extending, in a clear atmosphere, to the Mourne Mountains and the Scotch coast. The castle contains a barrack, bomb-proof magazine, and ordnance store-rooms; and for many years, 22 pieces of ordnance, 12-pounders, were mounted on the works. A total change has, however, been made in the defence of the castle, and cannon of a very large calibre are now mounted, in order to command the entrance of the Lough. In 1575, a wall 16 feet high and 7 thick, with 7 bastions, to surround the town, was commenced, and completed in the year 1608; a considerable portion of the wall is still standing, and one of the four entrance-gates. On the 14th June 1690, King William III. landed here with his army, seventeen days before the battle of the Boyne.

The rock on which the king stepped on landing is at the end of the quay, projecting from it, and still forming the landing-place. In 1760, Commodore Thurot captured the castle, but on the approach of troops from Belfast, was forced to abandon it. The parish church, said to have been founded in the year 1164, on the site of a pagan temple, is a fine old building, dedicated to St. Nicholas. There are several other churches and chapels in the

town, and several good day and Sunday schools in connection with the religious bodies, and a fine model school has been erected by the National Board. There is a Literary and Scientific Society, with reading-room, library, and museum. The fishery of the bay, which is famous for oysters of unusual size, employs a good number of the inhabitants. There are four spinning-mills, one for weaving linen, one bleaching establishment, a starch manufactory and a tan-yard. A market is held every Monday and Saturday, and a fair twice a year. Pop. (1871) 9397; (1881) 10,009. C. returns one member to parliament. There are several barrows or tumuli in the vicinity. C. is connected by railway with Belfast, Portrush, and Larne. A few years since, a shaft was opened by the Marquis of Downshire, in the hope of finding coal—without success; but salt of a superior quality, and in great abundance was found. A company has been formed, and are working the mine. The length and breadth of the county are nearly equal—about 5 statute miles.

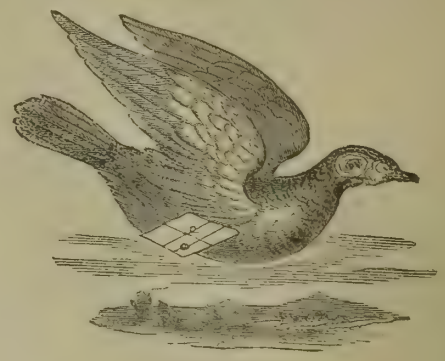
CA'RRICK-ON-SUIR, a town of Tipperary, situated, as its name implies, on the Suir, which is navigable at this point, 12 miles east of Clonmel, in the midst of very fine scenery. Pop. (1881) 6583. C. was formerly celebrated for its woollen manufacture, which has recently been considerably revived, and there are also linen and flax factories. It exports much agricultural produce. The town has recently been much improved. C. became a place of note soon after the Norman Conquest. There are the remains of a castle built in 1309, on the site of an old priory of the Knights of St. John of Jerusalem.

CARRIER, Jean Baptiste, one of the most infamous and blood thirsty members of the French National Convention, was born at the village of Yolai, near Aurillac, in Haut-Auvergne, in 1756. Entering the National Convention in 1792, he took an active part in the formation of the Revolutionary Tribunal, voted for the death of the king, demanded the arrest of the Duke of Orleans, and assisted in the overthrow of the Girondists.

At Nantes, whither he was sent on a mission against the moderates, in October 1793, he found ample means for indulging his insatiable thirst for human blood. The utter defeat of the Vendeans had filled the prisons with captives, and C. proposed and carried a resolution for murdering the unhappy prisoners *en masse*. Accordingly, on November 15, he compelled 94 priests to embark in a vessel, under pretence of deportation, and during the night drowned the whole of them, by having the ship scuttled. Another of these *Noyades*, as they were called, in which 138 persons were sacrificed, took place soon after, and they were repeated to the number of 25, their perpetrators facetiously terming them 'vertical deportations.' Other cruelties C. committed here. Men and women were tied together feet and hands, and thrown into the Loire; and this was called *mariage republicain* (republican marriage). With such recklessness were these murders committed, that, in one instance, a number of foreign war-prisoners were drowned by mistake. The water of the Loire was so poisoned by corpses, that its use for drinking and cooking was prohibited. 500 political prisoners were shot, as in a battue, on the bridge near Nantes. Even Robespierre was offended by these enormities, and recalled C., who boldly justified his own conduct before the Convention. The fall of Robespierre was, however, soon followed by outcries against Carrier; judgment was decreed against him, and he perished under the guillotine, December 16, 1794—dying with the protestation that, in all his cruelties, he had acted according to orders, and as a true republican patriot.

CARRIER PIGEON, a variety of the domestic Pigeon (q. v.), remarkable for the degree in which it possesses the instinct and and power of returning from a distance to its accustomed home; and which has been, therefore, much employed to convey letters from one place to another. In Eastern countries, where such messengers are most frequently employed, it is the practice to bathe the pigeon's feet in vinegar to keep them cool, and to prevent it from alighting in quest of water, by which the letter might sustain injury.

Pigeons intended for this use, must be brought from the place to which they are to return, within a short period, not exceeding a fortnight of their being let loose, and at a time when they have young in their nest; the remarkable fecundity of the C. P. affording particular facilities for its employment in this way. The bird is also kept in the dark and without food, for at least eight hours before being let loose. The instinct by which it is guided, like most other instincts, has received no sufficient explanation. That it recognizes objects by sight, and so directs its course, is nothing more than a conjecture, and as such, is only very partially supported by the fact of the great power of vision which these birds, in common with so many others, are known to possess, and by that of the C. P., on being let loose, immediately rising spirally to a great height in the air, as if to obtain opportunity for the exercise of this power. The C. P. has probably been more used in the Turkish dominions than in any other part of the world, and during the siege of Paris in 1871, it safely conveyed many important messages. Its rate of flight is not less than thirty miles an hour, and it has been known to pass over great distances still more rapidly. The variety generally described as the C. P. (*Columba tabellaria* of Linnæus, *C. Turcica* of some authors, but not generally regarded by naturalists as a distinct species), is of remarkably large size, about fifteen inches in length from the point of the bill to the extremity of the tail, and has the cere very



Carrier Pigeon.

large and carunculated, the eyes surrounded with a broad circle of naked red skin, and the wings reaching nearly to the extremity of the tail. There is, however, a smaller variety, which is said to be superior to it, and which has not the carunculated cere, nor the broad circle around the eye. Carrier pigeons are trained by being conveyed, when young, to short distances of a few miles from home and then let loose, the distance being gradually increased; and this training is said to render them much more secure as messengers.

CA'RRIERS, a class of persons who, in various forms, by land and sea, undertake the carrying of goods, particularly articles of commerce. In all countries aspiring to commercial intercourse, the Carrying Trade, as it is called, has been less or more developed. The method of carrying in Arabia, Persia, and some other countries in the east has, till the present time, been chiefly by means of the camel, an animal of great value, on account of its strength, patience, and power of endurance. See Camel. In England and Scotland, previous to the general use of wheel-carriages, goods were carried on pack-horses, as is still practised in some parts of Spain with mules. See Pack-horse, also Mule. After the pack-horse came the one-horse cart and the four-wheeled wagon, as engines of land-conveyance. Carrying with one-horse carts settled down as a universal practice in Scotland, where it is still conducted in all districts not traversed by railways. The Scotch C., winding their way by roads over hill and dale, at the

Covered English Wagon.

rate of about 20 miles a day, have ever been a respectable and useful body of men, exceedingly trustworthy, and moderate in their charges. In connection with Edinburgh, Glasgow, and other centers of traffic, they travel to and from provincial towns for the most part once a week on certain days, so that their arrival at any particular place may be reckoned on with great exactness. In England, the employing of wagons for carrying goods in connection with the metropolis and provincial towns is now of old date. These carriers' wagons, greatly limited in their range by the introduction of canals and railways, are still to be seen in some of the rural districts. A wagon of this kind is provided with four broad huge wheels; and being a heavy and clumsy engine of conveyance, is drawn by four horses, though, when roads were bad in old times, six horses were not unusual. The driver ordinarily rode on a pony alongside the vehicle; now he more frequently walks, carrying a long whip. The wagon has a hooped top with movable covering; and the hinder part has always been left vacant for the use of passengers, who are necessarily huddled together on straw. Traveling in the 'tail of the wagon' is now entirely gone, or nearly so; but with all its rude inconveniences, it was common till past the middle of the 18th c. and has afforded scope for some of the most grotesque descriptions of Fielding and Smollett. The tedious process of carriage

by these wagons largely increased the prices of goods, and retarded the growth of commerce.

The first modification in the carrying trade took place by means of inland navigation, to which reference has already been made. See CANAL. The conveyance of cotton goods from Lancashire, of earthenware from Staffordshire, of metal goods from Birmingham, of salt from Cheshire, &c., became much more easy than before, owing to the large quantity which could be packed in each barge, and to the great amount of work done by each horse. The chief owners of the old wagons became, in time, the chief owners of the canal-boats; they paid rates or tolls to the canal companies. The celebrated English firm of Pickford & Co. has been for many generations, and still is, at the head of the goods carrying trade.

When railways were established, a great struggle ensued; the owners of the road-wagons and canal-barges had a formidable competition. They wisely accommodated themselves to a state of things which they could not prevent, and added the trade of railway goods C. to their former business. Three systems were tried: 1. The company purchased road-wagons or vans, collected goods at the various towns, conveyed them by railway, and then distributed them at their several destinations. 2. The company confined their attention to the mere conveyance on their railway, leaving the collection and delivery to the ordinary carriers. 3. The company combined both systems, conveying on the railway everything that offered, and competing with the C. for the road-traffic. During the greater portion of the period in which the railway system has been in operation, the second of the above three plans has been adopted more extensively than either of the others. Taking as examples the greatest railway company and the greatest carrying firm, Messrs. Pickford had warehouses or dépôts at all the principal towns where the London and North-western Railway had stations. The merchants and manufacturers were customers, not to the company, but to the firm, for the conveyance of merchandise. Messrs. Pickford employed their own wagons and horses, clerks and porters, in collecting and delivering goods, and paid to the company so much per ton for the conveyance along the railway, the toll varying according to the nature of the goods and the distance run. There were seldom any quarrels or disputes under this system. The carrier was responsible to the customer from first to last for the safety of the merchandise; and he had a claim against the company for any injury while the merchandise was on the railway. Under the third system, disputes were much more frequent. The companies were bound by law to carry goods for all persons at certain tolls; but when they became road C. as well, they competed with the ordinary C. in a way which the latter could barely contend against. The Great Western Railway has been unfavorably distinguished for jealousies and lawsuits between the company and the carriers.

At the present time, the tendency is for the companies to take the responsibility of the whole conveyance, the C. acting as their agents, if willing so to do, or else endeavoring to maintain a fair competition. The goods-vans traversing the streets of the metropolis, and other great towns, are now more frequently inscribed with the names of railway companies than with those of private carriers. The introduction of the Parcels Post system (1883) will no doubt greatly revolutionize, and in some respects vastly increase, the carrying trade.

The goods-dépôts of the several railways are scenes of great activity during the night; for it is then that the arrival-trains are mostly unpacked, and the departure-trains mostly made up. During the day, vans are collecting goods from manufactories and warehouses; these goods are sorted at the dépôts, and are, when evening comes on, distributed among different trains, according to the part of the country to which they are to be conveyed. On the other hand, goods-trains arriving during the evening and night are unpacked, the goods classified according to districts, and sent out for delivery by road-vans on the following day.

The four-horse broad-wheel wagons, as already said, have almost disappeared from English roads; vans of lighter construction sufficing to convey merchandize from and to the various railway stations. Canals still command a trade, but it is chiefly in coal, stone, lime, ores, slate, bricks, and other articles very bulky in proportion to their value. The conveyance of manufactured goods has, for the most part, passed over to the railways.

In towns, there are C. whose business is confined wholly to short distances. Taking the metropolis as an example, there are C. residing in all the villages and hamlets round about, each possessing one or more single-horse covered carts. Every morning the cart, containing miscellaneous articles collected in the village or hamlet, goes to London, and delivers each article at the particular house or establishment to which it is addressed. When thus emptied, it receives a supply of packages or other articles going *from* London to the suburbs, and makes its return-journey in the evening. The plan is cheap and convenient, and does not seem likely to be supplanted by any other; for no amount of railway extension would wholly accommodate *short* traffic. For the metropolis more strictly, however, an excellent system has been established by the 'London Parcels Delivery Company.' Two or three times a day, parcels are conveyed from receiving-houses all over the metropolis to a central dépôt near Fetter Lane, there sorted, and sent out again for delivery.

The metropolis, out to a wide distance, is separated into districts, and one or more carts, filled with parcels, are sent to each district at certain hours of the day. The speed is rapid, the times are punctual, and the service in general well conducted. The suburban C. have arranged among themselves a sort of central dépôt or 'house of call' in the Old Bailey, for the exchange of traffic; but their system is not so well organized as that of the company just named.

The progress of improvement in the English CARRYING TRADE is a type of the advances similarly made in the United States, where canals, railways, and coasting steam-vessels have generally superseded the old tedious methods of conveyance; but on the long and then almost trackless routes to the shores of the Pacific were till lately to be seen the old processes of carriage by pack-mules and horses and bullock-wagons, the cost of transit by these means being very great.

The term CARRYING TRADE has latterly been applied more specially to all kinds of conveyance of merchandise by sea, whether across the ocean or along the coast. In this broad view, it, in reality, involves the whole question of mercantile marine, British and foreign.

CARRIERS, LAW RESPECTING. A carrier, in Law, is one who offers to the public to convey passengers, or goods, from one place to another, for hire. The offer must be general—for a private person who contracts with another for carriage, is not a carrier in the legal sense, and does not incur the peculiar responsibilities which, in almost every country, it has been found expedient to attach to the occupation of a public or common carrier. Carriage, in law, is thus a peculiar modification of the contract of hiring. In Rome, the responsibilities of carriers by water were regulated by a prætorian edict, which was applicable also to innkeepers and stablers (Nautæ, Caupones, Stabularii, Dig.; lib. iv. t. 9); and from that edict the law of carriage in modern Europe has been mainly borrowed, sometimes directly, as in Scotland, sometimes indirectly, as in England. The ground on which the edict increased the responsibilities attaching to an ordinary contract of hiring was, that the persons whom it enumerated were under peculiar temptation to consort, either personally or through their servants, with thieves and robbers, without the connection being such as to admit of proof; and that the public safety consequently required that they should be held responsible for whatever had been intrusted to them, till its safe delivery at the place to which they had undertaken to convey it. This responsibility in our own law extends not only to the acts of the carrier's servants, but also to those of the other guests in an inn, or the other passengers in a conveyance. The only exception to this liability at common law is in the case of loss arising from the act of God (q. v.) or the Queen's enemies—i. e., the fury of the elements, or war. But there are several statutory limitations.

The liability for gold and silver, and articles of unusual value, is restricted to £10, unless the extra value has been previously stated and paid for as insurance against the greater risk (11 Geo. IV. and 1 Will. IV. c. 68, and 17 and 18 Vict. c. 31); and the proof of value is laid on the person claiming compensation. But the last-mentioned act, commonly called the Railway and Traffic Act of 1856, provides, on the other hand, that the company shall be liable for neglect or default in the carriage of goods, animals, &c.; notwithstanding any notice or condition or declaration made by the company, for the purpose of limiting their liability. The decisions of the courts have also somewhat limited the universal responsibility of the carrier. For example, it has been decided that he is not liable, *qua* C. (and the same applies to an inn-keeper), for money taken from the pockets of the traveler; but that, if the money has been taken from the pockets of clothes which have been stolen, or from trunks which have been broken into, his responsibility comes into operation.

Under C. are included carters and porters, who offer themselves for hire, to carry goods from one part of a city to another. Whether the same be the case with hackney-coachmen, is more doubtful; though, from the extent to which they are now employed in the transport of luggage, there seems no sound reason for an exemption in their case. Wharfingers and warehousemen are liable only under the special contracts into which they may have entered, or in accordance with mercantile usage. In England, it has been decided that lodging-house keepers are in a different position from carriers and inn-keepers, on the ground that they do not profess to entertain all-comers, or to receive their goods. C. are liable to make good to the owners of goods intrusted to them all losses arising from accidental fire. This rule was introduced into Scotland by the Mercantile Law Amendment Act of 1856. Carriers have a lien upon the goods they have carried for payment of the carriage only. The lien is,

however, restricted to the particular goods to which the carriage refers, and ceases on possession of them having been given up. It does not cover any account or balance due either by the sender or consignee to the carrier.

CA'RRION CROW. See CROW.—C. C., also called *Black Vulture*, is not in America, as in Britain, the name of a species of crow, but of one of the Vulture family. See VULTURE.

CARRION FLOWERS, a name which, on account of their smell resembling that of putrid meat, has been given to the flowers of many species of *Stapelia*. The genus *Stapelia* belongs to the natural order *Asclepiadeæ*, and is remarkable for the excessive development of the cellular tissue of the stem and reduction of that of the leaves, resulting in a general aspect like that of the *Cactus* family. The species are natives of the Cape of Good Hope. The flowers are often large, and not devoid of beauty, but the carrion stench is very strong. It is not yet known to what chemical substance it is owing.

CA'RRON, a village in Stirlingshire, Scotland, on the right bank of the Carron Water, 3 miles east-north-east of Falkirk. It is celebrated for its ironworks, which are among the largest of the kind in Britain. The works were established in 1760; and are carried on by a company, who employ a great number of men. Pop. (1881) 902.

CARRON OIL. See BURNS.

CARRONA'DES are short iron guns, invented by Mr. Gascoigne, and named after the Carron Iron Works in Scotland, where they were first made. They are lighter than ordinary guns, and have a chamber for powder, like mortars. They were made standard navy guns in 1779, to be carried on the poop, forecastle, and upper works. Being manageable by a smaller number of hands than guns, and being very useful in close engagements, they were held in much favor during the great war: the seamen called them 'smashers.' A 68-pounder carronade weighed not much more than half as much as the 42-pounder gun in use in 1779. They range from 68-pounders down to 6-pounders. The denominations, weights, lengths, calibre, &c., of the chief varieties of carronade are noticed under CANNON.

Some C. are made shorter with a given bore. C. are but little used, except by the English and French. Though valuable at close quarters, they are no match for long guns at a distance; and therefore a ship armed only with C. would fare badly in a general action. In recent years, C. have to a considerable extent been replaced in the English navy by howitzers, long guns, and shell guns.

CA'RROT (*Daucus*), a genus of plants of the natural order *Umbelliferæ*. They are mostly natives of the countries surrounding the Mediterranean Sea. The Common C. (*D. Carota*), is a biennial plant, common in Britain and most parts of Europe, also in the Caucasus; and is universally cultivated not only in Europe and the European colonies, but in China, Cochin China, &c., for the sake of its root. The root of the wild plant is slender, woody, and of a very strong flavor; that of the cultivated variety is much thicker and more fleshy, much milder in its flavor and qualities, generally red, but sometimes orange or yellowish white. The subvarieties in cultivation are also distinguished by their form—some being longer and more tapering than others—by their size, and by the duration of their growth; the *early* kinds being also comparatively small, and almost exclusively cultivated in gardens for culinary use, whilst the larger and *late* kinds are often also grown in fields, for feeding cattle. The field cultivation of the C. is carried on to a much greater extent in some parts of France, Germany, and Belgium, than in Britain; but it is increasing in Britain. The C. appears to have been cultivated at an early period in Flanders and Germany, and to have been introduced into the gardens of England in the beginning of the 16th century. In the reign of Charles I., ladies wore C. leaves as an ornament instead of feathers; and the beauty of the leaves is still occasionally acknowledged by placing a root, or the upper portion of one, in water, that it may throw out young leaves to adorn apartments in winter. The C. prefers a light and rather sandy soil, and often succeeds very well on a peat soil. It is very liable to the attacks of the larva of the Crane Fly (q. v.), by which the greater part of a crop is sometimes destroyed when the young roots are about the thickness of a quill; on which account, in gardens where there is particular reason to apprehend danger from this enemy, it is the practice to make a number of successive sowings, some of which may probably escape. As an article of food, C. contains a large amount of what are called heat-producing compounds, with a small proportion of flesh-forming matter. It consists essentially of starch, sugar, and albumen, along with a volatile oil, which communicates a flavor to many dyspeptics very unpleasant. The following is the composition of dried carrot:

Starch and sugar	93·71
Albumen	4·35
Red neutral substance (carotin)	0·34
Fixed and volatile oils	1·00
Ash	0·60
	100·00

C. is easy of digestion, and gently laxative. Boiled C. is used as a poultice for foul ulcers and other sores, and as a vermifuge. Grated C. forms an agreeable cooling, but also stimulant application.

A sirup is prepared from carrots; and when cut into small pieces and roasted, they are occasionally used in Germany as a substitute for coffee. A strong ardent spirit is distilled from them in some parts of Europe, 10 lbs. of carrots yielding about half a pint. C. seeds are employed as a diuretic, also as a carminative and stimulant; those of the wild C. being preferred.—Besides the crane fly, already noticed, carrots have numerous other insect enemies. One of the most troublesome is the CARROT FLY (*Psila rosæ*), a small dipterous fly, the larvæ of which, by eating away the surface of the root, cause what is commonly known as *rust* in carrots, and prepare them for the further operations of millepedes and other destroyers. The larvæ of several species of moth (*Depressaria*) are very injurious to them when in flower and seed. An aphis (*A. dauci*) often kills the young plants.

Carrot Fly (*Psila rosæ*):*
a, larva, natural size; *b*, larva magnified; *c*, *d*, its operations on the root; *e*, pupa, natural size; *f*, pupa, magnified; *g*, mature insect, natural size; *h*, mature insect, magnified.

CARROU'SEL (Fr.), a species of knightly exercise, which, down even to the beginning of the 18th c., was very common in all the courts of Europe. C. was a kind or imitation of the tournament, and for a time after the discontinuance of the latter seems to have supplied its place. The dresses, for the most part, were those of the knights of former times, and the combatants, or rather competitors, were divided into two parties, usually according to their different nationalities. One of the favorite exercises in France consisted in running at the pasteboard head of a Moor or Turk with a lance, cutting it down with a sword, or firing at it with a pistol. Another of these tests of skill and horsemanship, if not of courage, consisted in carrying off a whole line of rings, which were suspended for the purpose. The C. in France was not known earlier than the reign of Henry IV.; but it had existed for some little time previously in Italy.

There were brilliant carrousels under Louis XIII., and two celebrated ones were given in honor of Mademoiselle de la Vallière—the one at Paris in 1662, the other at Versailles in 1664. The place where the first of these fêtes was held, has ever since been called the Place du Carrousel. A revival of the C. was attempted at Berlin in 1750; and in 1828 the Cavalry School at Saumur held one in honor of Madame la Duchesse de Berry. The so-called Eglinton Tournament—an entertainment given in the year 1839 by the chivalrous Earl of Eglinton—was in reality a carrousel.

CARSE is a term applied in Scotland to low lands adjoining rivers. The word is of uncertain origin. In Stirlingshire, it is restricted in its sense to the level alluvial soils which are only a few feet above the river Forth. In Perthshire, it also applies to the whole of the slightly undulating lands to the north of the Tay, which form the C. of Gowrie. C. soils usually consist of argillaceous deposits, which produce crops of great luxuriance, although there are some which consist of hungry and barren clays. The richest of them are of a hazel color, and become friable when exposed to the action of frost; the poorest, on the other hand, are of a yellow color, containing little vegetable matter to render them amenable to cultivation. The best kinds of C. soils are generally farmed on the six-course shift—1. Grass; 2. Oats; 3. Beans; 4. Wheat; 5. Potatoes; 6. Turnips or Fallow. Large crops of grass are grown when the clover-plant catches. It is

*For the accompanying illustration, and many others of a similar nature throughout this work, we are indebted to Morton's *Encyclopædia of Agriculture*.

mostly made into hay, and the after-math is used for soiling horses and cattle in the straw-yards. The land is seldom pastured, as the feet of animals trample and destroy the grasses, when the weather is wet. The oat-crop is more uncertain on the carses, but in favorable years, the yield is large, and the quality of the grain is excellent. Beans are very successfully grown, indeed the best of the C. soils are the best bean-soils in Scotland. Where the land is rich, and not too stiff, the potato is sometimes largely grown. On the poorest description of the C. soils, the potato does not thrive. Wheat can be grown in closer succession on the C. lands, than on any other description of land with the same expenditure of manure. A large stud of horses are required on C. lands, to enable the farmers to prepare the land for the various crops, at the seasonable moment.

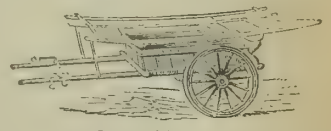
CARSON CITY, capital of the state of Nevada, U.S., in a fertile and picturesque region near the foot of the Sierra Nevada, 178 miles N.E. of San Francisco. Pop. (1870) 3042; (1880) 4227.

CARSTAIRS, WILLIAM, a distinguished political and ecclesiastical character of the 17th c., who took a very active part in bringing about the Revolution of 1688, was born at Cathcart, near Glasgow, February 11, 1649. He was educated at the village school of Ormiston, in East Lothian, and subsequently at the university of Edinburgh, where he displayed a remarkable aptitude for learning. In his 24th year, Scotland being then in a most unsatisfactory state, alike from a political and religious point of view, C. went to study theology at Utrecht. His scholarship, polite address, knowledge of men, and great political information, especially regarding his own country, recommended him to the notice of the Prince of Orange, who chose him as his confidential adviser in all matters relating to Britain. In 1682, being in England on a mission of observation from Holland, he was employed to negotiate between the English and Scotch conspirators in the Rye House Plot. With others implicated, he was arrested and put to the torture of the thumb-screw, but refused to confess anything that had not been previously revealed, and that only on condition that what he said should not be used in evidence, either directly or indirectly, against any other person. At this time, he had secrets from Holland of the greatest importance in his possession, which he carefully concealed, although there can be no doubt that their revelation would not only have saved him from torture, but have obtained for him great reward and honor. Britain, therefore, owes very much indeed to the firmness of C. at this juncture. He returned to Holland about the beginning of 1685; and, acting mainly on his advice, the Prince of Orange planned and carried out the invasion of 1688. He accompanied the prince as chaplain, and after the settlement of the crown, when the prince had been firmly established as William III., C. was instrumental in effecting a reconciliation between him and the Scottish Church, when the ill advice of other councillors had nearly led to an open rupture. From 1693 to the death of the king in 1702, he could not have had more influence in Scottish affairs if he had been Prime-minister of the country; and his authority in church-matters was such, that he was popularly called 'Cardinal Carstairs.' He was elected Principal of the university of Edinburgh in 1704, and in this capacity used all his influence with government to obtain an increase of patronage for the Scottish colleges. In the same year, he was presented to the Church of Greyfriars, and was appointed Moderator of the General Assembly next succeeding, an office to which he was four times elected in the course of eleven years. He died August 1715, deeply regretted by the whole nation, and leaving a reputation for scholarship and sincere piety, as well as for unbounded charity and political sagacity rarely equalled. See *Life of C.*, by Rev. Dr. Story (1874).

CARSTENS, ASMUS JACOB, an eminent German artist, was born near Schleswig, May 10, 1754. In 1762, he went to Copenhagen, where, when first introduced to the Royal Gallery of Paintings and Casts from the Antique he was so excited that he shed tears of joy. After staying seven years in the Danish capital, where he produced his 'Baldur's Death,' and 'Eolus and Ulysses,' supporting himself chiefly by portrait-painting, he commenced a journey on foot to Rome, but was obliged to return for want of means after reaching Mantua. He resided in Lubeck for some time, but through the kindness of a wealthy amateur artist named Rodde, he contrived to reach Berlin, where his great composition, the 'Fall of the Angels' (with 200 figures), gained for him an appointment as professor in the academy, while his decoration of a saloon in the Dorville Palace obtained for him an introduction to the king and a pension. He was now enabled to visit Rome, where he devoted himself to the study of the works of Michael Angelo and Raphael. His first work in Rome, a 'Visit of the Argonauts to the Centaur Chiron,' was distinguished by purity of style, beauty of forms, and fine distribution of light. His numerous subsequent drawings mostly represented scenes from the ancient classic poets, with subjects from Ossian, Dante, and Shakspeare. C. died May 26, 1798.

CART, a species of carriage with two wheels, in which respect it differs from the ordinary wagon that has four wheels. There are different kinds of carts, according to the nature of the goods or articles to be carried, and they also differ considerably in different countries. The C. is little seen in England where the heavy and more capacious wagon takes its place. It is, however, used for agricultural and other purposes in Cumberland and adjoining northern counties. There, it differs only in a slight degree from the C. universally used in Scotland. The Scotch C. is an exceedingly convenient form of carriage for general merchandise, or for agricultural produce, and well adapted for being drawn on roads in a hilly country. A material advantage consists in its weight, being about only half a ton, while its usual load is from a ton to 22 cwt; from which circumstance it is a particularly handy vehicle for comparatively light loads, and so far is superior to the English wagon, which is best adapted to carry huge loads of from two to three tons.

In carrying hay, straw, or grain from the harvest-field, Scotch farmers employ a peculiar kind of C. without sides to admit of a bulky load; but they also, as occasion serves, use for a similar purpose an ordinary C., on which they place a movable frame, as is seen in the adjoining cut. All grain for market is carried in the one-horse C., and a driver takes charge of two carts. The following advantages of one-horse carts are well enumerated by Lord R. Seymour: 'A horse, when he acts singly, will do half as much more work as when he acts in conjunction with another; that is to say, that two horses will, separately, do as much work as three conjunctively. This arises, in the first place, from the single horse being so near the load he draws; and in the next place, from the point or line of draught being so much below his breast, it being usual to make the wheels of single horse-carts low. A horse harnessed singly has nothing but his load to contend with; whereas, when he draws in conjunction with another, he is generally embarrassed by some difference of rate, the horse behind or before him moving quicker or slower than himself; he is likewise frequently inconvenienced by the greater or less height of his neighbor: these considerations give a decided advantage to the single horse-cart. The very great ease with which a low C. is filled may be added; as a man may load it, with the help of a long-handled shovel or fork, by means of his hands only; whereas, in order to fill a higher C., not only the man's back, but his arms and whole person must be exerted.' To these just observations it need only be added, that in many parts of England there is a wasteful expenditure in horse-power, a pair of horses being often set to draw a clumsy wagon to market, containing a load which could with the greatest ease be drawn by one horse in a less ponderous machine.



Scotch Cart, with movable frame.

The one-horse C. is employed by carriers all over Scotland, the load being usually piled high in a square form, and covered in with a woollen wrapper, in which state the C. is drawn 18 to 20 miles a day. See CARRIERS. In France and Germany, the carrier's C. is a more gigantic machine. Long in the body, very strong in construction, and poised on two high wheels with broad rims, this continental C. carries enormous loads, almost equal to what are seen in the large wagons of England. The ingenious manner in which the load is adjusted to rest exclusively on the wheels, and so relieve the single horse in the shafts, is a matter of surprise to all strangers. All carts, whatsoever, in Great Britain, must bear the name and address of the owner, painted conspicuously on them, according to statute 1 and 2 Will. IV. c. 22. See WAGON.

CARTAGE'NA, a fortified seaport of Spain, on a bay of the Mediterranean, in lat. 37° 36′ N., long. 0° 57′ W. It is built partly on the declivity of a hill, and partly on a plain extending down to the sea, and is enclosed by hills which screen it from all winds. The harbor is one of the best in the Mediterranean, capacious enough to hold the largest fleets. The entrance is narrow, and completely commanded by the fortifications on an island called La Isoletta, on the south. It was formerly the largest naval arsenal not only in Spain but in Europe. The city, which is surrounded by walls, has a Moorish aspect; its streets, cathedral, and the ruins of an old castle being of that architecture. C. has manufactures of sail-cloth and glass, besides extensive blast furnaces and smelting-works, and a trade in barilla, agricultural produce, and esparto grass. The tunny fishery is important, and its ancient silver and lead mines, recently re-opened, are again productive—the export of lead to Great Britain and France in 1873 being 32,000 tons. The zinc and iron ores amounted to 496,000 tons. In 1873 C. was seized by a communal junta, but was retaken by the national forces in 1874. Pop. of town and suburbs (1877) 75,908. C., which was a colony of the Carthaginians, was built by Hasdrubal 242 B.C., under the name of New Carthage.

It formed the head-quarters of the Carthaginians in Spain, and soon became a city of much wealth and influence. It was captured by P. Scipio in 210 B.C., and became of importance under the Romans, who are said to have employed 40,000 men daily in the mines in the neighborhood. It was sacked by the Goths, and did not again attain any note until the time of Philip II.

CARTE, THOMAS, an English historian, distinguished for his industry and research, was born at Clifton, in Warwickshire, where his father was parish minister, in 1686. Educated at Oxford, he afterwards took the degree of M.A. at Cambridge, and entering holy orders, was appointed reader at the Abbey Church, Bath; but being attached to the Stuarts, he resigned his office rather than take the oaths to the new government. In 1722, he was suspected of having been concerned in the conspiracy of Bishop Atterbury, whose secretary he was, and £1000 was offered for his apprehension; but he escaped to France, where he remained for some years. On his return to England, he published a life of the Duke of Ormond, remarkable for the fulness of its information. In 1747—1755, he published a *History of England*, bringing it down to the year 1654. This work is very valuable for its facts, but the author had not the capacity to grapple with these philosophically. Hume and other historians, however, have been much indebted to him for the materials of history. Among his other works was an edition of *Thuanus;* and at his death, in 1754, he left behind him 20 folio and 15 quarto volumes of MSS., in further illustration of the history of England to 1688, which have proved of great utility to subsequent writers. These are preserved in the Bodleian Library, Oxford.

CA'RTEL, during a time of war, is an agreement between the belligerents for an exchange of prisoners. Sometimes the name is given to a ship, called by the French a *bâtiment parlementaire*, commissioned to convey the exchanged prisoners, or to carry messages to the enemy. A ship, when thus employed, must carry no cargo, ammunition, or implement of war, except one gun for signals.

CARTER, ELIZABETH, an English lady, remarkable for her classical attainments, and also for her knowledge of modern languages, was born December 1717, at Deal, Kent. Slow at first to learn, she afterwards displayed remarkable aptitude. In her 21st year she published a small volume of poems, and in the succeeding year she translated from the Italian of Algarotti *An Explanation of Newton's Philosophy for the Use of Ladies*. These publications brought her into note, and obtained for her the friendship of such men as Bishop Butler, Archbishop Secker, Sir Joshua Reynolds, Burke, and Dr. Johnson, the latter of whom especially held her in great esteem, and had the highest opinion of her proficiency as a Greek scholar. A translation of Epictetus which she made, was most favorably received by the literary press of her time, both at home and abroad. She died unmarried, February 1806, at the age of 89.

CARTERET, JOHN, EARL GRANVILLE, a distinguished orator and statesman of the 18th c., was born April 1690, his father being Baron Carteret of Hawnes, Bedfordshire. His education, commenced at Westminster School, was completed at Oxford. From the latter place, according to Dean Swift's humorous assertion, he carrried away more Greek, Latin, and philosophy than was at all becoming a person of such high rank. Introduced into the House of Peers in 1711, he spoke in favor of the Protestant succession, and in consequence received the early notice of George I., and obtained some lucrative appointments. In 1718—1719, he was appointed ambassador extraordinary to Sweden, and in the following year succeeded in concluding a peace between Sweden, Prussia, and Hanover. In 1721, he was appointed secretary of state, and in this capacity defended with great zeal the proceedings of government in the Atterbury conspiracy. In 1724, he was made lord lieutenant of Ireland. During his vice-regency, he was in constant intercourse, and held frequent discussion, with Dean Swift about public affairs. His lord lieutenancy, which lasted from 1724 to 1726, and again from 1729 to 1730, was popular, particularly the latter period. From 1730 to 1742, he was one of the most able and determined of the leaders of the opposition in the House of Lords against Sir Robert Walpole, and on his displacement, was made a secretary of state. On the death of his mother in 1744, he succeeded to the title of Earl Granville, and in the same year had to resign his seals of office, the Broad Bottom Administration (q. v.) expressly excluding him; but he continued to receive marks of the royal favor. C. was a most liberal patron of men of letters. He died January 1763.

CA'RTHAGE, called *Carthago* by the Romans, *Carchedon* by the Greeks, both of which are but forms of the native name *Karthhadtha*, i. e., 'New Town' (found on ancient coins), was the greatest city of antiquity on the north coast of Africa, and was situated in what now constitutes the state of Tunis, on a peninsula extending into a small bay of the Mediterranean Sea. It was founded, according to legend, by Dido (q. v.), a Phœnician queen, who had fled from Tyre after the murder of her husband almost nine centuries before the Christian era, but more probably (like the Anglo-Indian Calcutta) it originated in an emporium or *factory* established by the colonial merchants of Utica, and the capitalists of the mother-city Tyre, on account of the convenience of its situation. Unfortunately we know very little of its growth. Our information only begins after C. had become one of the greatest commercial cities of the world, and we have but very scanty and one-sided accounts of it even then. The number of the inhabitants before its destruction amounted to about 700,000. The population was partly of Phœnician, partly of Libyan descent. The territory which the Carthaginians acquired by the subjugation of the Libyan tribes, and by the ultimate annexation of other older Phœnician colonies, with which they had at first been simply in alliance, such as Utica, Hadrumetum, Tunis, Hippo, the two Leptes, &c., extended in the middle of the 5th c. B.C. southward to Lake Triton, eastward to the Great Syrtis, and westward to Hipporegius (now Bona). The maritime power of the Carthaginians enabled them also to extend their settlements and conquests to the other coasts of the Mediterranean. In the 6th c. B.C., they were masters of Sardinia, and had begun to contend for the possession of Sicily. Hanno (q. v.) founded colonies on the west coast of Africa beyond the Straits of Gibraltar, and Himilco visited the coasts of Spain and Gaul. The relations of C. to foreign states in earlier times are not very clear. The first treaty with the Romans was concluded in 509 B.C.; the second, in 348 B.C.; the third, in 306 B.C. The connected history of C. begins with the 5th c. B.C., a period of wars between the Carthaginians and the Greeks in Sicily. The Carthaginian army under Hamilcar was destroyed by Gelon at Himera in 480 B.C. It was not till 410 B.C. that the war began which ended in the conquest by the Carthaginians of some parts of the island. Dionysius the Elder, or rather the pestilence working for him, put a stop to their conquests, but did not succeed in expelling them.

War raged almost constantly between Dionisius and the Carthaginians. The more feeble reign of Dionysius the Younger afforded them an opportunity of extending their conquests, yet they were frequently repelled and defeated by the Sicilian Greeks; and during 311—301 B.C., Agathocles carried the war into Africa, and attacked C. itself. After his death, the Carthaginians again increased their dominions in Sicily; and although Pyrrhus contended successfully against them at first, he left that island entirely in 275 B.C. The subjugation of the south of Italy by the Romans, brought the two great and conquering nations into collision, and the First Punic war arose, 264 B.C., and after a great naval victory of the Romans, terminated in 241, the Carthaginians giving up Sicily, Sardinia, and Corsica, and paying to the Romans a large sum of money. Soon after this, a mutiny of the hired troops of C., combined with an insurrection of the Libyan tribes, the ancient inhabitants of the country, who were kept down by the arbitrary rule of the Carthaginian colonists, threatened the entire ruin of the city. Hamilcar brought that bloody war, however, to a successful termination, and led an army to Spain, where he, and after him Hasdrubal, obtained great successes. Here was founded New C., now Cartagena (q. v.) After Hasdrubal's death, 221 B.C., Hannibal (q. v.), burning to revenge the defeat which his native city had sustained from the Romans, broke the treaty with them, and took Saguntum, 219 B.C. Thus began the Second Punic war, in which Hannibal pursued his career of conquest from Spain, through Gaul, and across the Alps into Italy itself, defeated the Romans with terrible slaughter in various battles, and, by that of Cannæ in particular, brought Rome to the very brink of ruin. Yet the war terminated in the total defeat of the Carthaginians by Publius Cornelius Scipio, who overthrew their power in Spain, and was victorious over Hannibal in the final and decisive battle of Zama, in Africa, in October 202. A peace was then concluded, in which the Carthaginians were limited to their African territories; but most of their ships of war and war-elephants were taken from them, besides an immense sum of money, and they were taken bound not to make war without permission of the Romans. Massinissa, king of Numidia, skilfully availed himself of dissensions which arose within C. between the nobles and the people, to advance his own interests at the expense of the Carthaginians; and as they (151 B.C.) opposed him, and drove his adherents out of the city, the Romans seized the opportunity for a new declaration of war, 149 B.C., on the ground that the treaty was broken; and after a siege of two years, C. was taken by Publius Cornelius Scipio Aemilianus, 146 B.C. For six days the combat was maintained in the streets of the city, and for seventeen days the work of its destruction by fire was carried on by the conquerors. The country became a Roman province.

C. Gracchus sent out 6000 colonists to found a new city on the site of Carthage. It was called Junonia, but it did not prosper. Augustus, carrying out the intention of his great uncle, restored the city, and the new C. had become, in the second and third centuries of the Christian era, one of the finest cities of the Roman

empire. In 439 A.D., Genseric made it the capital of the Vandal kingdom; Belisarius conquered it in 533, and named it Justiniana; the Arabs under Hassan utterly destroyed it in 647 A.D.; and now only two or three small hamlets and a few ruins mark its site.

We have not very satisfactory accounts of the constitution of the Carthaginian state. It is certain that it was oligarchical, and that the chief power was in the hands of the great families (gentes), from whose members the senate, amounting to 300, was chosen. This senate, appointed, as it were, a more select council of 30, and sometimes a still smaller one of only 10, at the head of whom were two *suffetes* (probably the same as the Hebrew *shofetem*, 'judges'), but it is not certain what relation these bore to one another, or how their power was apportioned between them. We can gather dimly, from various scattered statements, that the Carthaginian oligarchy, while despising the multitude, was itself split up into factions, and torn by family jealousies. Corruption largely prevailed; and it would perhaps have been better for the country if the power had been in the hands of a popular despot than of a band of insolent and tyrannical nobles.

The Carthaginian army was raised from the conscription of the subjugated Libyans, from the hired Numidians, and from slaves In the time of Agathocles, the city sent forth 40,000 heavy-armed infantry, 1000 cavalry, and 2000 war-chariots, but the state could easily raise 100,000 troops. The fleet in the First Punic war consisted of 350 ships, carrying 150,000 men. How C. contrived to raise revenues sufficient to cover the enormous expense her military and naval organization involved, is not very clear. It was, in all likelihood, derived from tribute imposed on subject Libyan or Numidian races, in great part from mines in Spain, and from import duties derived from her maritime and inland trade, which was prodigiously great. Her merchantmen visited every coast and island of the Mediterranean, and even ventured as far as the Azores, Britain, the Baltic, &c.; while her caravans penetrated through Sahara to the gold-producing districts of the Niger, and through the Libyan Desert to the lands along the Nile.

The religion of the Carthaginians appears to have been substantially the same as that of the Phœnicians—a worship of the stars and of fire. Moloch was the chief deity, and to him children and captives were sacrificed. The highest natural manifestation of this deity was the Sun. Besides Moloch, the Carthaginians worshiped the Tyrian Hercules; Astarte, the goddess of the elements; Esmun, the god of the celestial vault; and a variety of heroes, heroines, and genii or spirits, such as the Genius of Death, Hamilcar (who fell at the battle of Himera), Dido, the brothers Philæni, &c., as well as a few of the lesser Greek divinities, of whom a knowledge had been obtained in Sicily. It does not appear that there was a distinct sacerdotal order in Carthage. Probably religious ceremonies were performed by the dignitaries of the state, but our knowledge on this interesting point is too meagre to permit of our arriving at any very definite conclusion.

CARTHAGE, CAPE, a headland of North Africa, jutting out into the Mediterranean, in lat. 36° 52′ N., long. 10° 22′ E. Traces of the ancient city of Carthage (q. v.) are found on it to the north of the Tunis lagoon.

CARTHAGE'NA, capital of the state of Bolivar, one of the United States of Columbia. It stands on the Caribbean Sea, a little to the S.W. of the mouth of the Magdalena, in lat. 10° 26′ N., and long. 77° 54′ W., having the best harbor on the coast, with a naval arsenal and strong fortifications. Its population is estimated at 10,000, not more than one-tenth being white. The temperature ranges from 80° to 86° F.—the air, however, being dry and healthy. In the history of Spanish America, and more especially in that of the war of independence, the city occupies a prominent place.

CARTHAGENA BARK. See CINCHONA.

CARTHA'GO, a term of various application in Central America —1. An almost landlocked bay or lagoon of the Caribbean Sea near the north-west extremity of the Mosquito shore.—2. A river entering the same from the south-south-west, about lat. 15° N., and long. 84° W.—3. A river of Costa Rica, flowing into the Gulf of Nicoya, an inlet of the Pacific, near lat. 9° 30′ N., and long. 84° 30′ W.—4. A city, or rather the ruins of one, on the same, about 60 miles from its mouth. Down to 1841, it was the capital of Costa Rica; but being in that year all but destroyed by an earthquake, it was supplanted by San José, previously its superior in wealth and importance, about 15 miles to the west-north-west of itself. The volcano of its own name, doubtless connected with its overthrow, is valuable as a landmark to mariners.

CA'RTHAMINE, or CARTHAMEINE. The dye so called is obtained by a chemical process from safflower (q. v.), (*Carthamus tinctorius*), in crystals which are insoluble in water, but slightly soluble in alcohol and ether. When newly precipitated, C. immediately and permanently attaches itself to cotton or silk, but not to wool, requiring no mordant, dyeing the fabric a fine red, which is changed to yellow on the addition of alkalies, and may be returned to red again on being treated with acids.

CARTHU'SIANS, a monastic order which owes its origin to St. Bruno, who retired in 1086 with six companions to the solitude of La Chartreuse (whence the name), near Grenoble, where they built hermitages, wore rude garments, and lived upon vegetables and coarse bread. In 1134, the fifth prior, Guigo, composed a body of rules, called the *Statuta Guigonis* or *Consuetudines Cartusiæ*, but they have been often changed. After 1170, when the order received papal approbation, it extended rapidly. It dates from 1180 in England, where the name of Chartreuse-houses was corrupted into charter-houses. The C. were divided into two classes, fathers (*patres*) and brothers (*conversi*). Each occupied a separate cell, with a bed of straw, a pillow, a woollen coverlet, and the means of manual labor or of writing. They left their cell, even for meals, only on festivals and on days of the funeral of a brother of the order. Thrice a week, they fasted on bread, water, and salt, and there were several lengthened fasts in the year. Flesh was forbidden at all times, and wine, unless mixed with water. Unbroken silence, except on rare occasions, was enforced, as well as frequent prayer and night-watching. These austerities were continued, with little modification, by the modern C. The order at one time counted 16 provinces, and can still boast some of the most magnificent convents in the world—as *La Grande Chartreuse*, near Grenoble, and *Certosa*, near Pavia. They were given to hospitality and works of charity, and were on the whole better educated than the mendicant orders. Their principal seats were in Italy, France, and Switzerland; but they have shared the fate of the other monastic establishments, and their convents are now for the most part solitudes indeed.—The Carthusian nuns arose at Salette, on the Rhone, in France, about 1229. They followed the rules of the Carthusian monks, but with some mitigations, of which the most notable is that they have a common refectory.

CA'RTILAGE is a firm elastic substance, of a pearly whiteness, presenting to the unaided eye a uniform and homogeneous appearance. Cartilages may be divided into the *temporary*, the *permanent*, and the *accidental*. The *temporary* cartilages are substitutes for bone in the earlier periods of life, and after a certain time become ossified. See OSTEOLOGY. At birth the extremities and larger eminences of the long bones, and the margins of the flat bones are still cartilaginous, and this C. does not altogether disappear till the period of puberty. The *permanent* cartilages are either *articular* or *non-articular*. *Articular* cartilages are attached to the extremities of bones, and enter into the formations of joints. *Non-articular* cartilages are usually more flexible than the articular. They are sometimes attached to bones, to lengthen them out, as, for instance, in the nose, the auditory canal, and the Eustachian tube. See HEARING, ORGANS OF. In other cases they form the basis of distinct organs, as the larynx, the trachea, and the eyelids. *Accidental* cartilages are cartilaginous concretions, which are occasionally found in situations where they do not normally occur, and are of no general interest. The physical properties of cartilages, especially their elasticity, resisting power, and incapability of extension, are such as to fit them admirably for the functions which they have to perform in the animal economy. A brief notice of the microscopical characters of C. will be found in the article CELLS, and a reference to its chemical composition will be found in the articles GELATINOUS TISSUES and GLUTEN.

CARTILA'GINOUS FISHES are those fishes which have a skeleton destitute of bony fibres. In some of these fishes, the skeleton is merely rudimentary, so that they seem to form an intermediate link between vertebrate and invertebrate animals. In the lancelets (q. v.) (*Amphioxus*) it consists of nothing more than a slender, transparent, flexible dorsal column; in *Myxine* also it is a soft flexible tube, without appearance of vertebræ or of ribs; in the lampreys, the dorsal column is still a mere cylinder of cartilage, without any notable division into segments; whilst even in the sturgeon, the center of the backbone is a continuous gelatinous cord, and in the sharks the vertebræ are formed of hollow cones, meeting at their apices in the middle, and having their cups filled with the remains of the gelatinous cord, an arrangement from which result great elasticity and flexibility. In many instances, even in the higher C. F., several vertebræ are united in a single piece; in all of them the skull is formed of a single piece without sutures, although the general form agrees with that of the skull of other fishes, and the same parts of regions may be recognized.

The calcareous matter present in the skeleton is always deposited in a granular manner, giving a characteristic dotted appearance; but even in the skull of the Basking Shark, one of the most highly organized, the earthy matter has been found to form little more than 3 per cent. of the whole substance; in the skeleton of the lamprey, it is only 1½ per cent. In other parts of their organization, C. F. differ from each other very widely; some of them possessing the organs of the senses in as great perfection as any fishes whatever, whilst in others these organs are very imperfectly de-

veloped. Linnæus placed the C. F. along with Batrachian reptiles in his class *Amphibia*. By the general consent of naturalists, however, they are placed in the class of Fishes. Cuvier, referring to the very different degrees of organization which they exhibit, says 'they form a series ranging parallel to the bony fishes, just as the marsupial mammalia range parallel with the other ordinary mammalia.' Owen and others, admitting the justice of this view, have, however, pointed out the C. F. generally, characters corresponding with those of the osseous fishes in their embryotic state, and with the permanent or mature conditions which prevailed among the fishes of some of the older geological periods. One remarkable characteristic even of the higher groups of C. F.—sturgeons, sharks, rays, &c.—is the *heterocercal* tail, the vertebral column being prolonged into the upper portion of the caudal fin, and the lower one given off on its under side, as in the fossil fishes generally of the Old Red Sandstone and other oldest fish-producing rocks.—Cuvier divided C. F., or *Chondropterygii* (Gr. cartilage-finned), into three orders: *Sturiones* (Sturgeon, Chimæra, &c.), having the gills free, and gill-openings with a lid, like the osseous fishes; *Selachii* (Sharks and Rays), having the gills fixed, and consisting of folds of membrane on a plane surface, with numerous gill-openings, the jaws movable as in other fishes generally; and *Cyclostomi* (Lampreys, &c.), also having fixed gills and numerous gill-openings, the mouth adapted for sucking. Müller and Owen, however, separate the *Cyclostomi* of Cuvier from the other C. F., on account of important anatomical differences, particularly in the structure of the heart, which in the *Cyclostomi* wants the *bulbus arteriosus*, or thick muscular swelling of the commencement of the arterial system close to the ventricle; whilst this, which may, in fact, be considered as a third chamber of the heart, is present in the *Sturiones* and *Selachii*, and within it are three or more longitudinal rows of valves; characters derived from the vascular system being deemed by these great naturalists of the highest value in determining the arrangement of the class of fishes. The lancelets occupy a place by themselves, from their absolutely wanting a heart, and having the circulation carried on by the muscularity of the entire vascular system.

CARTOO'N (Ital. *cartone*, pasteboard; from Lat. *charta*, paper). In the fine arts, C. is a design on strong paper, of the full size of a work to be afterwards executed either in fresco, oil color, or tapestry. The object of the artist in preparing a C. is, that he may adjust the drawing and composition of his subject in circumstances in which alterations can be effected with facility, before proceeding to the execution of the work itself. Cartoons are generally composed of a number of sheets of stout paper or pasteboard, pasted together at the edges, and stretched on a frame. The surface is sometimes *primed*, or washed with a ground-color; but more frequently this process is dispensed with. The drawing is made either in chalks or in *distemper* (q. v.), in which latter case the C. itself has very much the appearance of a fresco. Frequently only two colors are used, merely for the purpose of producing light and shade, in which case the C. is said to be *in chiaro oscuro*. The C., when finished, is transferred to the canvas or plaster on which the work is to be executed, either by tracing with a hard point, or by pricking with pins, charcoal in both cases being used. Sometimes lines are simply drawn across it, or, if it is wished to preserve it from injury, threads are stretched across it from pins placed at the required distances along the edges. In *fresco* painting (q. v.), the plaster on which the work is executed must be kept wet, in order that it may absorb the color, and consequently only a small portion can be executed at a time. For this reason, the C. must be traced in small compartments of the size that the artist can finish without stopping. It is here, consequently, above all, that the necessity for the previous execution of a C. is greatest, as it would be impossible to sketch the whole design on the plaster in the first instance. But the great masters used such studies in *chiaro oscuro* as guides to them in almost all their more extensive works, and many of these monuments of their care, as well as of their genius, have been preserved. We have cartoons of Andrea Mantegna, Domenichino, the Caracci, &c.; but the finest specimens of cartoons in existence are those of Raphael at Hampton Court. These marvellous conceptions were sent to Flanders in the reign of Leo X., in order that they might be copied in tapestry in two sets, one of which was designed for the pope, the other for a present by the pope to Henry VIII. of England. The tapestries which are very inferior to the designs, are still in existence. One set is in Rome, the other was in England till the death of Charles I., when it was purchased by the Spanish ambassador, and carried to Spain. At a recent period it was brought to London and offered for sale, but as no English purchaser was found, it was again carried to the continent.

For many years the cartoons, originally twenty-five in number, lay neglected at Brussels, and many of them were destroyed. The seven now at Hampton Court were at length purchased by Rubens for King Charles I. It is an instance of Cromwell's good sense, in a direction in which it was not often exhibited, that at the dispersion of the royal collections, these cartoons were purchased for the nation by his special command. So low was the artistical taste of the time, however, that whilst the 'Triumph of Julius Cæsar,' by Andrea Mantegna, still at Hampton Court, was valued at £2000, the cartoons of Raphael were set down at £300! In Charles II.'s time, these remarkable works were again consigned to oblivion. An attempt was made to have them copied in tapestry, by which they were seriously injured. William III., strangely enough, followed in Cromwell's footsteps in appreciating what Charles II. had neglected. He had the cartoons restored, and built a gallery for them at Hampton Court, where, with the exception of a visit to Windsor in George III.'s time, they have since sojourned. The following are the subjects represented: 1. Paul Preaching at Athens; 2. The Death of Ananias; 3. Elymas, the Sorcerer, struck with Blindness; 4. Christ Delivering the Keys to Peter; 5. The Sacrifice at Lystra; 6. The Apostles Healing the Sick at the 'Beautiful Gate' of the Temple; 7. The Miraculous Draught of Fishes. Our space and our design equally precludes us from attempting any statement of the merits of these exquisite compositions. Several of the lost cartoons are partially transmitted to us by engravings, some of which were executed from the tapestries; others, it is believed, from the originals. The subjects of these are—1. The Adoration of the Kings; 2. Christ appearing to Mary Magdalene; 3. The Disciples at Emmaus; 4. The Murder of the Innocents; 5. The Ascension. These were engraved, along with the others, by Somereau, a French engraver, in 4to. Other cartoons of Raphael exist—one the property of the Duke of Buccleuch, and two in the possession of the king of Italy, which are said to have belonged to the set sent to Flanders. There is also a portion of one in the National Gallery in London, but it is now painted over with oil color. The best engravings of the cartoons at Hampton Court are by Dorigny, Audran, and Holloway; but in future it is probable that they will be more known to the public by means of photographs, of which Messrs. Colnaghi and others have already produced very beautiful specimens.

CARTOU'CH is a word much used in the French military service, but less frequently in the English. The name was once given to a wooden case containing 200 to 300 musket-bullets, and 8 or 10 1-lb balls, fired from a mortar or howitzer in defence of a ditch or intrenchment; but such missiles have been superseded by others. The cartridge-box carried by the soldiers used to be called a C. in England, and still is in France.

CARTOUCHE, the name by which the French, and we after them, designate the ovals on which the hieroglyphic characters for the names of Egyptian kings are sculptured. See CAVO-RILIEVO. C. is also used to signify a tablet, either for ornament or to receive an inscription, so formed as to resemble a sheet of paper or parchment, with the edges and ends rolled up. Cartouches are often seen on tombs. The same term is sometimes applied to modillions, or brackets supporting a cornice.

CA'RTRIDGE is a cylindrical case made to contain either the whole or a part of the materials for discharging from a firearm. Those for ordnance or large guns are chiefly made of serge and flannel, sewn up into the form of a bag, which, supplied with a given weight of powder, is tied round the neck, and strengthened by iron hoops. The weight of powder varies from about 300 lbs. for an 81-ton gun, to a few ounces for a mountain gun.

Cartridges for small arms which load at the muzzle are usually paper tubes, containing a leaden ball and a few drachms of

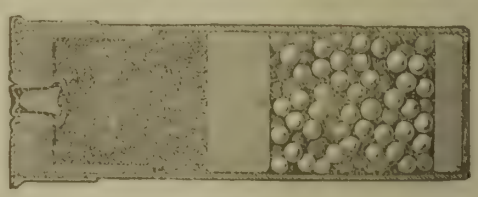


Fig. 1.

powder. The tubes are made in such a way that the powder has two or three thicknesses of paper around it, while at the mouth of the tube and over the bullet there is only one. The paper over the bullet is lubricated generally with a composition of beeswax and tallow. In loading, the paper at the mouth of the tube has to be twisted or bitten off; the powder is then poured into the barrel, the tube reversed, and the bullet inserted into the muzzle, and the tube broken away. Cartridges for breech-loading small-arms are generally formed of a thin sheet of brass coiled into a cylinder, and having an iron case, in the center of which is the percussion arrangement. Those used for the Snider and the Martini-Henry rifles are described in the article on BREECH-LOADING ARMS. Besides the C. case of coiled brass, there are others made of solid brass or copper (an American invention), and these

seem to be gaining favor abroad, the Prussians having adopted such a case for the new Mauser rifle.

For muzzle-loading shot guns, the chief cartridges used contain a charge of shot packed in a paper cylinder of a size suitable for the bore of the gun. Some of these, in addition to the paper covering, are surrounded with a wire net-work, for the purpose of increasing the range and penetration.

The C. for breech-loading shot guns is usually a stout cylinder of paper with a metal case. They are made of various sizes to suit the different calibres of guns, and with a pin or central fire ignition. In the pin-fire C., a small brass pin passes through the side of the case into the percussion cap, and protrudes through a small hole in the top of the barrels. The pin is struck by the hammer of the gun, and forced into the percussion cap, which explodes, and ignites the powder. In the central-fire C., the cap is in the center of the case, and is exploded by the hammer of the gun acting on a piston contained in the false breech. Fig. 1 is a longitudinal section of a central-fire C., full size.

Fig. 2.

In America, a solid brass C. case is often used for shot guns.

For sporting rifles, the cartridges are quite as numerous and as varied as for shot guns. With large-bore rifles the same C. case is generally used as for shot guns, but loaded with powder and ball (spherical, solid conical, hollow conical, or shell). For small-bore, or what are known as Express rifles, either a coiled brass C. case, similar in construction to that for the Snider or Martini-Henry rifle, but made to contain a larger charge, or a solid brass case is used. The coiled case can be reloaded twice or thrice, while the solid case can be reloaded as often as twenty times, and on this account the latter is rapidly gaining favor with sportsmen in India and Africa. The express C. contains a very heavy charge of powder, with a light hollow conical bullet giving very great velocity, low trajectory, and immense killing power. Fig. 2 is a longitudinal section of a ·450 gauge Henry express C. (full size), the charge of powder in which is 4 drachms, while the bullet weighs only 270 grs.

Cartridges for breech-loading pistols and revolvers are generally small metal cylinders containing a charge of powder and a bullet, and with rim, pin, or central fire ignition, the diameter varying from ·230 of an inch upwards.

CARTRIDGE-PAPER, a light-colored strong paper, originally manufactured for soldiers' Cartridges (q. v.), is extensively used in art, its rough surface being useful for certain kinds of drawing.

CARTWRIGHT, Edmund, celebrated on account of his invention of the power-loom, was born April 24, 1743, at Marnham, Nottinghamshire. Educated at Oxford, he obtained a living in the English Church, and devoted himself exclusively to his ministerial duties and to literature, until a casual conversation, in 1784, directed his attention to machinery, and in 1785, he exhibited his first Power-loom (q. v.) in action, an ingenious though very rude machine; upon which, however, he subsequently effected improvements rendering it almost perfect. Its introduction was vehemently opposed, and a mill fitted up with 500 of his looms was ignorantly and maliciously burned down. C., in 1790, took out a patent for combing wool, and secured patents for various other improvements in connection with manufactures. But his patents yielded him little return, and in 1809, government, in consideration of his inventions, granted him £10,000. C. was the author of a legendary poem, entitled *Arminia and Elvira*, and other poetical pieces. He died October 1823.

CARTWRIGHT, Thomas, a distinguished Puritan divine of the 16th c., was born in Hertfordshire about 1535. He studied at Cambridge, where, in 1570, he was chosen Margaret Divinity professor. His lectures here were too honestly critical of the polity of the church to be acceptable to the chief authorities, who deprived him of his professorship, and subsequently of his fellowship. C. traveled on the continent, and made the friendship of such men as Beza, who, in a letter concerning him, says, 'I think the sun doth not see a more learned man.' On his return to England, he again became embroiled with the church and the government, and for his nonconformity suffered imprisonment several times. He died December 1603. He wrote *A Confutation of the Rhemish Translation, Glosses, and Annotations on the New Testament*.

CARUS, Karl Gust., a German scholar, physiologist, physician, and artist, was born at Leipsic, 3d January 1789. He first attracted notice by a series of lectures on comparative anatomy, delivered, in his native city about the year 1812. After having superintended, during the war of 1813, the French hospital at Pfaffendorf, he went to Dresden, where he was appointed professor of midwifery in the newly organized medico-chirurgical academy; but resigned his office when elected court physician and councillor of state. His house was the rendezvous of all the most distinguished savans and artists in Dresden. C. wrote a vast variety of works, some of which are marked by original and striking views, as, for instance, *Ueber den Kreislauf des Blutes der Insecten*, in which he demonstrates the circulation of the blood in insects. He died in July 1869.

CA'RVEL-BUILT. The difference between the *carvel* and the *clincher* methods of arranging the outer planks in ship and boat building is explained under Clincher-built.

CARVIN-EPINOY, a town of France, dep. of Pas-de-Calais, 11 miles south-south-east of Lille, and about the same distance by railway. There are manufactures of beet-root sugar, starch, earthenware, and leather. Pop. (1876) 6167.

CARVING, a subordinate branch of sculpture, is usually performed on ivory or wood. Ivory was the favorite material for this purpose in the east from an early period. Among the Babylonians, who likewise practised gem-engraving to a great extent, carved heads or staves were executed in vast quantities, as every Babylonian carried a staff and a signet-ring. During the palmy days of Grecian art, ivory was largely employed; the nude portion of the colossal statues of the gods being composed of some solid material overlaid with plates of ivory, while the remaining portions were of plate gold. At a later period, ivory was chiefly employed in small works, usually of a decorative character. During the earliest period, statues of the gods were generally of wood, painted, gilt, or draped with colored robes, different kinds of wood being appropriated to different divinities. Carvings in ivory form an important branch of early Christian sculpture. Among the most curious of these are the ivory tablets adorned on the outside with low-reliefs, and in the inside coated with wax for the purpose of writing upon. The chair inlaid with ivory that belonged to Archbishop Maximilian in the cathedral at Ravenna, is of this period (546—555). In the year 803, Charlemagne received two richly carved doors as a present from Constantinople, but works of the same kind were executed at a much earlier period. Towards the end of the middle ages, the art of carving in wood was brought to a high degree of perfection in Germany. Altars were adorned with carvings of this material, often of large size, and with numerous figures; in general, the nude portions were carefully and tastefully colored after nature, and the draperies gilt. Specimens are to be seen in the churches at Altenberg, Erfurt, Prague, and in some churches in Pomerania. The finest and most perfect specimens are a series of reliefs relating to the doctrine of transubstantiation in the church of Tribsees. Many of the Belgian churches also possess very beautiful examples of wood-carving. Michael Wohlgemuth of Nuremberg, and after him Veit Stoss, were eminent carvers in wood. The wood-carving on the great altar of the cathedral at Schleswig by Hans Bruggemann belongs to the beginning of the 16th century. Many graceful specimens of wood-carving, on a smaller scale, belonging to this period, are to be seen in museums.

Nuremberg was celebrated for its wood-carvings; but only a few of the many works ascribed to him can be assigned with certainty to Albert Dürer. Portrait medallions, usually cut in box, were much in vogue during the early part of the 16th century. The first artist in this line was Hans Schwartz of Augsburg. During the 17th and 18th centuries, we find ivory again extensively employed in crucifixes, crosses, and goblets, with relief representations. The most eminent artist is Franz de Quesnoy.

CARY, Rev. Henry Francis, known for his admirable translation of Dante, was born at Birmingham in 1772. At Oxford, where he entered Christ Church as a commoner in 1790, he was early distinguished as a classical scholar, and also for his knowledge of Italian, French, and English literature. In 1805 he translated Dante's *Inferno*, and in 1814 the whole of the *Divina Commedia*, a translation remarkable not only for its accuracy but for its expressiveness and force. He afterwards translated Pindar's *Odes* and Aristophanes's *Birds*, and wrote a series of memoirs, in continuation of Dr. Johnson's *Lives of the Poets*. For some years he held the appointment of assistant-librarian in the British Museum, and died in 1844. A memoir by his son was published in 1847.

CARY, Sir Robert, son of Henry Cary, Lord Hunsdon, was born in 1559 or 1560, and rose to eminence in the civil service of Queen Elizabeth. For a number of years, he acted as English warden on the marches. As a courtier, he was present at the death of Elizabeth, 1603, and expeditiously rode on horseback to Edinburgh to communicate the intelligence to her successor, James VI. At the coronation of Charles I., he was elevated to the peerage as Earl of Monmouth. At his death without male issue

the earldom became extinct. Sir Robert Cary wrote his *Memoirs* (Edin. 1808), a work interesting chiefly from notices connected with Border history.

CA'RYA. See HICKORY.

CARYA'TIDES (pl. of *Caryatis*, literally, a woman of Caryæ), a name given to female figures, in Greek architecture, when applied instead of columns to support a roof. The traditional account of the origin of the name is, that the inhabitants of Caryæ, a city in Arcadia, having joined the Persians after the battle of Thermopylæ, the Greeks, after their victory over the Persians, destroyed the town, slew the men, and carried the women into captivity.

Caryatis:
From ruins in the Villa Strozzi, on the Appian Road—height, 7 feet 10 inches.

As male figures representing Persians were used for this purpose, it occured to Praxiteles, and other Athenian artists, that female Caryatæ, in their national costume, might be thus employed to commemorate the disgrace of their country. Lessing, and various other writers, have treated this account as fabulous; but it seems to be confirmed by a bas-relief preserved at Naples, in which two female figures are represented in the attitude of C., and which has a Greek inscription mentioning the conquest of Caryæ. Male figures used for the same purpose are called Atlantes (q. v.).

CARYO'CAR, a genus of large trees of the natural order *Rhizobolaceæ*, and almost constituting the whole order. They are all natives of Guiana and Brazil, and are sometimes called *Pekea* trees. They yield good timber for ship-building, and produce the delicious nuts, now not uncommon in the London market, called *Butter nuts* or *Souari nuts*. The fruit is a sort of drupe, containing several combined nuts. The fleshy part of the drupe consists of a butter-like substance, which melts between the fingers, and is used in cookery instead of butter, on which account these trees are sometimes called *butter-trees*. It forms merely a thin covering for the nuts, the bristles on the outer surface of which, in some of the species, sting like the hairs of the nettle, and are very troublesome to those who open them. The kernels are remarkably soft. An oil is extracted from them which is scarcely inferior to olive oil. *C. nuciferum* is now cultivated in the island of Saint Vincent; but *C. butyrosum*, *C. glabrum*, *C. tomentosum*, and other species appear equally worthy of attention.

CARYOPHYLLA'CEÆ, a natural order of exogenous plants, containing upwards of 1000 known species, mostly herbaceous plants, a few half shrubby. The stems are tumid at the articulations; the leaves always opposite and entire, often uniting around the stem. The flowers are regular; the calyx persistent, of 4—5 sepals, either free or united into a tube; the corolla of 4—5 petals, which are frequently bifid, and generally terminate in a claw at the base, sometimes wanting; the stamens as many, or twice as many, as the petals; the ovary of 2—5 carpels; the stigmas sessile; the fruit is a one-celled capsule, with central placenta, to which the seeds are attached.—The plants of this order are mostly natives of temperate and cold countries; some of them are only found on tropical mountains, near the limits of perpetual snow. Most of them are inconspicuous weeds; some produce beautiful flowers; almost all are insipid and inert; a few contain *saponine*, and afford a substitute for soap. See SOAPWORT. To this order belong the Pink, Carnation, Sweet William, Lychnis, Chickweed, &c.

CARYOPHYLLUS. See CLOVES, MYRTACEÆ.

CARYO'PSIS, in Botany, a fruit in which the seed and pericarp are so incorporated as to be inseparable, and even undistinguishable. The grain or fruit of grasses, as Wheat, Barley, Rye, Maize, &c., is a caryopsis.

CARYO'TA, a genus of palms, natives of the East Indies, one of which, *C. urens*, remarkable for the acridity of its fruit, which produces a burning sensation when its pulp is applied to the skin, is also highly valuable for the great quantity of juice (*toddy*) which flows from its wounded spathes, sometimes, in the hot season, to the amount of 100 pints in twenty-four hours from a single tree. Sugar (*jaggery*) is made from this juice by boiling it down, and on this account this palm is sometimes called the Jaggery palm. The pith of old trees, or farinaceous part of the trunk, is also much used for food, and is said to be equal to the best sago. The outer part of the stem is very hard, and applicable to many purposes. The fibres of the leaf-stalks are made into ropes, which are very strong and durable; the leaf-stalks, merely stripped of the leaflets, are used as fishing-rods, being light, tapering, and elastic; and the woolly substance found at their base is sometimes used for caulking ships. This palm is found both in India and Ceylon, and abounds chiefly in mountainous districts. It rises to a height of 60 feet, with a trunk of a foot in diameter, and a magnificent spreading head of great double pinnate leaves, and triangular leaflets, the apex of the triangle being their point of attachment.

CASACALE'NDA, a town of Italy, in the province of Campobasso, 17 miles north-east of Campobasso, on the site of the ancient Calela. Fruits and wine of good quality are produced in the district, where silk-worms are also reared. Pop. 5900.

CASA'LÉ, a city of N. Italy, province of Alessandria, situated on the right bank of the Po, which is here crossed by an iron bridge, 38 miles E.N.E. of Turin. It is a place of considerable antiquity, and occupies the site of a more ancient town. Many Roman remains are found, and coins of the early ages of the republic. It has a cathedral, dating from the 8th c., with valuable archives. The old citadel, founded in 1590, was one of the strongest in Italy, and within recent years the fortifications have been greatly strengthened and extended. During the Italian campaign of 1859, C. was occupied by divisions of the Sardinian army, and for a short time formed the head-quarters of the French emperor. It has manufactures of silk-twist, and a trade in the produce of the district, which is very fertile. Pop. (1871) 20,436. C. formerly gave its name to a province which had an area of about 350 square miles, and a population of about 143,000.

CASA'L-MAGGIO'RÉ, a town of N. Italy, province of Cremona, on the left bank of the Po, 22 miles east-south-east of Cremona. Being subject to frequent inundations from the river, strong embankments have been constructed for its protection. It has manufactures of earthenware, leather, glass, &c. Pop. 5000.

CASA'L-PUSTERLE'NGO, a town of N. Italy, province of Milan, 12 miles south-east of Lodi, on the road to Cremona. It has manufactures of silk fabrics, linen, and earthenware, and an extensive trade in Parmesan cheese, which is here manufactured of the best quality. Pop. 5600.

CASAMA'SSIMA, a town of Italy, in the province of Bari, 14 miles south-east of the city of that name. It has a convent and two abbeys, and the vicinity produces wine and almonds. Pop. 6600.

CASANO'VA, FRANCIS, a celebrated painter of battles and landscapes, was born in London, of Venetian parents, 1732. Educated in Italy, he afterwards went to Paris, from which he was driven by the severe criticism of Diderot. C. then took up his abode in Dresden, where he painted chiefly battle-pieces, and by one of his greatest works gained a place in the Academy. He afterwards went to Vienna, and painted for the Empress Catharine her victory over the Turks. He died at Briel, near Vienna, 1805. The execution, and especially the coloring of his works, are excellent.

CASANOVA DE SEINGALT, GIOVANNI JACOPO, a notable adventurer of the Cagliostro species, was born, 1725, in Venice, and studied in Padua, afterwards in Venice, intending to enter the church. Having been expelled for sufficient reasons from a seminary of priests, he traveled to Naples, visited Rome, and after many adventures, arrived in Constantinople. On his return to Venice in 1745, he supported himself for a time by his skill as a violinist, until he gained some celebrity by curing a senator who had been attacked by apoplexy. His irregularities again drove him from Venice. He now wandered about some time among the chief cities in the north of Italy, Milan, Mantua, Verona, Ferrara, Bologna, Parma, &c., but in 1750 he proceeded to Paris, where he was patronized by the nobility, and became acquainted with several eminent authors. It is needless to mention in detail his endless, inexplicable peregrinations. He visited almost every European capital, was somehow introduced to the best company, invariably excited the disgust or ill-will of those who knew him, and had always to 'vanish' after a brief period of enjoyment. In 1761, we find him distinctly professing the miraculous after the Cagliostro fashion: he having undertaken to regenerate old Madame D'Urfé, into a young man—for a consideration! He died in Bohemia in 1803. His celebrated memoirs, *Mémoires écrits par Lui-même* (12 vols., Leip. 1826—1838), contain many interesting notices of the manners of his times, intermixed with details of his personal adventures.

CASAREEP, or CASSIRIPE, a sauce or condiment made from the juice of the Bitter Cassava or Manioc root. It is in the highest esteem in Guiana, where it is employed to flavor almost every dish; and it is the basis of the favorite West Indian dish called *pepper-pot*. It is a powerful antiseptic, and meat can by means of it be kept for a long time quite fresh, even in a tropical climate. It is made by evaporating and concentrating the juice, which is also mixed with various aromatics. The poisonous principle of the juice is dissipated in the evaporation, so that although the juice in a fresh state is readily fatal to life, the C. is perfectly safe

and wholesome. C. is imported into Holland and Britain, and remains unimpaired in quality for several years.

CASAUBON, ISAAC DE, a great scholar and critic, was born February 8, 1559, at Geneva, where, in 1582, he was appointed professor of the Greek language. Subsequently he held professorships at Montpellier, 1596, and at Paris 1598, but the death of Henry IV. rendered his position (C. being a Protestant) very insecure, and he therefore gladly accepted the offer of Sir Henry Wotton to visit England. King James received him with distinction, and appointed him sometime after prebendary of Canterbury and Westminster. He died in London, July 1, 1614. His acute investigation and criticism were applied to several branches of archæology and theology. Among his chief works may be mentioned the able dissertation, *De Satirica Græcorum Poësi et Romanorum Satira* (1605), the treatise *De Libertate Ecclesiastica* (1607), and the *Exercitationes contra Baronium* (1614), a confutation of Cardinal Baronius. His critical and exegetical works include editions of Diogenes Laertius, Aristotle, Theophrastus, Suetonius, Persius, Polybius, Theocritus, Strabo, &c.—See *Isaac Casaubon*, by Mark Pattison (1875).

His son, MERIC CASAUBON, was born at Geneva, 14th August 1599; educated first at Sedan, he accompanied his father to England, and entered Christ Church College, Oxford, where he took his degree of M.A. in 1621. He was appointed rector of Ickham, near Canterbury, 1628, and afterwards professor of theology at Oxford. He died at Oxford, July 14, 1671. His attachment to Charles I. deprived him of all his preferments during the Commonwealth, but at the Restoration he received them again. Meric was, like his father, distinguished for his erudition; edited the works of Marcus Aurelius Antoninus, Terence, Epictetus, &c.; and wrote a treatise, *De Enthusiasmo* (Lond. 1655).

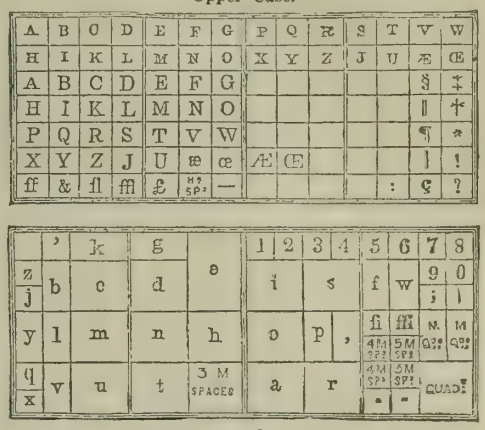
CA'SBIN, or KAZVIN, a town of Persia, in the province of Irak-Ajemi, 90 miles west-north-west of Teheran. It is situated on an extensive plain of the same name, and is enclosed by walls. Before the time of Shah Abbas the Great, C. was for a brief period the capital of Persia. The plain affords good pasturage, and in the vicinity of the town are extensive vineyards and orchards. The town is very extensive, but a great part of it is now in ruins, owing to its frequent subjection to earthquakes; and the population, which at one time was estimated at 200,000, is now probably not so much as a fifth of that number. Some velvets, brocades, and coarse cotton cloth are manufactured; and C. has also a considerable trade in raw silk, rice, &c.

CASCARI'LLA, (i. e., little bark, from Span. *cascara*, bark), the name given in South America to many different kinds of bitter medicinal barks which form articles of commerce. Peruvian bark itself bears no other name in the districts which produce it; and the name C. has recently been introduced in botany for a subdivision of the genus *Cinchona* (q. v.). By European physicians and apothecaries, the name C. Bark (*cortex cascarillæ*) is given to the bark of the *Croton Eleutheria* (see CROTON), a small tree, a native of the West Indies, where it is known as the *Sweet-wood* and the *Sea-side Balsam*. It is imported in considerable quantities into Europe from the Bahama Island, and appears in commerce in small thin fragments and in quills. It is sometimes employed as a substitute for cinchona, although inferior in tonic and febrifuge qualities. It is a favorite medicine in Germany.—The barks of a number of other species of *Croton* appear to possess properties similar to those of C. Bark.

CASE, in Grammar. See DECLENSION.

CASE, in legal phraseology, though often used as synonymous with Cause, has, both in the law of England and Scotland, separate though not always very definite meanings. A formal written argument, prepared with a view to obtaining the opinion of a court of law, is called a case. By 15 and 16 Vict. c. 86, s. 61, the practice theretofore prevailing in the Court of Chancery of directing cases for a court of common law, is abolished. In Scotland, cases were formerly resorted to in almost every suit of intricacy and difficulty; but the abuse which arose from this practice has been remedied by 13 and 14 Vict. c. 36, s. 14. The statements which are laid before the House of Lords in appeals from Scotland, are cases in the sense now indicated.—In Scotland and Ireland, as in England, questions in dispute can now be stated for the opinion of courts without the usual formality of pleadings, and decided more quickly.

CASE, in Letter-press Printing, a receptacle for types, generally made 34 inches long, 15 inches broad, and 1¾ inch deep, and divided into compartments or 'boxes,' each of which contains types of one class or letter. A pair of cases consists of an upper and a lower case: the upper one has 98 'boxes,' and contains the capitals, small capitals, and some other letters that are only occasionally required in composition; the lower one has 53 'boxes,' and holds the letters of the small character, figures, spaces, and most of the points. The places assigned to the several letters of the alphabet in the boxes of the case are not precisely the same in all printing-offices, but the differences are few. The accompanying illustration shows a prevalent arrangement. When in use, the cases lie on a frame four feet high, and the compositor stands in front of them. The different sizes of the boxes in the lower case depend upon the comparative frequency in which the several letters occur in composition, and the position in the case allotted to each letter is such as to afford the greatest facility in



composing. The letter *e*, which is most run upon in the English language, has a box much larger than any of the other compartments, and is placed directly in front of the compositor. In the upper case, the boxes are of uniform size, and the letters are placed in alphabetical order, the comparatively rare occurrence of capitals rendering it immaterial which letter is nearest the compositor's hand. A case will hold a quantity of 'letter' more than sufficient to 'set up' a page and a half of this work, which is equal to 15,000 types.

CASE-HARDENING is the process of converting the surface of certain kinds of malleable-iron goods into steel, thereby making them harder, less liable to rust, and capable of taking on a better polish. Fire-irons, portions of fine grate-fronts, gunlocks, and other articles of limited size, are very commonly so treated, but the process is sometimes applied to large objects, such as iron railway-bars. The articles are first formed of bar iron, and being heated to redness, are sprinkled with a little powdered yellow prussiate of potash, and heated again. The result is, that the heat decomposes the prussiate of potash, and the liberated carbon combines with the iron, forming a coating of steel on the surface of the articles. Another mode of C. is to heat the articles along with some animal matter, such as the parings of horns and a little common salt, from one-half to several hours; the articles are then cooled in cold water, or, in oil, when they are of a delicate nature. Charcoal alone is also employed. The coating of steel is very thin, seldom exceeding $\frac{1}{16}$th of an inch. Where it is wanted to be thicker, the articles are treated several times. A Swedish ironmaster has found that a very excellent case-hardening is obtained by treating iron objects with a mixture of animal matter and arsenious acid dissolved in hydrochloric acid, and heating as usual.

CA'SEINE, or CASEUM, is an organic compound allied to albumen (q. v.), found in the milk of the mammalia, and in peas, beans, and other leguminous seeds, when it receives the name of LEGUMIN. The proportion of C. in milk (q. v.) varies, but averages about 3 per cent., and it may be coagulated and separated therefrom by the addition of a little rennet (q. v.), as in the manufacture of cheese (q. v.), or by the employment of a few drops of a mineral acid, such as dilute sulphuric acid. In either case, the C. separates as *curd*, which still retains attached to it some oil and earthy salts, though the greater portion of these substances, along with the sugar, remain in the watery liquid or *whey*. The elementary bodies which enter into the composition of C., and the proportion in which these are present in 100 parts are—carbon, 53·83; hydrogen, 7·15; nitrogen, 15·65; oxygen, 22·52; and sulphur, 0·85. The properties of C. are, that it is not coagulated by heat, as is well evidenced in the heating of milk, but is coagulated on the addition of rennet; sulphuric, hydrochloric, or nitric acids; alcohol, creasote, or infusion of galls, but not by acetic acid. It also forms insoluble precipitates with solutions of the poisonous salts, acetate of lead, nitrate of silver, and bichloride of mercury (corrosive sublimate), and hence the efficacy of taking large doses of milk in cases of poisoning by those deadly salts, as the C. in

the milk, forming an insoluble compound with the poison, keeps it from exerting its deadly powers.

The form of C. obtained from plants, and termed legumin, is generally procured from leguminous seeds, like peas or beans, though it can also be extracted from the majority of vegetable substances, especially from sweet and bitter almonds, and even from tea and coffee. Dried peas contain a fourth of their weight of legumin, and this can be extracted by bruising the peas to powder, and digesting in warm water for two or three hours. The liquid is then strained through cloth, which retains the insoluble matters, and allows the water with the legumin dissolved therein, and with starch mechanically suspended, to pass through. On settling, the starch falls to the bottom of the vessel, and the clear liquid holding the legumin in solution, on the addition of a small amount of acetic acid, yields a precipitate of legumin or vegetable caseine. So perfectly does the vegetable C. resemble the C. from milk, that the one can hardly be distinguished from the other by chemical tests or by taste; and at the present time there is regularly prepared in various parts of China, especially near Canton, a form of cheese from peas, which is sold to the populace in the streets of Canton under the name of *Taofoo*. C. is a most important article of food. See NUTRITION.

CA'SEMATE, originally a loopholed gallery excavated in a bastion, from which the garrison could do execution upon an enemy who had obtained possession of the ditch, without risk of loss to themselves. Hence the designation, from Span. *casa*, house, and *matar*, to kill. As defence from shells became more important, the term was subsequently applied to a bomb-proof vault in a fortress, for the security of the defenders, without direct reference to the annoyance of the enemy. A *casemated* battery consists of such a vault or vaults, with openings for the guns. A C. may also serve for barracks, or for an hospital, or for a store-house. The great want of ventillation in casemates renders them bad places for barracks; and the artillerymen are nearly stifled with smoke when firing from such confined places.

CA'SEMENT (It. *casamento*, a large house), a frame with hinges to open and shut, enclosing part of the glazing of a window. Windows of this description are rare in this country, but are almost universal on the continent. Also a name for a deep hollow, circular moulding, similar to the *scotia* of classical and *cavetto* of Italian architecture. The C. is very prevalent in the perpendicular style of Gothic architecture, and is sometimes enriched with running foliage.

CA'SERNE is a barrack or building for the accommodation of the soldiers forming the garrison of a fortified town or post.

CASE'RTA, a town of Italy, in the province of the same name, is situated on a plain about 17 miles N.E. of Naples. It is chiefly remarkable on account of its magnificent palace, one of the finest in Europe, and formerly the frequent residence of the Neapolitan court. During 1860, C. acquired celebrity as the head-quarters of Garibaldi and his army. A royal silk manufactory has been established in the neighborhood. Population, with the adjoining hamlets, (1872) 29,142.

CA'SE-SHOT, or CANISTER-SHOT, is an assemblage of bullets or small balls, enclosed in a cylindrical case or canister. The diameter of this canister is a little less than the bore of the gun from which it is to be discharged. According to the size of the canister, the balls vary from 1 lb. to ½ oz. each, from 30 to 280 in number, and from 3½ lbs. to 85 lbs. in total weight. The canister bursts immediately on leaving the gun, and the balls spread out into an irregular sort of cone. Within a range of 500 yards, they work great execution among troops; they are generally used at 200 or 300 yards.

In a more modern and effective kind, called *spherical case*, the bullets are enclosed, along with a charge of powder, in an iron shell, instead of a tin canister. It is often called *shrapnel shell*, from the name of its inventor. A spherical case-shot for a 68-lb. carronnade, or for an 8-inch howitzer, contains 337 balls; for a 24-pounder gun, 128; and for an 18-pounder, 90. It is exploded by a fuse, the length of which depends on the distance of the point where the destructive effect is to be wrought. Its effect is something like that of a prolonged musket-fire. The shrapnel shell is not of much use against the hull of a ship; but it is very destructive against masses of men on shore, or on the decks of a ship, with a greater range than that of ordinary canister. Artillerymen prefer just such an amount of charge as will burst the sphere, without scattering the balls very widely.

CASH (Fr. *caisse*, a chest for containing money) is sometimes used as synonymous with money, as distinguished from produce, in which sense it includes all immediately negotiable paper—bills, drafts, and bonds, as well as coin and bank-notes. At other times, it is used, in a limited sense, to denote coin and bank-notes, as distinguished from negotiable instruments which pass by indorsation.

CASH ACCOU'NT, or CASH CREDIT, a form of account with a bank, by which a person is entitled to draw out sums as required by way of loan to a stipulated amount. The practice began about 1729 in Scotland, with the banks of which country it is still peculiarly identified; but it is not unknown elsewhere, though on a somewhat different plan. In connection with the Scotch banks, the C. A. system is placed on a distinct and secure basis, which we shall briefly describe. The persons procuring a credit of this kind are for the most part retail-dealers, tradesmen, and farmers, who possess a limited capital, and need occasional loans.

Instead of borrowing money by bills or mortgages, they apply to a bank for a C. A. to the extent, it may be, of £500. In the origin of the system, the bank may be said to have been influenced by three considerations—first, the necessity for making advantageous use of its capital; second, the desire to extend its issues of small notes; and third, the nature of the security offered. Since Sir Robert Peel's act restricting circulation of notes, the second of these reasons no longer operates; for the banks are now much above their authorized issue, and must hold an equal amount of coin against the surplus. What the bank particularly wants, is a customer who will be constantly depositing sums in notes of other banks, and drawing out sums in its own notes. The C. A. system aids this process. It secures a customer who will be frequently operating on his account, according to the exigencies of his business, and whose overdraughts, as well as deposits, tend to benefit the concern. Obviously, for the Debtor, the system works more advantageously than when a fixed sum is borrowed, for in that case interest would run on for the whole amount, whereas by a C. A. the trader merely draws what he requires; and by paying in his surplus money in small sums, he is charged with interest only on the sum actually at his debit from day to day. In negotiating a C. A., a bond is prepared by the bank stating the amount and the nature of the security, the cost of which is borne by the borrower. Banks often, in security, accept heritable property and policies of life insurance, but more commonly two persons in good credit become cautioners, or co-obligants along with the principal. Unless the liability of the cautioners respectively be expressly limited in the bond, each is liable for the whole amount. If the bank liberates one cautioner without the consent of the other, it loses its recourse. This recourse is not lost by accepting a dividend from the sequestrated (bankrupt) estate of a principal or cautioner; but it will be lost by accepting a composition from either of these persons without consent of the other. The bank can at any time stop the credit, and call for payment of the balance due. A cautioner can at any time withdraw his name from the credit, on paying up the balance, and the bank is bound to assign the debt to him. While cash accounts may be of great service to traders who act upon them discreetly, it is found that, in too many instances, these accounts are used as a dead-loan to the entire amount stipulated for; and for this, as well as a reason above assigned, banks care now very much less for this kind of business than formerly. Properly, traders are to look on the money procured on cash credits not as an addition to capital, but merely a temporary substitute for current business purposes while the capital is out with customers, and to be replaced accordingly until again required. It may be added, that the progress of commercial wealth in Scotland, now greatly lessens the necessity for having recourse to the C. A. system. See MARGINAL CREDIT.

CA'SHEL, a town of Ireland, in Tipperary county, and 105 miles south-west of Dublin by rail. It is irregularly built on the south and east slopes of an isolated height, rising abruptly from a rich and extensive plain. Pop. (1871) 4562. C. is a bishop's see, and returns one member to parliament. The ancient kings of Munster resided here. The top of the height, or 'Rock of Cashel,' is occupied by an assemblage of the most interesting ruins in Ireland, which have a grand effect from the country around. The ruins consist of a cathedral, the largest and most remarkable in the country, founded 1169, burned 1495, and afterwards repaired; a stone-roofed chapel, built 1127 by Cormac MacCarthy, king of Munster, and the most perfect specimen of the kind in the country; Hore Abbey, founded 1260; the palace of the Munster kings; and a round tower, 90 feet high and 56 in circumference. The round tower is built of freestone, but the other ruins of limestone. At C., in 1172, the great synod was held in which the Irish prelates first acknowledged the authority of the English king and church.

CASHEW' NUT (*Anacardium occidentale*), a tree of the natural order *Anacardiaceæ*, a native probably of the tropical parts of both hemispheres, although it has been commonly regarded as of American origin. It is a spreading tree of no great height. It abounds in a clammy, milky juice, which turns black on exposure to the air, and is used in India for varnishing, but is so acrid as to produce painful inflammation when it comes in contact with the skin

of some persons, or when they are exposed to its fumes. Others are comparatively unsusceptible of its influence. The fruit of this tree is a kidney-shaped nut, about an inch long, seated on the thicker end of a pear-shaped fleshy stalk, from which the botanical character of the genus is derived. The shell is double, the outer shell being ash-colored, and very smooth; and between it and the inner is a layer of very cautic black juice. The kernal is oily, and very pleasant and wholesome, and is in common use as an article of food in tropical countries, being made into puddings, roasted, and in various ways prepared for the table.

Cashew Nut (*Anacardium occidentale*).

In the West Indies, it is put into wine, particularly old Madeira wine, to which it is thought to communicate a peculiarly agreeable flavor, and for this use it is sometimes imported into Britain.

It is also for the same reason sometimes an ingredient in chocolate. Yet the vapor which arises from it in roasting, but which is derived from the coating of the kernel, and not from the kernel itself, is so acrid as to cause erysipelas and other painful affections of the face in those who conduct the process, unless great caution is used.—The fleshy stalk, sometimes called the *Cashew Apple*, varies in size, being sometimes not much larger than a cherry, and sometimes as large as an orange, and is white, yellow, or red. It is perfectly free of the acridity characteristic of the natural order, is acid and eatable, very pleasant and refreshing, and much used by the inhabitants of the countries in which the tree grows. A very pleasant vinous liquor is obtained from it by fermentation; and this by distillation yields a spirituous liquor, highly esteemed for its flavor. A gum which exudes from the bark of the tree, quite distinct from the milky juice already mentioned, is bland, and very similar to gum-arabic.

CASHGA'R, or KASHGAR, the political capital of Eastern Turkestan, of which khanate—independent of China from 1865 till 1878—Yarkand is the commercial capital. C. stands 140 m. N.W. of Yarkand, in lat. 39° 25′ N., long. 73° 57′ E. It is surrounded by an earthen rampart, pierced with four gates, and is strongly garrisoned. It has manufactures of cotton, gold and silver cloths, carpets, &c.; and an extensive trade with Central Asia. Pop. estimated at 80,000. C. lies in a rich valley, irrigated by one of the head streams of the river Tarim; its houses are mostly built of clay. The city is said to have been an important commercial town before the Christian era. See TURKESTAN.

CASHIE'RING is a punishment for officers in the army and navy. It is a severe form of dismissal from the sovereign's service, and implies that the officer, by some disgraceful conduct, has deserved not only dismissal, but disqualification for ever again entering the service. Sometimes there are words added, implying still deeper ignominy and degradation. On some rare occasions, when a court-martial has awarded C., the commander-in-chief has mitigated the punishment to simple dismissal. 'Scandalous and infamous conduct,' and 'Conduct unbecoming the character of an officer and a gentleman,' mark two degrees of offence which may lead, the one to C., the other to dismissal.

CASHME'RE, a valley of the Himalaya, between India Proper and Middle Tibet, stretching between lat. 33° 15′ and 34° 35′ N., and long. 74° 10′ and 75° 40′ E. Its bottom, a comparativelevel of about 2000 square miles, is about 5500 feet above the sea; while the enclosure, as a whole, from ridge to ridge, besides fully doubling the area, attains, at some points, nearly thrice the altitude. The mountain-wall of this secluded region presents but few passes, and most of these too lofty to be practicable in winter. In fact, the Baramula itself does not admit a wheeled vehicle. Through this single opening, situated at the south-west, the Jhelum carries down towards the Punjab the gathered streams and lakes of the entire basin, and is navigable for the last 70 miles of its course. This net-work of waters, without swelling into inundations, affords everywhere a perennial supply for the purpose of irrigation. Besides the copious rains of spring, the snows of winter covering even the plains to a depth of two feet for four months, accumulate, in every gorge and on every declivity, reservoir above reservoir, against the demands of summer. C. is traditionally believed to have been a vast upland lake, and alluvial deposits beyond the reach of existing influences would seem to confirm the idea.

In regard to climate, moderate but steady frost prevails from November to March; and again, the heat, ranging from 75° F. in June, to 85° in August, is often disproportionately oppressive, through the stagnation of the landlocked atmosphere. The staple production is rice, which, from the singular facilities of irrigation, is an all but sure crop, yielding, even in a tolerable season, 30 or 40 returns; and in the abundance and excellence of its fruits, C. is said to surpass all the rest of the world. The valley is, in general, considered to be remarkably healthy. The inhabitants, almost universally held to be models of strength and beauty, have suffered much from famine and pestilence. The famine of 1878–79 was very severe, producing terrible mortality and distress beyond description. The people are mostly Mohammedans, divided between the Sunnite and Shiite sects. The manufactures—all superior of their kind—are shawls, leather, firearms, and attar of roses. The principal towns are Serinagur, Islamabad, Shupayon, Pampur, and Baramula. The history goes back, through colossal monuments chiefly of marble, beyond the dawn of authentic annals. In 1315, C. first received Mohammedanism; in 1586, it was annexed to the Mogul empire; in 1752, it fell under the power of the Afghans; and in 1819, it was subjugated by the Sikhs. Lastly, being ceded, at the close of the first war of the Punjab, to the British, it was by them transferred to Gholab Sing, as the nucleus of a state of its own name, which comprised also Jamu, Bulti, Ladakh, Chamba, &c. Area of principality, 68,944 sq. miles; pop. 1,500,000.—C. or Srinagar, the capital, lies on the Jhelum, about the center of the valley. Pop. 15,000. See Bellew's *Kasmir and Kashgar* (1875).

CASHMERE GOAT, a variety of the common goat, remarkable for its very long, fine, and silky hair, from which the highly valued Cashmere shawls are made. It is not so much in Cashmere that this variety of goat is to be found, as in Tibet, from which

Cashmere Goat.

the finest goat-hair is imported into Cashmere, to be there manufactured into shawls. The hair is even longer than that of the Angora goat, and not, like it, curled into ringlets, but straight. It is about eighteen inches long. A single goat does not yield more than three ounces, and the fleeces of ten goats are requisite for the manufacture of a shawl a yard and a half square. The hair is spun by women, and dyed after it is spun. It is said that 16,000 looms are kept in constant employment in Cashmere, producing annually about 30,000 shawls. The shawls are woven in rudely constructed looms, a pair of shawls sometimes occupying three or four men a whole year in weaving. C. shawls of the finest quality, are sold in London at from £100 to £400 each. Plain shawls are simply woven in the loom, but those with variegated patterns are worked with wooden needles, a separate needle being used for each color. These shawls are in the highest request in India; but the hair of several other breeds of goat inferior to that of Tibet is employed for the manufacture of shawls called by the same name. Imitations of these are manufactured in France rather extensively, some from the Tibet wool entirely, and others of a mixture of this with silk and cotton. It is said that 24 pounds of the best Tibetan goat-hair sell in Cashmere for 20 rupees, or £10 sterling.

Attempts have been made to introduce the C. G. into Europe. Baron Alstrœmer attempted, in the end of last century, to naturalize it in Sweden; and a very spirited attempt to introduce it into Britain has recently been made by Mr. Towers. A mixed race, produced by crossing the C. G. and the Angora goat, has been found to possess most valuable qualities, the hair being long, fine, and more abundant than in any of the parent breeds.—The male of the C. G. has very large, flattened, wavy horns.

CA'SIA, or POET'S CASIA (*Osyris alba*), a shrub of the natural order *Santalaceæ*, a native of the south of Europe, 3-4 feet high, with linear-lanceolate deciduous leaves, long supple

branches, numerous small white flowers, and red drupes (stone-fruit) of the size of a pea. The branches are used for making crates. The shrub has been much admired for its modest beauty. Keats speaks of

'The drooping flowers
Of whitest casia, fresh from summer showers.'

CASIMIR, properly Kazimierz, was the name of many Polish princes and kings. With the establishment of the power of Casimir I. in 1040, the predominance of Christianity was decided in Poland. But the most distinguished of this name was Casimir III., called Casimir the Great, who succeeded his father, Vladislaus Loketek, as king of Poland in 1333. He added Little Russia and Red Russia to his dominions; repelled the Tatars, who then threatened Poland; and waged successful war in Silesia, which he conquered but did not retain. He showed great anxiety for the advancement of the arts and of learning in his kingdom, and for the improvement of the condition of the most oppressed classes, which won him the title of King of the Peasants. A Jewish mistress obtained from him liberties for the Jews, which they have since retained in Poland. He died in consequence of the falling of his horse in 1370.

CASI'NO, an Italian diminutive of *casa*, a house, signifies a place for social reunions. The Italian nobles have long had casinos detached from the palaces, in which they live, whither they can retreat and enjoy themselves, and it is probable that the *public* casinos were the result of an attempt made by the middle classes to imitate their superiors. In Italy, a C. is generally close by a theater, and is a place where musical or dancing soirées are held, containing a conversation-room, billiard-room, and rooms for other kinds of amusement, as well as small apartments where refreshments may be had. Casinos are numerous in Italy and Germany, and have been introduced into England. In general, they are not supposed to exert an edifying influence on the community.

CASINO, or MONTE-CASINO, a mountain overhanging the town of San-Germano (the ancient Casinum), in the Italian province of Caserta, between fifty and sixty miles north-north-west of Naples, is celebrated on account of the monastery founded here by St. Benedict (q. v.) in 529 A.D. This monastery is remarkable for its noble architecture, its ancient wealth, its library and archives, and in modern times for the learning of its monks, who have a printing-press, from which several important works have issued. The beautiful situation of the abbey, and the reputation of the monks as masters of the healing art, formerly made Monte-Casino a favorite resort of pilgrims. Luigi Tosti the librarian of the abbey, has given an account of its literary treasures in his *Storia della Badia di Monte-Casino* (1841—1843), and a most valuable catalogue (1st vol., 1874; 2d, 1876) is in preparation.

CA'SOLI, a town of Italy, in the province of Chieti, situated on a hill 17 miles south of the city of Chieti. Pop. between 5000 and 6000.

CASO'RIA, a town of Italy, 5 miles north-north-east from Naples. Silk is produced in the district. Pop. 8000.

CA'SPÉ, a town of Spain, in the province of Saragossa, 57 miles south-south-east of the city of that name. It is situated near the Ebro, has manufactures of oil and soap, and a trade in the agricultural produce of the district. Pop. 7500.

CA'SPIAN SEA, an inland sea or great salt-lake, the largest in the world, on the boundary between Europe and Asia, extending from lat. 36° 40′ to 47° 20′ N., and long. 46° 50′ to 55° 10′ E. Its length from north to south is about 700 miles, and its average breadth about 200 miles. Its total area is estimated at 180,000 square miles. The coast-line is irregular, and on the east side especially there are several bays and indentations of coast, the principal being those of Mertvoi, Mangushlak, Kenderlinsk, Karabugos, and Balkan. From the west, the naphtha-impregnated peninsula of Apsheron stretches into the C. opposite the Balkan Gulf; Mount Caucasus also rises on its west side. On the south rises the lofty range of the Elburz Mountains, between which, however, and the coast, on this side almost unbroken, extends a low flat plain of from 15 to 20 miles in breadth. On the north it is bordered by great steppes, and the country eastward is a vast plain. It is probable that at one time its waters, which are said to be still diminishing, covered great part of the adjacent steppes. Some singular changes appear to take place in the level of the Caspian. Various measurements have made its depth and elevation different. One Russian measurement made it 348 feet below the level of the Black Sea, another only 84 feet. The latter is confirmed by Major Wood (*The Shores of Lake Aral*, 1876). It has no tides, but its navigation is dangerous because of violent storms, especially from the south-east, by which its waters are sometimes driven for many miles over the adjacent plains. The depth near the southern end is about 600 feet, and in some places near the center it attains a depth of nearly 3000 feet; but near the coast it is very shallow, seldom reaching a depth of more than 3 feet at 100 yards from the shore, and in many places a depth of 12 feet is not reached within several miles of the beach. On the north-east and east it is especially shallow. It receives the waters of a number of large rivers, of which the greatest is the Volga. The Ural, the Terek, the Kur, and the Atrek also fall into it. The water of the C. S. is salt, but much less so than that of the ocean. Its northern parts are covered with ice during winter. It abounds in fish, and very valuable fisheries are carried on, especially for sturgeon and salmon. By a canal uniting the head-waters of the Volga with the rivers Tvertza and Schlina, the C. is united with the Baltic Sea. The sea is now surrounded on three sides by Russian territory, the southern shore still remaining Persian. The Russians have a fleet stationed upon it, and the most of its commerce is in their hands. Steam-packets have been established on it.

The chief Russian town upon its shores is Astrakhan, less important are Derbend, Guriev, Baku, and Krasnoi-yar. Balfrush, Reshd, and Astrabad are Persian towns. The practicability of making the Amu-Daria (see OXUS), now running into the Sea of Aral, again an affluent of the C. S., has recently been much debated.

The C. S. was known to the Greeks and Romans. According to Strabo, it derived its name from the Caspii, a tribe inhabiting its western shores. The name Caspian was afterwards limited to the western portion of the lake—the eastern being designated the Hyrcanian Sea.

CASQUE. See HELMET.

CASS, LEWIS, an American statesman, born at Exeter, New Hampshire, in 1782. He was educated for the law, but quitting that profession, he entered the army in 1812, and rose rapidly to the rank of general, though his merit was not very conspicuous. In 1813, he was elected governor of Michigan, in which state he settled. During his governorship, he kept himself apart from party politics, yet all his measures had a decidedly democratic tendency. In 1831, C. was made minister at war under General Jackson, and in 1836 he was sent as plenipotentiary to Paris. In this capacity he made himself popular by his replies, in *Galiganni's Messenger*, to the attacks of the English press on the claims of the Union with regard to its north-east boundaries, and by his protest against the measures of Guizot; but the treaty concluded by Daniel Webster with Lord Ashburton was so much opposed to the views maintained by C., that he resigned his post, and in 1843 returned to America, where he was received with marks of popular favor. He now aimed at the presidency, and in 1844 was put in nomination, but was defeated, as also in 1848, when he made another effort to obtain the supreme power. In 1857 he was appointed secretary of state, resigning office in 1860. Though active and energetic, he had no claim whatever to anything like comprehensive statesmanship. In regard to slavery, his conduct was ludicrously inconsistent, determined solely, as it would seem, by a view to what would be popular with those whose favor he was seeking to secure at the moment. Latterly, he went wholly along with the slave-holding party, advocating an extension of territory with a view to extend the ramifications of slavery. But he was chiefly remarkable on account of his bitter hostility to Britain, against which he was ever ready to inflame the minds of his countrymen on the slightest and silliest pretext. He is author of the *History, Tradition, Languages, &c., of Indians in the United States;* of *France: its King, Court, and Government;* and other works. He died in June, 1866.

CASSA'NDER, king of Macedonia, and son of Antipater, was born about 354 B.C. When young, he is said to have been ill used by Alexander the Great, and to have consequently conceived a mortal hatred to that monarch's family. On the death of his father, he expected to succeed to the regency; but Polysperchon received the honor instead, which so dissatisfied him that he resolved to contest the sovereignty with his opponent. He was completely successful; but while pursuing his career of conquest in the south of Greece, he learned that Olympias, mother of Alexander, was committing havoc in the north, and consequently hurried back to Macedonia. In less than a year, Olympias was taken prisoner, and put to death. Only Roxana, wife of Alexander, and her son Ægus, now stood between him and the throne of Macedon; but he did not find it convenient to 'make away' with these two until several years had passed. Meanwhile, he married Thessalonica, half-sister to Alexander, in whose honor he founded, about 316 B.C., the town which bears her name. In the following year he caused Thebes, which Alexander had destroyed, to be rebuilt. He next became involved in a war with Antigonus, king of Asia, which, with an intervening peace of one year, lasted from 315 to 301 B.C., in the last of which years Antigonus was defeated and slain at the battle of Ipsus. Along with his auxiliaries Seleucus, Ptolemy, and Lysimachus, he seized and shared the dominions of the vanquished. The rest of his life was spent in intrigue and military enterprise. He died 297 or 296 B.C.

CASSA'NDRA, according to Homeric legend, was the fairest daughter of Priam and Hecuba, and the twin-sister of Helenus. The children playing in the court of the temple of the Thymbræan Apollo, not far from Ilium, till it was too late for them to return home, a bed of laurel-twigs was made for them in the temple; and there, in the morning, two snakes were found licking their ears, from which resulted such an acuteness of hearing, that they could hear the voice of the gods. C. afterwards attracted the love of Apollo by her beauty, and he taught her the secrets of prophecy; but displeased by her rejection of his suit, laid upon her the curse that her vaticinations should never be believed. Accordingly, she prophesied in vain of the treachery of the Grecian horse and the destruction of Troy. On the capture of the city, she fled to the temple of Minerva, but was torn from the altar by the Locrian Ajax, and ravished in the temple. She afterwards, in the distribution of the prey, fell to the share of Agamemnon, to whom she bore twin sons, but was murdered by Clytemnestra.

CASSANDRA, a peninsula in the province of Roumelia, European Turkey, situated between the Gulfs of Salonica and Cassandra, in lat. 40° N., long. 23° 30′ E. The ancient name of this headland was *Pallene*. Grain of superior quality is raised here; wool, honey, and wax are produced; and silk-worms are extensively reared. The Gulf of Cassandra (ancient *Toronaicus Sinus*) has a length of 33 miles from south-east to north-west, and a breadth of 10 miles.

CASSA'NO, a town of Italy, in the province of Cosenza, 34 miles north of the town of that name. It is situated in a valley in the midst of the most beautiful scenery, has a cathedral, an old castle built on an imposing mass of rock in the midst of the city, and manufactures of linen, leather, silk, cotton, and macaroni. Pop. 8000.

CASSANO, a town of Northern Italy, 17 miles east-north-east of Milan. It is situated on the right bank of the Adda, here crossed by a bridge on the railway to Brescia, and has extensive silk-mills. C. was the scene of two sanguinary battles—one in 1705 between the French under the Duke of Vendôme, and the Imperialists under Prince Eugene, in which the latter were defeated; the other in 1799, when the Russians and Austrians under Suwarow defeated the French under Moreau. Pop. 4500.

CASSATION, COURT OF. In the law of France, the act of annulling the decision of a court or judicial tribunal is called *cassation*, from the verb *casser*, to break or annul (Lat. *quatere;* Eng. *quash*); and the function of cassation, as regards the judgments of all the other courts, is assigned to a special tribunal called the Court of C., which may thus be regarded, in a certain sense, as the last and highest court of appeal for the whole country. But as everything is excluded beyond the question whether or not the view taken of the law, and of the proper method of administering it by the inferior tribunal, has been the right one, the idea attached to this institution is less that of a court in the ordinary sense, than of a department of government to which the duty of inspecting the administration of justice is assigned. By the 65th article of the constitution of the year VIII., it was enacted that there shall be 'for the whole of France a tribunal of cassation, which shall pronounce on demands for cassation against judgments in the last resort pronounced by the tribunals;' and the following article of the same constitution bears that this supreme tribunal shall pronounce no judgment on the foundation or merits of the cause, but that, in case of its breaking the judgment pronounced, it shall remit to the tribunal appealed from to pronounce another.

The title of tribunal was afterwards changed for that of court, by a *senatus consultum* of the year XII.; but substantially the institution has retained its original character, notwithstanding all the changes of government which have occurred in France. The demand for cassation can be made only by the parties to the suit, or by the *procureur-général* of the Court of C. for the public interest. Criminal as well as civil judgment may be reviewed by the Court of C., the only exception being the judgments of justices of the peace and of courts-martial, military and naval. The delay allowed for bringing a civil case before the Court of C. is three months for persons domiciled in France, six months for those in Corsica, a year for American colonists, and two for all persons resident beyond the Cape of Good Hope. In criminal matters, the procedure is greatly more prompt, three full days only being allowed to the person condemned to bring his action of C., and the same space being given to the procureur-général. In all criminal and police cases, the Court of C. may pronounce judgment immediately after the expiry of these days, and must do so within a month. The Court of C. is divided into three sections, one of which is devoted to criminal matters. Its staff consists of a president, who has the title of *first* president, and three vice-presidents, who are called presidents; 45 councillors or ordinary judges; a procureur-général, or public prosecutor; 6 substitutes, who have the titles of advocates-general; and several inferior officers. The presidents and counsellors are named by the sovereign for life, the other officers being removable at pleasure. No judgment can be pronounced unless 11 judges are present, the decision being determined by the majority. Where the numbers are equally divided, 5 judges are called in; and cases of peculiar difficulty may be judged of by the three sections united. The whole court, when presided over by the minister of justice, possesses also the right of discipline and censure over all judges for grave offences, not specially provided for by the law. When thus constituted, the Court of C. may suspend the judges of the imperial courts from the exercise of their functions, and call them to its bar. The procureur-général of the Court of C. likewise possesses a surveillance over the procureurs-généraux of the imperial courts.

The members of this august tribunal wear a red gown with a violet *toque*, or cap of velvet; the robes of the presidents and of the procureur-général being doubled with white fur.

CASS'AVA, a West Indian name of the plant also called MANIOC (q. v.), and of the starch produced from it, which is otherwise called Brazilian arrow-root, and is popularly known in Britain as TAPIOCA (q. v.).

CASSAY,' or MANIPU'R, a mountainous country in Farther India, to the south-east of Upper Assam, stretching from 23° 49′ to 25° 41′ N. lat., and from 93° 5′ to 94° 32′ E. long., and having an area of 7584 square miles. It contains a population estimated at 126,000. It is important to England merely from its being on the Burmese frontier. Accordingly, before the war of 1825 began, it was occupied by the British; and, being permanently ceded at the close of the contest, it was handed over, free from tribute, to the native rajah. The inhabitants are more generally Brahmanists than Buddhists. The productions are tea, rice, tobacco, indigo, cotton, sugar, opium, and mustard; and the manufactures are muslins, silks, and a few iron wares. The chief town is Manipur which sometimes gives name to the principality.

CA'SSEL, the capital of the former electorate of Hesse-Cassel, now a portion of Prussia, pleasantly situated on both sides of the Fulda, here a navigable river, 120 miles by rail, N.N.E. of Frankfurt-on-the-Main. It contains (1875) 53,043 inhabitants, including military and servants and laborers connected with them. The oldest part of the town consists of a few very narrow, crooked streets, close on the banks of the Fulda; the more modern parts are on hills, which rise gently from the river. C. is partially walled. In Friedrichs-Platz, the largest square in any German town, stands the Elector's palace, a comparatively mean structure; a little below is the first story of a magnificent palace commenced in 1820, and stopped in the following year by the death of the Elector who projected it. Amongst the other public buildings and institutions, one of the most important is the *Museum Fredericianum*, which has a library of 90,000, volumes and some valuable MSS. The Picture-gallery contains about 1400 paintings, including some excellent specimens of the best masters. In the cabinet of curiosities, there are examples showing the gradual development and improvement of watchmaking from the earliest invention at Nuremberg to the present time. C. contains an observatory and is the seat of a number of learned and scientific associations. From 1807 to 1813 it was the capital of the kingdom of Westphalia. The gardens of Wilhelmshöhe—which was assigned by the present Emperor of Germany to the late Emperor Napoleon as a residence after his fall at Sedan, in September 1870—with their splendid fountains and cascades, and the colossal statue of Hercules, within the hollow of whose club eight persons can stand at one time, are only three miles from Cassel. There are manufactures of cotton, woollen, and silk fabrics, lace and carpets. Under the name of *Chassala*, the town appears to have existed as early as the 10th century.

CASSEL, a town of France, in the department of the Nord, 27 miles north-west of Lille. It is pleasantly situated on a hill, overlooking a country on all sides so flat, that the view, although the elevation is only 800 feet, is said to be one of the widest in Europe, extending over the broad fertile plains of Flanders, and to the chalk cliffs of England, and taking in 32 towns and 100 villages. During the great trigonometrical survey undertaken in the reign of the first Napoleon, Mont Cassel was one of the chief signal-stations. C. has manufactures of lace, linen, thread, hosiery, &c. Pop. (1876) 3224. It was known to the Romans, who had a station here, as *Castellum*.

CA'SSIA, a name given by the ancients to a kind of medicinal bark, but their descriptions are so imperfect that it is impossible to determine what bark it is. The name is employed in the English translation of the Old Testament in Exodus xxx. 24, and in Psa. xlv. 8, its use in these places being derived from the Septuagint; and it is not improbably supposed that the substance intended is the same now known in our shops as *Cassia Bark*, or *Cassia lignea*.—2. *Cassia* is now the botanical name of a genus of plants of the natural order *Leguminosæ*, sub-order *Cæsalpineæ*, containing many species—more than two hundred having been described—trees, shrubs, and herbaceous plants, natives of Africa and of the warm parts of Asia and America. They have abruptly pinnate

leaves, and flowers with deciduous calyx of five somewhat unequal sepals, corolla of five petals, of which the lower ones are the larger, ten free stamens, of which three are long, four short, and three abortive, and anthers opening by two holes at the top. The leaves and pods of many species have a peculiar sweetish but nauseous smell, and a nauseous bitter taste accompanied with a loathsome sliminess. They seem all to contain the purgative principle called Cathartine (q. v.), and the leaves of some of the Asiatic and African species are highly valued, and much used as a medicine, under the name of SENNA (q. v.). The leaves of *C. Marylandica* possess similar properties, and are now used to some extent in the United States of America.—*C. Fistula* (*Cathartocarpus*) yields the C. of the pharmacopœias, the *C. pods, Pipe C.*, or *Purging C.* of the shops. It is a large tree, a native of Egypt and other parts of Africa, perhaps also of the East Indies, in which, at all events, it is now widely diffused and cultivated, as well as in the West Indies and warm parts of America. Its leaves have 4—6 pair of ovate smooth leaflets, its flowers are yellow and in loose recemes; its pods, which have obtained for it the name of *Pudding-pipe Tree*, are sometimes two feet in length, cylindrical, black, consisting of thin brittle woody valves, within which is a cavity divided by numerous thin transverse, partitions, each cell containing a single seed imbedded in a soft black pulp.

It is this pulp that is the part used in medicine; it has a sweetish mucilaginous taste, and in small doses is a mild laxative. It is sometimes removed from the pods when fresh; or an extract is obtained, after they are dried, by boiling and evaporating. It is said to contain 61—69 per cent. of sugar. The C. pods of the West Indies contain much more pulp, and are therefore more vaulable than those imported from the East.—3. *C. Bark*, or *C. lignea*, sometimes called *China Cinnamon*, is a bark very similar to cinnamon both in appearance and properties; but in thicker pieces, and less closely quilled, of a less sweet and delicate flavor, but more pungent. It is the produce of the *Cinnamomum Cassia* or *aromaticum*, a tree of the same genius with the Cinnamon-tree, a native of China, and extensively cultivated there. It is highly esteemed by the Chinese, and is now largely imported into Europe. As it contains a greater proportion of essential oil, and is also much cheaper than true cinnamon, it is much more generally used. The oil which it contains is called *Oil of Cassia*, and is very similar to Oil of Cinnamon. Coarse cinnamon is sometimes sold as cassia. *C. Buds* are believed to be the dried flower-buds of the same tree which yields C. bark. They are now imported into Britain in large quantities, and are much used in confectionary. In flavor and other qualities, they resemble C. bark; in appearance they are very similar to cloves.

CASSIA'NUS, JOANNES, or JOANNES MASSILIENSIS, or JOANNES EREMITA, a Christian teacher of the ancient church, who flourished in the early part of the 5th c., and distinguished himself as the promoter of monachism in Southern Gaul, and as the opponent of the extreme dogmas of St. Augustine respecting grace and free-will. Shortly before 415 A.D., he went to Massilia (Marseille), where he founded two monasteries according to the rules laid down in his *De Institutis Cœnobiorum*. One of these monasteries was for nuns; the other was the famous Abbey of St. Victor, which under C. is said to to have possessed not less than 5000 inmates, and which served as a model to a multitude of monastic institutions in Gaul and Spain. His *Collationes Patrum Sceticorum* is a work in 24 chapters, each of which gives a 'spiritual colloquy between monks in the desert of Sketis,' regarding the monastic life, and the vexed questions of theology. C.'s Grecian erudition, his dislike of dogmatic subtilties and his zeal for monastic habits, led him to oppose the doctrine of St. Augustine on works of grace, and to set up a doctrine which was known by the schoolmen as 'semi-pelagianism.' See PELAGIANISM. As C.'s doctrine gained support from the Massilian monks, St. Augustine, having been informed of it by his friend Prosper of Aquitaine, wrote strongly against it, especially in his treatise *De Gratia et Libero Arbitrio contra Collatorem*. It is not known when C. died; but it must have been subsequent to 433 A.D. The first collected edition of the various works attributed to him was published at Basel, in 1559; the best at Frankfurt, in 1722. The best account of his life and writings is by Wiggers. *De Johanne C.* (Rostock, 1824—1825).

CA'SSICAN (*Cassicus*), a genus of birds allied to starlings, having an exactly conical bill, thick at the base, and extremely sharp pointed, the commissure forming an angulated line, the bill ascending on the forehead, and encroaching circularly on the plumage. They are all American birds of gregarious habits, feeding both on fruits and insects, and 'exhibiting such surprising skill and ingenuity in the structure of their nests, that an old lady once gravely asked an American ornithologist whether he did not think they might be taught to darn stockings!' The Crested C., or Crested Oriole (*C. Cristatus*), is a native of Brazil, Guiana, and Paraguay. It is about 20 inches long, is sometimes seen in flocks of 50 or 100, and constructs its nest by knitting together shreds of a thin bark, *Tillandsias*, &c. The nest is about 36 inches long, and resembles a purse or pouch, the lower end hemispherical, and 10 inches wide, and is suspended from the extremity of a branch of a tall smooth-stemmed tree on the outskirt of a forest, apparently to insure safety from monkeys and serpents. Several of these nests are often to be seen hanging from the branches of the same tree.

CASSIDA'RIA, a genus of molluscs—class *Gasteropoda* (q. v.), order *Pectinibranchiata*—with univalve shells, generally regarded as belonging to the family *Buccinidæ* or Whelks (q. v.), but as forming a connecting link with the family *Muricidæ* (see MUREX). The shell is ventricose, with a moderately elevated spire, the aperture elongated, and the canal recurved, but not very abruptly—much less so than in the nearly allied genus *Cassis* (see HELMET SHELL,—the columellar lip covered with a plate, and the outer lip similarly margined within. The recent species, which are not numerous, belong to tropical and subtropical seas. Fifty fossil species have been described. The genus first appears in the Upper Cretaceous measures, where a single species occurs. In the Eocene 11 have been found, and about 40 in the Pliocene. It has its fullest development as a recent shell, no less than 70 species being known.

The name *Cassidariæ* is sometimes given to a family of coleopterous insects, of which the type is the genus *Cassida*. See TORTOISE BEETLE.

CASSI'NI, the name of a family distinguished by their services in astronomy and geography.

CASSINI, GIOVANNI DOMENICO, was born at Perinaldo, near Nice, on the 8th of June 1625, and studied at the College of Jesuits, Genoa. In 1650 he was appointed to the astronomical chair in the university of Bologna. His first work related to the comet of 1652. He subsequently devoted himself to the determination of astronomical refraction, and of the sun's parallax, &c. In 1664—1665 he determined the period of Jupiter's rotation. Subsequently, he determined the periods of the planets Mars and Venus, as also of the *apparent* rotation of the sun. He it was who discovered the third and fifth satellites of Saturn, and afterwards the first and second, as well as the dual character of that planet's ring. He was also the first who carefully observed the zodiacal light; he demonstrated that the axis of the moon was not (as had been believed) at a right angle to the ecliptic, and explained the cause of the phenomenon known under the name of lunar liberation. One of the finest observations was the coincidence of the nodes of the moon's equator and orbit. C. died September 14, 1712, at Paris, whither he had gone in 1669, at the invitation of Colbert, to take charge of the observatory erected by that minister.

CASSINI JACQUES, son of the preceding, was born at Paris, February 18, 1677. In 1694 he was elected a member of the Academy of Sciences. He traveled in Italy, Holland, and England, where he formed the acquaintance of Newton, Halley, Flamsteed, &c., and was elected a member of the Royal Society of London. On the death of his father, he succeeded to the charge of the observatory at Paris, and died April 16, 1756. C. wrote several treatises on electricity, the barometer, &c. In his treatise, *De la Grandeur et de la Figure de la Terre* (Par. 1720), he attempted to show that the earth must be a spheriod elongated at the poles. The Newtonians denied this, inasmuch as it was opposed to the ascertained facts of gravitation and rotation, which necessitated the earth's being a spheroid flattened at the poles. As an observer, C. was eminently successful. He determined the periods of rotation of all the satellites of Saturn then known, the inclination of the planetary orbits, the obliquity of the ecliptic very nearly, and the length of the year, &c.—His son, CÆSAR CASSINI, was also engaged in scientific pursuits.

CASSINI, JEAN DOMINIQUE, COMTE DE, the son of Cæsar Cassini, was born at Paris, June 30, 1748. He succeeded to the charge of the observatory, and completed in 1789 the great topographical map of France, begun by his father. But it having been decreed in 1793 that the observatory should no longer be in the hands of one person, three others were in consequence elected to the superintendence of it along with C., whose conduct in learning this fact showed that he had a greater regard for his own dignity than for the whole stellar universe. He refused to have anything more to do with astronomical science, and obstinately kept his purpose through a life that nearly lasted a century, and which was apparently so prolonged to test the durability of a Frenchman's disdain. In his 95th year he published a small volume of poems. He died October 18, 1845.

CASSIODO'RUS, or (according to several MSS.) CASSIODO'RIUS, MAGNUS AURELIUS, a Latin writer, who distinguished himself by his erudition in an age of barbarism, was born at Scylaceum (now Squillace), in Calabria, about 468 A.D. He was a member of a noble Roman family, and soon attracted the attention of Odoacer by his superior abilities and accomplishments. Under this monarch he held various offices, but after the defeat and

murder of Odoacer by Theodoric the Ostrogoth, he passed into the service of the latter. The highest honors now fell upon him; and for years he administered the Ostrogothic power with remarkable prudence and success. In his 70th year, however, he withdrew to Calabria, where he founded the monastery of Viviers, and employed himself and the other monks in the invaluable work of copying classical MSS.; his great desire being to improve the education of the clergy. C. was about 100 years old when he died. Besides his grammatical and rhetorical manuals, which were used as text-books during the middle ages, he wrote a very important work, entitled *Variarum Epistolarum Libri XII.* This is a collection of state-papers, and is, in fact, the most extensive as well as the most reliable source of information which we possess in regard to everything connected with the Ostrogothic rule in Italy. The style, however, is very peculiar, and shows the influence which the political career of C. had exercised on his language and modes of thought. The editio princeps of the *Variarum* was printed at Augsburg in 1533.

CASSIOPE'IA, the *Lady in her Chair*, a constellation in the northern hemisphere, near Cepheus, and not far from the north pole. It is marked by five stars of the third magnitude, forming a figure like an M. A line from Capella to the bright star in Cygnus passes nearly through the middle of this M. C., according to Flamsteed, contains 55 stars, all of small magnitude. The figure is that of a woman sitting in a chair with a branch in her hand. In the year 1572, there all at once appeared in C. a new star. It was first noticed by Tycho Brahé on the 11th November, when its lustre exceeded that of all the fixed stars, and nearly equalled that of Venus. The star gradually diminished in lustre, from the time of its being observed until, in March 1574, it disappeared. It is said to have alarmed all the astronomers of the age. Tycho Brahé wrote a treatise on it, and supposed—without good reasons—that it had previously appeared in 945 and 1264. Sir John Herschel suggested the possibility of its reappearance in 1872, but his suggestion was not verified.

CASSIQUIA'RÉ, or CASSIQUIARI, a river of Venezuela, South America, forming the south bifurcation of the Orinoco, which it leaves in lat. 3° 10′ N., long. 66° 20′ W., and after a rapid south-west course of about 130 miles, joins the Rio Negro in lat. 2° 5′ N., long. 67° 40′ W. About 100 yards in breadth when it issues from the Orinoco, it gradually increases until at its union with the Rio Negro it attains a width of 600 yards. By means of this singular river, water-communication is established, through the Amazon, Orinoco, and their affluents, between the interior of Brazil and the Caraccas in Venezuela.

CA'SSIS (Fr., the black currant-tree), a French liqueur prepared from black currants; the manufacture has recently become of great importance. See CURRANT.

CASSITE'RIDES. See SCILLY ISLES.

CA'SSIUS, LONGI'NUS CAIUS, one of Cæsar's assassins. At the breaking out of the civil war, though a tribune of the plebs, he sided with Pompey and the aristocratic faction against Cæsar. He was taken prisoner by the latter, who pardoned him, and even made him one of his legates. In 44 B.C., through the influence of Cæsar, he was made *Prætor Peregrinus*, and was promised the governorship of Syria in the following year. But his mean and jealous spirit could not endure the burden of gratitude imposed upon him by the generosity of the dictator, and he resolved to be released by the murder of his benefactor. Having attached to himself the mutinous spirits among the subjugated aristocracy, and also won over M. Brutus, the pseudo-patriotic conspiracy was soon matured, and on the 15th of March, 44 B.C., Cæsar fell by the daggers of assassins. The result of this bloody deed was not what C. had expected. The popular feeling—as witnessed by the riots that broke out at Cæsar's funeral—was strongly against the murderers; and the military power fell into the hands of Mark Antony. C. therefore fled to the east, and made himself master of Syria. Afterwards he united his forces with those of Brutus, and having greedily plundered Asia Minor, they crossed the Hellespont in the beginning of 42 B.C., marched through Thrace, and took up a superior position near Philippi, in Macedonia. Here they were attacked by Antony and Octavian. The division commanded by C. was totally routed, although, on the other hand, Brutus succeeded in repulsing the troops of Octavian. C., supposing that all was lost, compelled his freedman, Pindarus, to put him to death. C.'s wife, a half-sister of Brutus, survived him upwards of sixty years. She died in the reign of Tiberius, 22 A.D.

CASSIUS, PURPLE OF, is a coloring substance of very ancient use, which is prepared by adding a mixed solution of protochloride and bichloride of tin gradually to a solution of chloride of gold, when a more or less abundant precipitate of the double stannate of gold and tin (AuO,SnO_2+SnO,SNO_2) is thrown down. The Purple of C. is soluble in ammonia, yielding a very pretty purple solution, from which it can again be obtained, with solid form unchanged, by evaporating the ammonia. Mixed with borax, or some fusible glass, Purple of C. is employed by the potter to communicate a rich purple or rose tint to the better kinds of china, and it also imparts the red color to the kind of glass known as *Bohemian glass*.

CASSIVELAU'NUS, a British chief, who fought against Cæsar during his second invasion of the island, 54 B.C. He ruled the country north of the Thames, and had a great reputation as a warrior, but his capital was taken by the Romans, and he himself compelled to flee. He afterwards sued for peace, which he obtained, on condition of paying tribute and giving hostages.

CA'SSOCK, a long loose coat, formerly in common wear, but now usually worn only by the clergy. As worn by the clergy of the Church of England, it is a long coat with a single upright collar. Black is the common color for all orders of the clergy, but on state occasions bishops frequently wear purple cassocks. In the Roman Catholic Church cassocks vary in color according to the dignity of the wearer—priests wearing black, bishops purple, cardinals scarlet, and the pope white.

CA'SSOWARY (*Casuarius*), a genus of birds nearly allied to the ostrich (see BREVIPENNES and OSTRICH), but distinctively characterized by still greater shortness of wing, by a laterally compressed bill, by a bony crest, by pendent wattles on the naked neck, and by three toes on each foot, all furnished with claws, the inner toe short, and armed with a very long and sharp claw. There are also very important anatomical differences in its digestive organs, which are not adapted to the same coarse diet, for the C. 'has short intestines and small coeca, wants the intermediate stomach between the crop and gizzard, and its cloaca does not proportionally exceed that of other birds.' There are about ten recognized species of C., the best known of which is *Casuarius galeatus*, a native of New Guinea, the Moluccas, and other Asiatic islands. Most of the other species are indigenous to New Guinea; the *C. Australis* is a well-distinguished Australian form. In general appearance, the cassowary is not unlike the ostrich, but has a much shorter neck. It is the largest known bird except the ostrich, and its height, when erect, is about five feet. It feeds on fruit, eggs, and succulent herbage.

When attacked, it defends itself by kicking obliquely backwards with its feet, and by striking with its short wings, the rigid barbless shafts of which, although useless even to aid it in running, are not without value as weapons. There are only about five of them in each wing, somewhat resembling the quills of a porcupine; and at the end of the last joint of the wing there is a spur. The color of the C. is a brownish black; the feathers are loosely webbed, and hang down, so that, at a little distance, the bird seems clothed with hair. Those of the rump are 14 inches long, hanging down in place of a tail. The head and upper part of the neck are naked and of a bluish color, and there are two pendent wattles, partly red and partly blue, on the front of the neck. On the breast is a callous bare part, on which the bird rests its body on the ground. The bony crest or helmet reaches from the base of the bill to the middle of the crown, and is about three inches high, exhibiting the most intense blue, purple, and scarlet blended together. The C. lays a few eggs, which it leaves to be hatched by the heat of the sun; and which are greenish, and have a much thinner shell than those of the ostrich. Its flesh is black, tough, and juiceless. The C. is not unfrequently to be seen in menageries in Europe, but is becoming more rare in its native regions, in which it is sometimes kept tame.

Cassowary.

CAST, an impression produced by pouring a ductile substance, such as plaster of Paris, into a mould. This method was employed by the ancients in multiplying not only objects of art, such as the small household statues of the gods, but articles of direct utility. The so-called *Celts*, or chisels of bronze, which, with the moulds for casting them, are found in England, Ireland, and France, testify to the fact, that the art of casting from a mould is one of the earliest acquired by semi-civilized nations. Casts are of incalculable value in familiarizing the eyes of those who can never look on the originals with the grand and beautiful forms of antique art. The best to be had in this country are those executed, and sold on application, at the British Museum. Casting, when applied to metals, is called Founding (q. v.).

CAST, CASTING-LINE. The casting-line, in Angling, is a gut-line on which the artificial flies are fastened. It is made up of several lengths of gut, knotted together, and usually from two to four yards long. The flies are attached at intervals of about two feet, and the line with its flies is called a *cast*. The term *cast* is also applied to a part of a stream where certain fish may be taken, as a trout-cast, a salmon-cast.

CAST-IRON, or PIG-IRON. This is the crudest form of iron, and the method of its production is described under the head IRON. There are two leading kinds of it—namely, white pig-iron and gray pig-iron; the former is also called forge-iron, from the fact of its being chiefly used for conversion into malleable iron and steel; and the latter is often called foundry-iron, on account of its suitability for castings. Of each of these, again, there are many varieties; and much light has of late years been thrown on what constitutes their different qualities, by experiments in the manufacture of steel. White cast-iron, when smelted from the argillaceous ores of the coal-measures, is of inferior value to the gray; much of it, indeed, being produced against the will of the iron-master, when the blast-furnace is working badly. But when obtained from pure ores and fuel it is the most valuable kind, because it contains fewer impurities, and has its carbon nearly all in the combined state, in which case it is best suited for the manufacture of wrought-iron and steel. Gray pig-iron contains carbon both in the combined and the uncombined (graphitic) state. In the grayest kind, uncombined carbon greatly prevails, and the fracture of the iron is more distinctly granular or scaly-crystalline than is the case with other varieties. Such cast-iron is usually called No. 1. It is much softer, but fuses at a higher temperature than white pig-iron. It also becomes thinly liquid when melted, and expands slightly just before cooling—properties which render it extremely valuable for castings. As the grayness and graphite-like brightness diminish, the iron is known as No. 2, No. 3, and so on for several numbers, till we come to the close texture and light color of white pig-iron; No. 2 being but slightly different from No. 1, and No. 5 from white-iron in quality. No. 3 is intermediate between the extremes. When cast-iron is partly gray and partly white, it is called mottled iron. Cast-iron contains from 2 to 5 per cent. of carbon, the maximum amount in steel being 2; but steel is practically free from silicon, sulphur, and phosphorus, while cast-iron is not.

CAST-STEEL. This term, until lately, was confined to steel made by melting Blister-steel (q. v.), obtained by the old cementation process. Through this simple operation of melting it in crucibles, which was invented by an Englishman named Huntsman about the middle of last century, steel was first readily made perfectly homogeneous, and fitted for the production of the finer kinds of tools and cutting instruments. The crucibles are made of fire-clay, mixed with a small proportion of the material of old ones and coke. They are very carefully prepared and annealed, but notwithstanding this, the heat of the furnace is so high that they can only be three times used. Each crucible contains from 30 to 40 lbs. of steel, which is poured, when melted, into cast-iron ingot-moulds previously smoked. The name 'cast-steel,' however, can no longer be confined to steel so made, because Bessemer steel, although produced by a quite different process, is truly a cast-steel. In Sheffield, the finer kinds of cast-steel are now sometimes called 'crucible-steel'; but since puddled steel, which, like the Bessemer, cannot be used for fine cutlery, is also cast in crucibles, such a term is not sufficiently distinctive.

CASTA'LIA, a fountain on the slope of Parnassus, a little above Delphi, in Phocis, sacred to Apollo and the Muses. It was the 'holy-water' of the Delphian temple; and all who came to consult the oracle, or visited the place with any religious purpose whatever, were wont to bathe their hair *rore puro Castaliæ* (in the pure dew of C.), but those who wished to be purified from murder, bathed their whole body. The Roman poets feigned that its waters filled the mind of those who drank of it with poetic inspiration. It was imagined to have some connection with the river Cephisus, and to flow from the subterranean Styx. The fountain, whose waters are still pure and delightful as in the days of classical antiquity, now bears the name of St. John, from a small chapel of that name close by.

CA'STANETS, a musical instrument of percussion in the form of two hollow nut-shells, which are bound together by a band fastened on the thumb, and struck by the fingers to produce a trilling sound in keeping with the rhythm of the music. The *krotalon* of the ancients was somewhat similar. The C. were introduced into Spain by the Moors, where they retain the name of castanulus, from their resemblance to the form of the chestnut. The C. are now much used in the ballet and in the opera.

CASTA'ÑOS, DON FRANCISCO XAVIER DE, Duke of Bayien, a celebrated Spanish general, was born at Madrid in 1756, and studied in Germany the military tactics of Frederick the Great. For some time after his return to Spain, he had no opportunity of acquiring distinction; but when Napoleon I. invaded that country, C. received the command of a division of the Spanish army, and on the 22d of July 1808, compelled 20,000 French, under General Dupont, to surrender at Baylen. It is asserted, however, that the merit of this prodigious success belonged more to Aloys Reding, a Swiss by birth, and the second in command. In November of the same year, C. was in turn defeated by the French at Tudela.

The arrival of Wellington necessarily reduced him to a subordinate position, but he took part in the important battles of Albuera, Salamanca, and Vittoria. In 1811, he was appointed general of the 4th Spanish *corps d'armée*, and commandant of several provinces. In 1815, he was placed at the head of 80,000 troops, destined to invade France, some of which had already crossed the frontier when the news came of the battle of Waterloo. Although no great favorite with the court politicians, his talents could not be overlooked. In 1825 he was called to the state council, where he became a decided opponent of the Carlist party. He died 24th September 1852, at the advanced age of 96.

CASTE, a term applied chiefly to distinct classes or sections of society in India, and, in a modified sense, to social distinctions of an exclusive nature among the nations of the West. When, at the end of the 15th c., the Portuguese began to penetrate to India by the Cape of Good Hope, and to trade with the Deccan or southern portion of the Indian peninsula, they found arbitrary social laws, full of intricate regulations which constantly interfered with their intercourse with the natives, especially in matters involving the *subdivision of labor*. They found certain pursuits invariably followed by a certain class, and any attempt to induce a man to perform offices not appointed for the class of which he was a member, met with violent opposition, though such offices might, according to European notions, be more honorable than many he was content to fulfil. They observed, also, that these different classes often varied in appearance, the result, in some cases, of their addiction for many generations to the same pursuits; in others, of their having actually arisen from a different stock. Hence they applied to these various divisions of society the term *casta*—a Portuguese and Spanish word, meaning a breed. As applied to these classes of Hindu society, the word has passed into most European languages. From its frequent use in India, it has sometimes been erroneously considered of Hindu origin.* Of late, it has been spelled *caste*, but by old authors *cast;* and it is even a question, whether the word may not be as genuine English, as *casta* is Spanish.

In the south of India, the Portuguese became acquainted with what is considered the most exaggerated evil of caste. There are found there large numbers of a class called *Pariahs*, or, in other districts of India, *Chandalas*. They are probably the relics of some early conquered race, who have been degraded by uninterrupted ages of oppression, as is represented to have been the case with the Helots of Sparta, and people in a similar condition. These Pariahs were always identified with outcasts—i. e., persons who had forfeited the privileges of their original order. No one of any C. would have any communication with them. If one of them even touched a Nayr, or warrior of high C., he might with impunity kill him. Some sorts of food were defiled by even their shadow passing over them; and the name of Pariah or Chandala conveyed to the Hindu the idea of the utmost vileness and disgust. All who violated the institutions of their class were held to sink into this class—a condition which involved the loss of all human respectability and comfort. These regulations were, moreover, referred to religion.

As India was at this time the land of the marvelous, and its inhabitants, though as various as the different nations of Europe, viewed as one homogeneous people, what was only true of one portion of the peninsula, was considered as prevailing everywhere, and as identical with the divisions of the Indians into *seven* tribes or castes, mentioned in olden times by Strabo, by Diodorus Siculus, and by Arrian. Nor was it forgotten that the Egyptians, whose early civilization was as undoubted as that of India, were also divided, according to Herodotus, into seven classes of priests, warriors, herdsmen, swineherds, tradesmen, interpreters, and pilots, to each of which were assigned particular districts.

About the middle of the 16th c., however, Abraham Roger, chaplain of the Dutch factory at Pulicat, gained the confidence of a Brahman, acquainted with the Sanscrit language, and by this means learned pretty exactly the account of the origin of C. given in the *Laws of Menu*, a work inferred to have been written not later than 900 B.C., which was long known only by name in Europe, until about the end of the last century, when a copy was obtained, and translated by Sir William Jones. The whole of the Hindus are represented by Menu as divided into four classes:

1. The *Brahmans*, or *sacerdotal class*, who are said, at the moment of creation, to have issued from the *mouth* of Brahma. Their business is reading and teaching the Vedas, and the performance

* In Sanscrit, castes are called *Varnas*, i. e., 'colors;' color being, no doubt, the chief distinction at first.

of sacrifice for themselves and others. They are to be the chief of all created beings; the rest of mortals enjoy life through them. By their imprecations, they can destroy kings, with all their troops, and elephants, and pomps. Indra, when cursed by one of them, was hurled from his own heaven, and compelled to animate a cat. Hence, the Brahman is to be treated with the most profound respect, even by kings. His life and person are protected by the severest laws in this world, and the most tremendous denunciations for the next. His own offences are treated with singular lenity; all offences against him with terrible severity. He is forbidden to live by service, but on alms; and it is incumbent upon virtuous men and kings to support him with liberality; and all ceremonies of religion involve feasts and presents to him. The first part of his life is to be devoted to an unremitting study of the Vedas—books, be it observed, older than the code of Menu, and yet, except, perhaps, one of the later hymns, containing no mention of C. as a religious ordinance. He is to perform servile offices for his perceptor, and beg from door to door. In the second quarter, he lives with his wife, reads and teaches the Vedas, assists at sacrifices, and, 'clean and decent, his hair and beard clipped, his passions subdued, his mantle white, his body pure, with a staff and a copy of the Vedas in his hand, and bright golden rings in his ears,' he leads a studious and decorous life. The third quarter of his life he must spend in the woods, as an anchorite, clad in bark, without fire, wholly silent, and feeding on roots and fruits. The last period he is released from external forms and mortifications, and is to spend his time meditating on the divinity, until at length he quits the body, 'as the bird leaves the branch of a tree, at pleasure.'

2. The *Kshatrya*, or *Chuttree*, or *military class*, sprang from the *arm* of Brahma, and bear something of a sacred character. It is stated that the sacerdotal order cannot prosper without the military, or the militaty without the sacerdotal; and the prosperity of both, as well in this world as in the next, is made to depend on their cordial union. The Kshatrya are to give alms, to sacrifice, to read the Vedas, and defend the people. Though Brahmans are to draw up and interpret laws, they are carefully excluded from administering them. The *executive* government is vested in the Kshatryas alone.

3. The *Vaisya*, or *Bais*, or *mercantile class*, sprang from the *thigh* of Brahma. Their grand duties are to keep cattle, carry on trade, lend on interest, cultivate the soil, and turn their attention to every description of practical knowledge. They are to be perfect men of business.

4. The *Sudras*, or *Sooders*, or *servile class*, came from the *foot* of Brahma. They are to serve the three superior classes, more especially the Brahmans. Their condition is never to be improved; they are not to accumulate property, and are unable by any means to approach the dignity of the higher classes. Utter and entire submissiveness to the Brahmans is the spirit of all a Sudra's duties, and this is to be enforced by penalties as severe as they are ridiculous. Yet, withal, the Sudras were not to be slaves, either public or private, and to occupy a position much higher than the Chandalas.

Mixture of castes, though not absolutely forbidden, entails disadvantages on the children, and the offspring of a Brahmanical woman and a Sudra becomes a Chandala, or outcast.

Such—omitting the minute and childish laws and penalties, many hundreds in number, by which it is proposed to carry the principle of C. into the pettiest affairs of life—is a brief outline of it, as gathered from the code of Menu. There is no historical evidence that it ever existed in this form, and, from the nature of the case, we may conclude that it never did. In the *Toy-cart*, the oldest Hindu drama, no extravagant veneration for Brahmans anywhere appears. In fact, one of them is condemned to death; and the arrangements of society appear to have been the same as at present. The laws of C. form, it is true, a part of what is reputed to be Hindu law, but they have remained in all the states of India, Hindu as well as Mohammedan, to a great extent a dead-letter. There is nothing to show that the code of Menu was drawn up for the regulation of any particular state. Some have even conjectured that it may have been the work of some learned man, designed to set forth his idea of a perfect commonwealth under Hindu institutions, just as Plato in *The Republic* gives us his idea of a model government under Greek institutions.

Be this as it may, the C. which at present exists throughout the greater part of India is very different from that described in the code of Menu, though to this it owes, no doubt, much of its stability and its importance in the eyes of Europeans. With the exception of the Brahmans, the pure castes have disappeared, and out of the intermixture of the others have sprung innumerable classes, many of them unauthorized except by the people themselves. So engrained in the whole community is this tendency to class distinctions, that Mussulmans, Jews, Parsees, and Christians fall, in some degree, into it; and even excommunicated or outcast Pariahs form castes among themselves. Most of the existing castes partake of the nature of associations for mutual support or familiar intercourse, and are dependent upon a man's trade, occupation, or profession. Many of them have been described by Mr. Colebrooke in the *Asiatic Transactions*, vol. v. Many have had their origin in guilds, in schism from other castes, in the possession of a particular sort of property (as, for instance, landlords are spoken of as the C. of *zemindars*), and similar accidental circumstances.

Their names are often due to the district in which the C. took its rise, to their founder, to their peculiar creed, or any random circumstance. In the Bengal presidency, there are many hundreds of such castes, almost every district containing some unknown in those adjacent. Among the lowest classes, and especially among the servants of the English at Calcutta, it has degenerated into a fastidious tenacity of the rights and privileges of station. For example, the man who sweeps your room will not take an empty cup from your hand; your groom will not mow a little grass; a coolie will carry any load, however offensive, upon his head, but even in a matter of life and death, would refuse to carry a man, for that is the business of another caste. Such and many other regulations are described in every work on C., but are as unworthy of serious regard as are the assertions of self-importance found among little people all the world over. When an English servant pleads that such a thing 'is not his place,' his excuse is analogous to that of the Hindu servant when he pleads his caste. When an Englishman of birth or profession, which is held to confer gentility, refuses to associate with a tradesman or mechanic—or when members of a secret order exclude all others from their meetings—or when any other similar social distinction arises, it would present itself to the mind of the Hindu as a regulation of caste.

Nor does C., at the present day, *tie a man down to follow his father's business*, except, perhaps, in the case of the more sacred functions of the Brahmans. For the rest, Brahmans serve as soldiers, and even as cooks. Men of all castes have risen to power, just as in England our statesmen have sprung from every class of society. Nor, again, is loss of C. anything so terrible as has been represented; in most cases, it may be recovered by a frugal repast given to the members of the C.; or the outcast joins another C., among whom he will commonly be received with the heartiness due to a new convert. The question of the restoration of a Christian convert wishing to rejoin the Brahmanical C., has been differently decided by his fellow caste-men in different places.

As in the West, so in the East, C. enters into all the most ordinary relations of life, producing laws often most tyrannical and too anomalous to admit of generalization. In the West, however, whilst good sense and Christianity have ever tended to ameliorate social differences, the feeble mind of the Hindu and the records of his religion have had a contrary effect.

These modified views of C., which have begun to prevail in recent years, will be found more fully developed in Shore *On Indian Affairs*, Irving's *Theory and Practice of Caste*. Full accounts of the petty regulations of C., as laid down in the code of Menu, may be seen in Sir William Jones's *Translation of the Code of Menu*, Robertson's *Disquisition on India*, Richard's *India*, Elphinstone's *History of India*, Dubois's *India*, Colebrooke's *Asiatic Transactions*, vol. v., and in various articles in the *Calcutta Review*. See above all the first volume of Dr. John Muir's *Original Sanscrit Texts on the Origin and Progress of the Religion and Institutions of India; collected, translated into English, and illustrated by Notes* (5 vols.), and admirable illustrations of the system are given in Sherring's *Hindu Tribes and Castes as represented in Benares* (3 vols., 1872—1881).

The question how C. is to be dealt with in converts to Christianity, has now been determined by common consent of missionaries in India; and it receives no recognition within the Christian church. An opposite policy, in former times, founded on the opinion that C. might be regarded as merely a civil or social institution, and not as a part of the religion of the Hindus, is now believed to have been among the principal causes of the comparative decay of the churches or congregations founded during the 18th c. in the south of India.

CASTE'GGIO, or MONTEBELLO, a town of Piedmont, Northern Italy, 5 m. E.N.E. of Voghera. In the campaign of 1859, C. was occupied by Austrians prior to the battle of Montebello, in which they were defeated by the French and Sardinians. C. was also valorously but unsuccessfully defended by the Austrians in the great battle of Montebello between them and the army of Napoleon I. in 1800. As *Clastidium*, C. was an important military position as early as the times of the Gallic and Punic wars. Some Roman antiquities still remain, and numerous curious inscriptions and coins have been found. Pop. 3206.

CASTE'L (from the Latin *castellum*) is a name prefixed to various places in Italy, France, Spain, Portugal, &c., of which the most important are:

1. C.-ARQUATO, a town of Parma, North Italy, 19 miles south-east of Piacenza, picturesquely situated amid forests and vine-

yards, with a fine Gothic church and a noble old castle, from which the town derives its name. It has manufactures of silk and a population of 4400.

2. C.-Bolognese, a town of North Italy, about 22 miles west-south-west from Ravenna. It derives its name from a strong fortress built here by the Bolognese in the 14th c.; and is historically famous as the scene of a decisive battle betwen the Milanese and Florentines in 1434, in which the latter were completely vanquished.

3. C.-Buono, a town of Sicily, in the province of Palermo, eight miles south-east of Cefalu. It is noted for its mineral springs, and has a trade in manna. Pop. 5288.

4. C.-Franco, a town of Central Italy, eight miles east of Modena, with the old walls and ramparts of a castle built by Urban VIII., and near the site of the battle between the consuls Hirtius and Pansa and Mark Antony.—Also the name of a town of Italy, in the government of Venice, about 25 miles north-west from the city of that name, with linen and woollen manufactures, and a population of 4220.

5. C.-Gandolfo, a village of the former Papal States, 11 miles south-east of Rome, near the west shore of Lake Albano. Its situation is extremely picturesque, and it commands extensive views of some of the most beautiful scenery in Italy. The pope has his summer residence here. In early times, the noble family of the Savelli had a stronghold at C., by means of which, for a period of nearly 400 years, they bade defiance to popes, barons, and *bourgeoisie*. Pop. 1144.

6. C.-Sardo (formerly *C. Aragonese*), a fortified town and seaport, the strongest on the island of Sardinia, is situated on a steep rock on the north coast, 16 miles north-east of Sassari. The environs produce wine. Pop. 1946.

7. C.-Sarrasin, a town of France, in the department of Tarn et Garonne, on the Songuine, 12 miles west from Mantauban. It has the remains of an old castle said to be of Saracenic origin, a population in 1876 of 3547, manufactures of serge and worsted stockings, and a trade in the agricultural produce of the district.

8. C.-Termini (ancient *Camicianæ Aquæ*), a town of Sicily, in the province of Girgenti, and 16 miles north from the city of that name. It has extensive mines of rock-salt and sulphur, and a population of 8200.

9. C.-Vetrano, a town of Sicily, in the province of Trapani, 20 miles south-east of the town of that name. It is an interesting place with an old castle, several convents, manufactures of articles of coral and alabaster. Pop. in 1872, 20,420. Some of the most esteemed white wine of Sicily is produced in the vicinity.

CASTELLAMA'RÉ, a fortified city and seaport of South Italy, about 17 miles south-east of the city of Naples. It is built on the lower slopes of Monte d'Auro, and along a sheltered beach on the south-east side of the Gulf of Naples, over which it commands a magnificent view. It is on or near the site of the ancient *Stabiæ*, which was desolated by Sylla during the Social War, and where the elder Pliny afterwards lost his life when the city was overwhelmed with lava from Vesuvius. Some ancient remains have been found here. The town was sacked in the 15th c. by Pope Pius II., and again in the 17th c. by the Duc de Guise. It has a royal palace, a cathedral, several convents, among which that founded by Gonsalvo de Cordova, in the 16th c., is famous for the possession of an image of the Madonna, found in a well in the 11th c. which is greatly venerated by the peasantry, who make an annual pilgrimage to the church.

The old castle, which gave name to the town, was built in the 12th century. C. has a royal dockyard, affording employment to many of the inhabitants, and manufactures of linen, silk, cotton, leather, and sail-cloth. Pop. 20,488.—Castellamare is also the name of a town in Sicily, situated at the head of a gulf of the same name, and 20 miles east from Trapani. It has a population of 11,280, and exports of cotton, wine, fruit, and manna.—C., Gulf of, is an extensive bay on the north coast of Sicily. Its width from east to west, between Point Uomo Morto and Cape St. Vito, is about 15 miles; and its depth about 14 miles. It has deep water, and good anchorage, but is much exposed to north winds.

CASTELLAMO'NTÉ, a town of North Italy, in the province of Turin, 10 miles south-west of Ivrea. It has an old castle, manufactures of earthenware, and a trade in the agricultural produce of the district. Pop. 5641.

CA'STELLAN, or CHATELAIN, the keeper of a castle or *burg* in the middle ages. The office and the rank of the C. were various in various countries. In France and Flanders, the title C. belonged to the holders of certain demesnes, and was next in order of rank to that of a bailiff. In Germany, the C. had the jurisdiction of a Burg-graf during the ages of chivalry. In Poland, the title of C., with its appendages, remained in later times, and, after the 16th c., the castellans, with the waiwodes and bishops, formed the senate or superior legislative chamber.

CASTELLA'NA, a town of South Italy, in the province of Bari, and 26 miles south-east of the city of that name. Its trade is confined to the produce of the district. Pop. 9691.

CASTELLANE'TA, a town of South Italy, in the province of Lecce, 20 miles north-west of Taranto. It has a cathedral and several convents. Cotton is grown in the district. Pop. 8358.

CASTELLA'ZZO, a town of North Italy, about 5 miles south-west of Alessandria. Pop. 5749.

CASTELLEO'NÉ, a town of Lombardy, North Italy, situated near the Oglio, about 12 miles north-north-west of Cremona. It is surrounded by old walls, has a fine church, and a population of 5700.

CASTELLIO, or CASTALIO, Sebastianus, a theologian, born in Dauphiné in 1515. His proper name was *Châteillon*, which he Latinized, according to the usage of his time. About 1540, he was invited to Geneva by Calvin, and appointed Humanity professor; but having the misfortune, afterwards, to differ from the reformer in religious opinion, he was banished from the city, and went to Basel, where he spent the rest of his life in great poverty. He died in 1563. See Calvin.

Among his various writings may be mentioned *De Hæreticis*, &c.—a treatise which argues against the right of the magistrate to punish heretical opinions, and which produced a reply from Beza; a Latin version of the Old and New Testaments, published in 1551, and dedicated to Edward VI. of England; and a posthumous work, in dialogue, on predestination, election, free-will, and faith, first published by Faustus Socinus in 1578.

CASTELLO'N DE LA PLA'NA, a town of Spain, capital of the province of the same name, is situated in the midst of a fruitful plain, about 4 miles from the Mediterranean, and 40 miles north-north-east of Valencia. A magnificent aqueduct supplies the means of irrigation. C. is surrounded by walls, and is for the most part well built. It has some handsome old churches, and a singular bell-tower 260 feet high. Ribalta, the celebrated Spanish painter, was a native of Castellon de la Plana. It has manufactures of linen, woollen, sailcloth, paper, earthenware, and firearms; also brandy distilleries, and an active trade. Pop. 23,000.

CASTELNAUDARY, a town in the department of Aude, France, situated on a declivity, skirted at the base by the Canal du Midi, 22 miles from Carcassone. Pop. (1876) 7628. It has manufactures of woollen and silk fabrics, and earthenware, and carries on a lively trade in agricultural produce. The canal at this point expands into a large basin, which serves as a haven. It suffered dreadfully in the crusade against the Albigenses, and was, in 1212, the scene of a battle between Simon de Montfort and Raymond, Count of Toulouse. In 1355, it was captured by the Black Prince. In 1632, Marshal Schomberg here gained a victory over the party of the Duke of Orleans, when the brave Duke of Montmorency was taken prisoner, and afterwards executed at Toulouse.

CASTELNUO'VO, a seaport town of Dalmatia, Austria, situated near the west entrance of the Gulf of Cattaro. It is surrounded by walls, and defended by two forts and a citadel. It has manufactures of brass, and a trade in the produce of the district, which is fertile. It was captured by the British in 1814. Pop., including commune, (1880) 7188.

CASTIGLIO'NÉ, Lake of, a lagoon of Central Italy, in the province of Siena. It lies north of Grosseto, and has a length of about 10 miles, with a breadth of from 1 to 3 miles. Receiving the waters of the Bruna and other rivers, it discharges its water by a short canal into the Mediterranean.

CASTIGLIO'NE, a town of Sicily, province of Catania, on the north slope of Mount Etna, on the right bank of the Cantara, 35 miles south-west of Messina. The town stands on a square rock rising abruptly from the valley, and having a double crest, on which stand a domed church and the ruins of a feudal castle. Here, in 1297, in the war of the Vespers, Admiral Roger Loria raised the standard of rebellion against his sovereign, Frederick of Aragon. In the district are several large nut-plantations, which produce the best Sicilian hazel-nuts. Pop. 8000.

CASTIGLIO'NE, Baldasa'rre, Count, one of the most elegant of the old Italian writers, was born, 1478, at Casatico, in the duchy of Mantua, and studied at Milan. His shining talents, knowledge, and pleasing manners made him a favorite of Guidobaldo di Montefeltro, Duke of Urbino, a great patron of literature, at whose court he was honorably entertained, along with other men of eminence in letters. He was employed by the duke as envoy to Henry VIII. of England, who made him a knight; and was afterwards sent in the same capacity to Louis XII. of France, under Guidobaldo's successor, in several important ambassadorial missions. He died at Toledo in 1529. His chief work is the book *Del Cortegiano*, a manual for courtiers, remarkable for its elegant style. His Italian and Latin poems are also models of elegance, and his *Letters* (2 vols., Padua, 1769—1771) contain interesting contributions to the political and literary history of his time. Tasso devoted a sonnet to the death of C., and Giulio Romano raised to his memory a monument in Padua.

CASTIGLIO'NE, Carlo Ottavio, Count, an eminent Italian philologist, was born at Milan in 1795. At an early period, he dis-

played a predilection for antiquarian studies, more particularly numismatics. When only 24 years of age, he published a description of the Kufic coins in the cabinet of Brera, at Milan, under the title, *Monete Cufiche del Museo di Milano* (Milan, 1819), which showed a great knowledge of oriental languages and history. C.'s principal work in the sphere of oriental literature is his *Mémoire géographique et numismatique sur la Partie orientale de la Barbarie appelée Afrikiah par les Arabes, suivi de Recherches sur les Berbères Atlantiques* (Milan, 1826), in which he seeks to ascertain the origin and the history of the towns in Barbary whose names are found on Arabic coins. Out of Italy, C. is perhaps best known by his edition of some fragments of the Mœso-Gothic translation of the Bible by Ulphilas (q. v.), which had been discovered, in 1817, by Cardinal Mai among the palimpsests of the Ambrosian Library. At first, he published some specimens in conjunction with Mai, but in 1829, 1834, 1835, and 1839, appeared a variety of fragments of the Pauline epistles, edited by himself, and enriched with valuable disquisitions, commentaries, and glossaries. He died at Genoa, April 10, 1849.

CASTIGLIO'NÉ DE'LLÉ STIVIE'RÉ, a town of North Italy, 22 miles north-west of Mantua. It is walled, and defended by an ancient castle; but is chiefly celebrated on account of the victory obtained here by the French over the Austrians in 1796, and which gave the title of Duc de Castiglione to Marshal Augereau. Pop. 3716.

CASTI'LE (Spanish, CASTI'LLA) forms, in a geographical and political point of view, the central district of the Spanish peninsula, being the middle and most strongly marked plateau of Spain, as well as the central seat of the monarchy. Both geographically and politically it is divided into Old and New Castile—*Castilla la Vieja* and *Castilla la Nueva*. The former district, situated in 40° 5′—43° 32′ N. lat., and 1° 40′—5° 35′ W. long., rises, in the form of an elevated plateau, to the height of 2500—3000 feet. It is walled in on all sides: on the north, by the highest masses of the Cantabrian Mountains, which separate it from the Basque provinces and Asturias; on the south, by the high ridge forming the water-shed between the Douro and the Tagus; while the Sierras de Oca, de Urbion, and Moncayo, and the heights of Leon and Tras-os-Montes bound it on the east and west. The high plateau of Old C. is but scantily watered, and its natural characteristics far from inviting. In many parts, nothing is presented to the eye but a wide, unwooded, almost treeless waste of land, unrefreshed by streams, in some parts monotonously covered with stunted grasses, and in others, almost destitute of vegetation. The traveler may walk many miles without finding a village, or even a solitary farm-house. All Old C., however, is not a dusty desert. There are rich tracts in it producing some of the finest wheat in the world. Madder and grasses are also produced abundantly in some parts; and even the olive flourishes where it is protected from the frost and snow of winter, and from the cold winds prevailing in October and the following months. Iron and other minerals exist in plenty, but are not worked to any great extent. Sheep, cattle, pigs, and mules form the chief wealth of the inhabitants. Manufactures consist of coarse woollens, cotton, linen, leather, and glass.

The plateau of NEW CASTILE—which is situated between lat. 38° 23′ and 41° 15′ N., and long. 1° and 5° 25′ W.—like Old C., is also enclosed by mountains. Though lying 1800 feet lower than Old C., New C presents many similar characteristics of soil and scenery. It is mostly sterile, and scantily irrigated; little rain falls, and the nightly dews are insufficient to refresh the plains, which are entirely destitute of trees, and in summer appear quite burned up. Olives, corn, pulse, and saffron, are cultivated in some neighborhoods; but flocks of sheep constitute the chief wealth of extensive tracts of land.

The commerce, carried on by means of long trains of mules, reminds the tourist of the caravan-traffic over eastern deserts. Industry is almost entirely restricted to manufactures of coarse woollen goods. The yield of the salt-mines in the south is considerable; and quicksilver, especially at Almaden (q. v.), and iron (manufactured at Toledo) are plentiful. The Castilians have even more than the general haughtiness of the Spanish character. Their language prevails throughout the educated classes, as in the literature of Spain, and their rulers have extended their sway over the whole nation.

In the present administrative division of Spain into forty-nine provinces, the division of Old and New C., though it will long be remembered by the people, is one belonging to past history. Old C. is now divided into the eight provinces of Burgos, Legroño, Santander, Soria, Segovia, Avila, Palencia, and Valladolid. The population, distributed over an area of 25,400 square miles, amounted, in 1877, to 1,654,495. New C. includes the five provinces—Madrid, Guadalaxara, Cuença, Toledo, and Ciudad Real, and on an area of 20,200 square miles, has 1,367,304 inhabitants. Besides these provinces, the kingdom of Leon, Galicia, the principality of Asturias, and the districts of Estremadura, Andalusia, Granada, and Murcia, belonged to the crown of Castile.

C. first became an independent country in 762, and remained so until 1028, when it passed to Sancho III., king of Navarre. His son, Ferdinand I. (Great), founded the kingdom of C., and among other acquisitions annexed to it the kingdom of Leon. This union, however, was not permanent, Leon being made a separate kingdom for Ferdinand II. The two kingdoms, however, were afterwards reunited in the 13th c. in the person of Ferdinand III., and remained ever after under one sceptre. Among the successors of Ferdinand III., the most distinguished was Alfonso X., by whose direction the Alfonsine (astronomical) tables were drawn up. By the marriage of Isabella, sister and successor of Henry IV., with Ferdinand, king of Aragon (1469), the two crowns of C. and Aragon became united (1479), and from these sprang the kingdom of Spain, which, however, was not fully established before the death of Ferdinand, in 1516, when Charles I. of Spain (Charles V. of Germany) inherited both crowns.

CASTILLON, a town of France in the department of Gironde, situated on the right bank of the Dordogne, 26 miles east of Bordeaux. It has manufactures of cotton and woollen yarns, nails, and cordage. It is celebrated as the scene of the battle between the forces of Henry VI. of England and Charles VII. of France, July 1453, in which the English met with a signal defeat, their leader, the Earl of Shrewsbury, and his son, being slain. Of all their possessions in France, Calais alone remained to the English after this battle, the incidents of which were seized on by Shakspeare for the sixth scene in his play of *King Henry VI.*, Part. I. Pop. (1876) 2766.

CASTING, in Angling, is the term applied to the act of throwing a fly or a fish-bait. In casting a fly with a single-handed rod, the beginner should let out about as much line as the length of the rod; grasp the rod just above the reel; then wave it back over the right or left shoulder, with a slightly circular sweep, so as to extend the line behind; and then bring it forward with a steady cutting kind of action, urging the point of the rod towards the spot where the fly is to fall, taking care not to carry the point of the rod too far forward, or too low, or the line will not fall straight and evenly on the water. The object of the circular sweep behind is to prevent the fly from cracking off. By slightly raising the point of the rod just as the fly is delivered, the line is straightened; and the fly, checked in mid career, falls like thistle-down upon the water. Always allow time for the line to go straight out behind, for if returned too quickly, the fly cracks off. In casting with the double-handed rod, the one hand grasps the rod above the reel, and the other below it, the lower hand acting as a pivot upon which the rod turns.

In casting a bait, either for spinning, trolling, or live-baiting, the bait is suffered to hang from the point of the rod about a yard. Taking the rod in both hands, the line clasped to the rod in his right, the angler waves the bait gently back; and having first drawn as much line as he requires off the reel, and laid it loosely at his feet, he sends the bait forward with a swing towards the point he desires to reach.

CA'STING-NET, a species of net very widely distributed, having been found in use amongst various savage tribes in different parts of the world, some of whom, from long and constant practice, use it with a dexterity and address unknown in England. The nets used in England are usually from 13 to 20 feet in circumference when spread out. They are netted in the shape of a kind of long loose bag or cone; and so much is the number of meshes increased as the net progresses, that it is capable of being spread out in a perfectly flat and circular form, the apex of the cone forming the center of the circle. To this apex is attached a rope of some yards in length; when casting, this rope is fastened round the left wrist of the caster. The bottom of the net, which forms, when it is held up by the apex, the base of the cone, or, when spread, the circumference of the circle, is hung around with perforated leads or bullets. These have not only the effect of carrying the net to the bottom of the water, but also, when it is cast, of causing the net to spread open. The bottom of the net is turned up some six inches or more in depth, and hung up on the inside about every ten inches or so, to an upper portion of the net, by stout strings, so as to form a kind of purse; this is called the 'tuck.'

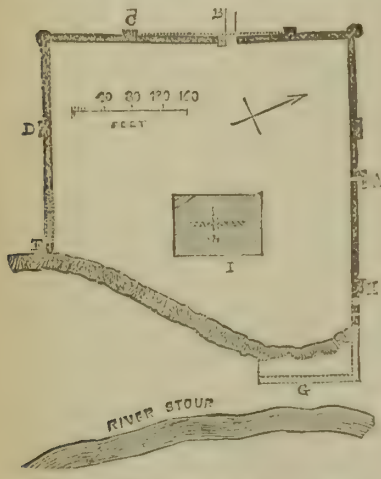
When the net is required to be cast, the caster, having fastened the rope to his wrist, and coiled it loosely in his left hand, hangs a portion of the net over his left shoulder; and then gathering as much of the outer edge of the net as he can collect in his right hand, and holding it up so as to open the net as much as possible, makes a semicircular sweep of the body and the right hand—rather difficult to accomplish without practice—and whirls the net away off the shoulder. The centrifugal motion thus communicated to the leads, &c., on the bottom of the net, causes it to open like a circle on the surface of the water, the leads carry it to the bottom, and the net thus covers all that comes within its circle. The rope is then pulled gradually, and worked from side to side, in order to narrow the circle, to bring it once more into a cone; and in their

efforts to escape, the fish that may have been covered are gradually driven into the tuck or purse of the net. When the leads are all close together, the net is lifted from the water, and the fish in the tuck are taken out. The cost of a cast-net is regulated by the circumference and the size of the mesh. They may be had from 12*s*. to 30*s*. or more.

CA'STING-VOTE, the vote by which the chairman or president of a meeting is generally empowered to *cast* the balance on the one side or the other, where the other votes are equally divided. In the House of Commons, the Speaker does not vote at all unless this occurrence takes place. As his position in this respect is felt to be a delicate one for a person whose duty it is to withdraw himdraw himself from the contentions of party, it is usual for the Speaker to vote in such a way as to give the House an opportunity of reconsidering its decision. The same rule prevails in select committees. Following a similar rule, the chairman at corporation and general meetings usually gives his casting-vote either in a way that will lead to a reconsideration of the subject, or for what seems the popular view of the case, although that may be at variance with his own convictions.

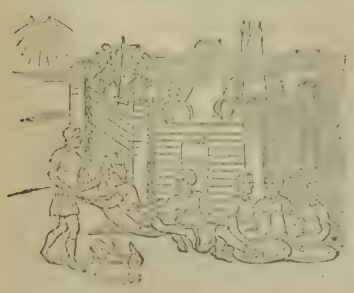
CASTLE (Sax. *castel;* Lat. *castellum*, dimin. from *castrum*), a building constructed for the purpose of repelling attack. The root of the word is the same as that of *casa*, a little house or hut, and probably means a driving off or repelling; and it is worthy of notice, in confirmation of this view, that in Welsh the radical syllable *cas*, signifies a C., separated, and also hatred, malice, &c. The *castella*, left by the Romans in Britain and elsewhere, were constructed on the general model of their stationary encampments (*castra stativa*), (see CAMP and ENCAMPMENT); and though they may have suggested the castles of the middle ages, they differed from them in being designed for military purposes only, and not also as places of permanent residence. Even Burgh Castle, in Suffolk, the ancient Garamonium, and Richborough Castle, in Kent, the ancient Rutupiæ, were encampments or fortresses rather than castles.

The accompanying ground-plan, taken from Mr. Roach Smith's interesting work on the *Antiquities of Richborough* and other places in Kent, will give a better conception than any mere description of the remains of the most remarkable Roman castellated fort to be found in this country.



Plan of Roman Castrum at Richborough:
A, postern gate; B, decuman gate; C, D, square towers; F, corner of south wall projecting over the cliff; G, return wall overthrown; H, site of tower in north wall; I, surface of subterranean building.

Besides these monuments of the military occupation of the island by the Romans, traces are found in various parts of the country of encampments or castles, which are ascribed to its aboriginal or early inhabitants. These are generally situated on the tops of hills; as, for example, the Herefordshire Beacon, on the Malvern Hills; Moel Arthur, in Flintshire; Chem Castle, in Cornwall; the Maiden Castle, in Dorsetshire; the Caterthuns, near Brechin, in Forfarshire; the Barmkin of Echt, in Aberdeenshire. It is probable that the Saxons adapted the Roman castles to a certain extent to their modes of defence, and traces of Saxon, and even Norman workmanship are found in structures which are believed to have been originally Roman. One very frequent change consisted in raising a mound of earth on one side of the walls on which the keep or citadel was erected. The Decuman and Prætorian gates were also, as at Portchester, converted into the fortified entrances peculiar to the castellated structures of the middle ages. But of castles designed for residence as well as defence, there are few or none which are of higher antiquity than the Conquest. They were part of the organization of the feudal system—castle-guard being one of the duties which the tenants were taken bound to pay in return for their lands; and till that system was developed by the Normans, the residences of persons of importance were probably guarded only by their domestic retainers, or, in extraordinary circumstances, perhaps by the national militia.



Roman Castellum.—From Vatican Virgil.

The absence of strongholds is said to have been a reason why William the Conqueror so easily became master of the kingdom; and it was as a protection against the resentment which the Conquest occasioned, that most of the great Norman castles of England were built. As these castles grew in strength by the additions and improvements of each generation, they afforded their possessors the means not only of security from their fellow-subjects, but of independence as regarded the central government. The lord of every C. became a petty tyrant; and no small portion of the history of England, and, indeed, of Europe altogether, during the feudal period, consists of an account of the attempts which were made by the monarch to extirpate what Matthew Paris has emphatically designated as 'these nests of devils and dens of thieves.' Of castles of this description, it is said that in England in the reign of Stephen (1135—1154), no fewer than 1115 were built.

The Norman C., which was the most complete structure of the kind, was generally surrounded by a moat or ditch; and in order

A NORMAN CASTLE.—From an Ancient Drawing published in Grose's *Military Antiquities:*

1. The Dungeon; 2. Chapel; 3. Stable; 4. Inner Bailey; 5. Outer Bailey; 6. Barbican; 7. Mount; 8. Soldiers' Lodgings. The Mount is supposed by Grose to be the Court hill where the lord dispensed justice, and where it was also executed.

that the ditch might be readily filled with water, the site chosen was usually either on the banks of a river, or on a peninsula running into a lake. In the latter case, the ditch was of course merely a deep cut made through the neck of land, by means of which the C. and its surroundings were converted into an island. On the inner side of the ditch, mounds were constructed, which were surmounted with walls and towers, both of which, but particularly the latter, were supplied with battlements and bastions. The entrance-gates were also protected by towers, which were usually of great strength. The communication was by a bridge, sometimes of stone, but usually of wood, which was made to draw up and down; and the entrance, in addition to thick folding-doors, was protected by a Portcullis (q. v.), which was dropped down through grooves in the masonry at the sides. The gateway, in castles of the larger sort, was further defended by a Barbican (q. v.). On passing the external wall, you entered the Bailey (q. v.), which sometimes consisted of several courts, and contained the barracks, magazines, well, a chapel, and sometimes even a monastery. The only portion of the C. which was always spoken of as distinguished from the bailey, was the Keep (q. v.) or citadel, which corresponded to the prætorium of the Roman fortification. The keep was a species of internal C., more strongly defended than any other portion of the fortress, and placed in the most advantageous position, so as to afford a last chance to the garrison when driven from the external works. As the keep had the same

design as the C. itself, it contained most of its appliances, even to a chapel, when large and complete.

The keep was also called the Dungeon or Donjon (q. v.). An excellent example of a keep is seen at Rochester Castle. The best known is probably that of Windsor, which forms so prominent an object in the surrounding landscape. The protection which the walls of his C. afforded to the retainers of a baron, in a state of society in which life and property were extremely insecure, naturally led to the construction of houses around the moat, and to this custom a very large number of the towns, both in England and on the continent of Europe, owe their origin. Along the banks of the Rhine, this process of town-formation may be seen in all its early stages; from the few peasants' houses and the village church nestling under the ivy-covered ruin on the cliff, to the large and prosperous city of Coblenz. Strange as it may seem, the existence of these castles may be regarded not only as a cause, but as an effect of a certain feeling of security on the part of the surrounding population; for where a country was thoroughly insecure, the risk of the castles falling into the hands of the enemy, and thus proving a source not of protection but of oppression, was so great as to prevent their erection. It is on this ground that Sir Walter Scott explains the slight character of the fortresses on the Scottish border, notwithstanding centuries of warfare. 'It was early discovered that the English surpassed their neighbors in the arts of assaulting and defending fortified places. The policy of the Scotch, therefore, deterred them from erecting upon the borders buildings of such extent and strength, as being once taken by the foe, would have been capable of receiving a permanent garrison. To themselves, the woods and hills of their country were pointed out by the great Bruce as their safest bulwarks; and the maxim of the Douglases, that "it was better to hear the lark sing, than the mouse cheep," was adopted by every border chief.' For these reasons, 'we do not find on the Scottish, borders, the splendid and extensive castles which graced and defended the opposite frontier. The Gothic grandeur of Alnwick, of Raby, and of Naworth, marks the wealthier and more secure state of the English nobles.'

The residence of the Scottish chieftain 'was commonly a large square battlemented tower, called a *keep* or *peel*, placed on a precipice, or on the banks of a torrent, and if the ground would permit, surrounded by a moat. In short, the situation of a border-house, encompassed by woods, and rendered almost inaccessible by torrents, by rocks and morasses, sufficiently indicated the pursuits and apprehensions of its inhabitants.'—*Minstrelsy of the Scottish Border*, Introduction.

CASTLEBA'R, the capital of the county of Mayo, Ireland, 159 miles west-north-west of Dublin. It is situated on the Castlebar river, near the head of a valley at the north-west end of the great limestone plain which includes the greater part of the counties of Roscommon, Sligo, Galway, and Mayo. The two main streets cross each other, and the chief buildings are in a square near the west end. The suburbs, as in most of the west Irish towns, consist of the wretched hovels of agricultural laborers. Pop. (1881) 3855. C. has some coarse linen manufactures. Here the Irish, in the rebellion of 1641, massacred the English parliamentary army, and in 1786 was executed the famous 'fighting Fitzgerald.' In 1798, the French general, Humbert, held the town for a fortnight. In 1846 and 1847, C. suffered extremely from the famine.

CASTLEREA'GH, Lord. See Londonderry, Marquis of.

CASTLES, in Heraldry, are often given as charges in the shields of persons who have reduced them, or been the first to mount their walls in an assault. The practice of heralds, in this as in other respects, has not been very consistent, as we learn that in 1602, a castle was granted by William Cambden, Clarencieux King of Arms, to William Frear, doctor of physic!

CA'STLETOWN, formerly the capital and seat of government of the Isle of Man, is called in Manx *Balley Cashtal*, or the Town of the Castle. C. is situated on the margin of Castletown Bay, near the south extremity of the island, and surrounds Castle Rushen, a Danish fortress of prodigious strength, having walls from 12 to 18 feet in thickness, built of limestone found on the spot, which is of so imperishable a nature that the sharp angles of the keep retain the marks of the builder's chisel, though completed in the 10th century. The castle was founded by Guthred II. of the Orrys kings of Man, and having been added to from time to time, it now consists of a pile of building of a most imposing appearance. It underwent a six months' siege by Robert Bruce in 1313. The keep is used as the public jail of the island, and the other portion of the castle consists of public offices, officers' apartments, and accommodation for the chancery and other superior courts.

Being in the neighborhood of the bold coast-scenery of the Calf of Man, Spanish Head, &c., C. is a desirable resort for the numerous tourists who frequent the Isle of Man. Ship-building has of late made progress. Near C. is King William's College, founded in 1830. Pop. (1871) 2320.

CA'STOR and PO'LLUX, the two principal stars in the constellation Gemini (q. v.), were so called from Castor and Pollux, sons of Leda and Tyndareus, king of Lacedæmon. Their sister was the famous Helen of Troy. On account of their mutual attachment, Zeus placed them among the stars.

CASTOR AND POLLUX, the name given to a meteor, seen at sea, and which, under the form of twin balls of fire, attaches itself to the masts of ships. Sailors predict fair weather from its appearance. Sometimes, however, only one ball of fire is seen; the meteor is then called Helena, and it is regarded as foreboding a storm. Shakspeare makes mention of this superstition in the *Tempest* (Act i. Scene 2).

CASTOR OIL, a fixed oil obtained from the seeds of the C. O. plant. In extracting the oil, the seeds are first bruised between heavy rollers, and then pressed in hempen bags under a hydraulic or screw press. The best variety of oil is thus obtained by pressure in the cold, and is known as *cold-drawn* C. O.; but if the bruised and pressed seeds be afterwards steamed or heated, and again pressed, a second quality of oil is obtained, which is apt to become partially solid or frozen in cold weather. In either case, the crude oil is heated with water to 212°, which coagulates, and separates the albumen and other impurities. Exposure to the sun's light bleaches the oil, and this process is resorted to on the large scale. When pure and cold drawn, C. O. is of a light-yellow color; but when of inferior quality, it has a greenish, and occasionally a brownish tinge. It is somewhat thick and viscid. Its specific gravity is high for an oil, being about 960 (water being taken as 1000). It is miscible with alcohol or spirits of wine and ether. Reduced to a temperature of 0° F., it does not become solid; but exposed to the air, it very slowly becomes rancid, then dry and hard, and serves as a connecting-link between the drying and non-drying oils. It has a nauseous smell, and an acrid, disagreeable, and sickening taste, which may be overcome by the addition of a little magnesia. The principal acid present in it is *ricinolic* acid ($HO,C_{36}H_{33}O_5$), which is allied to oleic acid.

C. O. is one of the most convenient and mildest of purgative medicines. Given in doses of one or two tea-spoonfuls, with a little peppermint-water, it forms a gentle laxative for habits easily acted on by medicine; while a dose of a table-spoonful, or a little more, will almost always succeed if it remains on the stomach. The only serious objections to the use of C. O., are its disagreeable flavor, and the sickness often produced by it; some persons get over this difficulty by floating the oil in hot coffee, which is said to remove its nauseous quality.

The adulterations of C. O. may be various. Several of the fixed oils, including lard, may be employed. The best test of its purity is its complete solubility in its own volume of absolute alcohol, which other fixed oils are not. Croton oil is occasionally added, to increase the purgative powers of the oil.

The Castor-oil Plant (*Ri'cinus communis*) is a native of the south of Asia, but now naturalized in the south of Europe, and in other warm regions of the globe. The genus *Ricinus* belongs to the natural order *Euphorbiaceæ*. It has panicled flowers, with 3—5 partite perianth; the fruit a tricoccous capsule, with one seed in each cell, the outside of the capsule generally covered with soft spines. The castor-oil plant is often cultivated in gardens in the middle, and even in the northern parts of Europe, where it is only an annual, attaining a height of 3—10 feet, but highly ornamental by its stately growth, its large, broad, palmato-peltate, 7—9-fid leaves ½—2 feet in diameter, and its generally purplish hue. Its flowers are produced in long glaucous racemes. In warmer climates, it is perennial, and its stem becomes arborescent, attaining even 30 feet in height, with a corresponding thickness, so that ladders are used for climbing it.

Castor-oil Plant:
a, end of a branch, with leaves and flowers; *b*, a capsule.

Different species which have been described, are probably mere varieties. It was known to the ancients, and appears to have been valued by them. Its seeds have been found in Egyptian sarcophagi. From the resem-

blance of its seeds to an insect called *ricinus*, it received that name from the Romans. The seeds are oval, and about four lines long. They are chiefly valued for the oil which they yield, on account of which the plant is cultivated in the Levant, Spain, Provence, the West Indies, Brazil, the United States of America, as far north as New Jersey, and in other tropical and warm temperate countries.—Although castor oil is chiefly used in medicine, it is not unfit for lamps and for oiling the wheels of machinery. The streets of Lima are lighted, and the machines used in the works of the sugar-plantations of Peru are oiled with it. The appearance of the castor-oil plant obtained for it the name of *Palma Christi*, by which it is still sometimes called. Its seeds were formerly known as *semina cataputiæ majoris*.

CASTO'REUM, a substance secreted in two glandular sacs, closely connected with, but quite distinct from, the organs of reproduction in the Beaver (q. v.), and at one time held in the highest repute in medicine, although now regarded as almost inert, and chiefly used by perfumers. The C. sacs are pear-shaped, and it appears in commerce in these sacs themselves, connected in pairs as they are taken from the animal. C. is produced both by the male and by the female beaver. In Hudson's Bay commerce, ten pair of them are equal in value to one beaver skin. Russian C. is of much higher value than American. C. was well known to the ancients. From the time of Hippocrates, it was regarded as having a specific influence over the uterus, and is still in use in the north of Europe. It was at one time also esteemed a most valuable medicine in hysteria, catalepsy, and other spasdmodic diseases.

CASTO'RIDÆ, a family of *Mammalia*, of the order *Rodentia*, of which the Beaver (*Castor*) is the type, and in which besides the beaver, the Coypu (*Myopotamus*), and the *Musquash*, some naturalists include other genera more commonly regarded as belonging to the Mouse and Rat family (*Muridæ*), as the Lemmings and Voles.

CASTRAMETA'TION is the art of encamping; and a *camp* is the result of that art. See CAMP, ENCAMPMENT.

CASTREN, MATTHIAS ALEXANDER, the greatest authority in regard to the Finnish people and language, was born in 1813, not far from the Lappish boundaries of Finland. He received his earliest instruction in the town of Tornea, and afterwards studied at Helsingfors. About the year 1838, he undertook a pedestrian excursion through Finnish Lapland, in order to extend his knowledge of the language and literature; and, in 1840, another through Carelia, to collect ballads, legends, &c., illustrative of Finnish mythology. On his return, he published in Swedish a translation of the famous Finnish poem, *Kalevala*, the metre and style of which have been imitated by Longfellow in his poem of *Hiawatha*. Aided by the government of his native province, he commenced his researches among the Finnish, Norwegian, and Russian Lapplanders, as also among the European and Siberian Samoyeds. Appointed linguist and ethnographer to the St. Petersburg Academy, C., between the years 1845 and 1849, prosecuted his laborious investigations as far east as China, and as far north as the Arctic Ocean. On his return, he was appointed first professor of the Finnish language and literature at the university of Helsingfors.

He employed himself in preparing for publication the vast materials which he had collected, but died 7th May 1852, from exhaustion—a martyr to science. Before his death, appeared *Versuch einer ostjäkischen Sprachlehre nebst kurzen Wörterverzeichniss* (Petersburg, 1849), as the first instalment of his *Northern Travels and Researches*. He also wrote *Elementa Grammaticæ Syrjaenæ* (Helsingfors, 1844), and *Elementa Grammaticæ Tscheremissæ* (1845); *On the Influence of the Accent in the Lappish Language* (Petersburg, 1845); *De Affixis Personalibus Linguarum Altaicarum* (Helsingfors, 1850), &c.

CASTRES, a town of France, in the department of Tarn, is situated on both sides of the river Agout, 46 miles east of Toulouse. The two parts of the town are united by two stone bridges. In the middle ages, C. was celebrated for its Benedictine abbey, the heads of which exercised a temporal sway over the place. Later, it was one of the strongholds of the reformed party, but it was forced to submit, and had its fortificattons demolished in the reign of Louis XIII. C. has beautiful promenades, shaded by fine alleys of trees, and in the neighborhood is a remarkable rocking-stone, 11 feet high, and weighing some 30 tons. It is of egg-shape, and rests upon its smaller end; a strong push is sufficient to cause its vibration. C. is a busy manufacturing place. Its fine wool-dyed goods are especially famous, and it has also manufactures of linen, leather, paper, soap, &c. Pop. (1876) 20,520.

CA'STRI, or KASTRI, a village of modern Greece, in the government of Phocis, situated on the south declivity of Mount Parnassus, and worthy of notice, as occupying a portion of the site of the ancient Delphi (q. v.). The famous Castalian spring, now called the Fountain of St. John, is situated between 200 and 300 yards to the east of the village. Beside it grows a plane-tree, the only one in C., which is fabled to be that planted by Agamemnon.

CA'STRO (ancient *Mitylene*), a seaport town of Asiatic Turkey, capital of the island of Mitylene, situated on the east coast, about 55 miles north-west of Smyrna. It is surrounded with walls, and defended by a castle, and its streets are narrow and dirty. Remains of the ancient town are found to the west. Pop. 6500.

CASTRO, INES DE, whose mournful fate is the subject of several tragedies and poems, was the daughter of Pedro Fernandez de Castro, and sprang from a branch of the royal family of Castile. She was appointed lady-in-waiting to the wife of Dom Pedro, son of Alfonzo IV. of Portugal. Her beauty captivated Dom Pedro, and, after the death of his wife, in 1345, he secretly married Ines.

Their stolen interviews took place in the convent of St. Clara, at Coimbra, until the secret was discovered and revealed to the king, who was made to believe that this union might prove injurious to the young Ferdinand, son of Dom Pedro by his deceased wife. Questioned by his father, Dom Pedro had not the courage to reveal the whole truth, while he refused to marry another. In the king's council, it was determined that Ines must die. To see this sentence executed, the king hastened to Coimbra, while his son, Dom Pedro, was engaged in hunting (1355); but the sight of the beautiful Ines, who, with her children, cast herself at the feet of the king, and prayed for mercy, diverted him for a few moments from his purpose. His advisers, however, soon obtained from the king permission to execute the sentence, and, in the course of an hour after the interview, Ines fell pierced by the daggers of assassins. Dom Pedro attempted a revolt against his father, but was pacified by the queen and the Archbishop of Braga, and promised not to seek revenge for the death of Ines. Two years afterwards, the king died, having shortly before his death recommended the murderers of Ines to leave Portugal, and seek shelter in Castile, where Peter the Cruel was then ruling. As several of Peter's nobles had escaped into Portugal, to avoid his oppression, he now proposed to Dom Pedro an exchange of fugitives, to which the latter (now king of Portugal) consented. Two of the assassins accordingly were delivered up, and were tortured and burned. Two years afterwards, the king, in an assembly of the nobility, declared that he had been lawfully married, by papal sanction, and in the presence of the Archbishop of Guarda, to Ines de Castro. When this statement had been confirmed by several testimonies, the king gave orders that the corpse of Ines should be removed from its grave, clothed in royal attire, with a crown on the head, and seated on a throne, should receive homage as queen. This strange ceremony was performed, the nobles of Portugal bowing before the enthroned dead, and kissing the hem of the royal robe. The body was then removed to Alcobaça followed by the king, with the bishops and the nobility, all on foot. A splendid marble monument was erected over the grave of Ines, surmounted by her statue, wearing a crown.

CA'STRO DEL RI'O, a town of Andalusia, Spain, situated on a slope on the right bank of the Guadajocillo, 16 miles south-east of Cordova. A portion of the old town is surrounded by ruinous walls; the new town lying outside of these has some good streets. It has manufactures of woollen and linen fabrics, earthenware, &c., and considerable trade in agricultural produce. Pop. 10,260.

CA'STRO-GIOVA'NNI, a town of Sicily, in the province of Caltanisetta, is situated 13 miles N.E. of the chief town of the province, on a remarkable fertile plateau, which rises precipitously to a height of 4000 feet above the sea-level. C. occupies the site of the ancient *Enna*, of which Ceres was the presiding goddess, and her most famous temple was here. The neighborhood was the scene of Proserpine's abduction by Pluto. In connection with the Punic and Servile wars, Enna has a conspicuous part in early history. There are no remains of the old town. A castle and other buildings of Saracenic origin are still standing. The district yields large quantities of sulphur. Pop. 14,633.

CASTRONUO'VO, a town of Sicily, in the Province of Palermo, 25 miles north of Girgenti. It is situated on a hill, is fortified, and in its vicinity are quarries of fine marble. Pop. 4029.

CASTROVILLA'RI, a town of South Italy, in the province of Cosenza, 34 miles north of Cosenza. It is situated on an eminence surrounded by mountains, is partially fortified, and has an old massive castle, and a trade in wine, manna, silk, &c. Pop. 7931.

CASTUE'RA, a town of Estremadura, Spain, 68 miles east-south-east of Badajoz. It is situated near the right bank of the Guadalefra, has several good streets, manufactures of brick, earthenware, &c., and a trade in agricultural produce; there is also some weaving carried on. Pop. 6870.

CA'SUAL POOR are persons temporarily relieved without being admitted to the roll of permanent paupers. See POOR-LAWS.

CA'SUALTIES OF SUPERIORITY, in the feudal law of Scotland, are such emoluments arising to the superior as depend on uncertain events. See WARD-HOLDING.

CASUARI'NA, a genus of trees of the natural order *Amentaceæ*, and of the sub-order *Casuarineæ*, which is regarded by some as a distinct natural order. The trees of this genus are almost exclusively Australian; one only, *C. equisetifolia*, being found in the South Sea Islands, the Indian Archipelago, the Malayan peninsula, and on the east side of the Bay of Bengal, as far north as Arracan. Some of them are large trees, producing timber of excellent quality, hard and heavy, the *Beef-wood* of the Australian colonists, so called from the resemblance in color to raw beef. *C. equisetifolia* is called in Australia the SWAMP OAK. It is a lofty tree, the *Toa* or *Aitoa* of the Society Islands, where it grows chiefly on the sides of hills, and where its wood was formerly used for clubs and other implements of war.

It has been introduced into India, and is there much valued, as its wood bears a great strain, and is not readily injured by submersion in water. The hardness and durability of this wood led the earlier voyagers to the South Sea Islands to designate it *Iron Wood*. *C. quadrivalvis* is the SHE OAK of New South Wales. CASSOWARY TREE is a popular generic name of the *Casuarinæ*. Some of the species are scrubby bushes. All of them have a very peculiar appearance, their branches being long, slender, wiry, drooping, green, jointed, with very small scale-like sheaths instead of leaves, they resemble arborescent *Equisetaceæ*. The fruit consists of hardened bracts, collected in a *strobilus*, or cone, and enclosing small winged nuts. The flowers have neither calyx nor corolla; the stamens and pistils are in separate flowers, the male flowers with only one stamen, the female flowers with a one-celled ovary, the male flowers in spikes, the female flowers in dense heads. More than 20 species are known.

CA'SUISTRY, called by Kant the *dialectics of conscience*, is that branch of theology and morals which professes to deal with very delicate moral questions—*casus conscientiæ*—and which supplies rules and principles of reasoning for resolving the same; drawn partly from natural reason and equity, and partly from the authority of Scripture, the canon law, councils, fathers, &c. C. has been, and still is studied chiefly by Roman Catholic theologians; but at one period Protestant divines also paid some attention to the perilous science. The rudiments of it, however, are to be sought for in antiquity. Traces of it are found in the Stoic philosophers of ancient Greece. This is not to be wondered at, for C. is not, in its essence, a device of the schoolmen, although the latter elaborated it into a science, but a natural expression of the intellect and moral nature of man, when he is placed in circumstances of great perplexity. The sound and healthy reason of antiquity, however, could not enter into the morbid refinement, or rather the insidious corruption of morals found in certain Jewish and Christian writers. The *Talmud* (q. v.) contains an enormous accumulation of casuistical questions, while the sphere of Christian ethics in the middle ages often became a mere arena for unprofitable and pernicious disputations of this nature, as is seen in such works as the *Summa Raymundiana*, *Summa Astesana*, *Summa Bartholina*, which obtained their names from their respective compilers. At a later period, the Jesuits Molina, Escobar, Sanchez, Busenbaum, &c., became notorious for their abuse of ingenuity in the construction of moral puzzles, and for the flagrant immorality of their solutions. Some of them still 'suffer the vengeance' of Pascal's immortal satire. It is nevertheless indubitable, that in the life of every man—now as formerly—*casus conscientiæ* will at times arise, when the higher laws of morality come into collision with subordinate conventional ones. The dubiety as to what the path of duty is, what *ought* to be done, resulting from this collision, naturally and legitimately leads to many nice considerations.

If these are carried on under the guidance of a pure conscience, no harm can ensue, but on the contrary much good. Such, however is not the *perverted*, C. of the Jesuits, 'the art of quibbling with God,' as M. Le Feore, preceptor to Louis XIII., called it, in which a man seeks to justify, by subtle quirks, his immoral actions. Mayer has published an account of all the writers on cases of conscience, ranging them under three heads—Lutheran, Calvinistic, and Romish.

CA'SUS BE'LLI, or a case of war, is the reason alleged by one power for going to war with another. It is found impossible to reduce these causes or reasons to any definite code, because an ambitious or aggressive power has no difficulty in *making* a reason to declare to others, without acknowledging the real reason.

CAT (Lat. *catus*), a name sometimes extended to the whole family of quadrupeds, designated by zoologists *Felidæ* (q. v.), the genus *Felis* of Linnæus; and sometimes more restrictedly applied to a section of that family, containing a number of its smallest species, the domestic cat and species most nearly allied to it. These form the subject of the present article. They all pursue their prey on the branches of trees more than on the ground, and are most expert climbers, in which, however, they are rivalled by some of the other *Felidæ*.

The origin of the domestic C. is by no means well ascertained; and by some naturalists it is described as a distinct species, under the name *Felis domestica*, which perhaps may be regarded as at least a convenient provisional designation, until satisfactory reasons can be adduced for referring it to some species existing in a wild state. By many, indeed, the domestic C. has been confidently pronounced to be a mere domesticated variety of the common wild C. (*Felis Catus*) of Europe and the north of Asia; but to this there are many objections; the most important being that it is always of smaller size, contrary to what is usually observed of the effects of domestication in animals; and that in cats of the domesticated race which have run wild, and in their known progeny, there is no appearance whatever of a tendency to return to the type of the true wild cat.—Another opinion as to the origin of the domestic C. has obtained the assent of a considerable number of naturalists; that it is derived from the *Felis maniculata*, or Gloved C. of North Africa, a species discovered by the celebrated traveler Rüppell. But Mr. Owen has stated a perfectly conclusive reason against identifying the domestic C. with the *Felis maniculata*, that the first desiduous molar tooth in the latter has a relatively thicker crown, and is supported by three roots, whilst the corresponding tooth both of the domestic C. and of the wild C. of Europe has a thinner crown, and only two roots.

The certainty, however, that the C. existed as a domestic animal in ancient Egypt, makes it not improbable that we ought to look for its original on the banks of the Nile, or in some of the countries from which the ancient Egyptians might most readily have obtained it. Of its rarity in Britain in former times, when the wild C. was common in all the woods which covered so much of the island, a curious evidence is afforded by a Welsh law quoted by Pennant—a law of the reign of Howel the Good, who died in 938 A.D.—fixing the prices of cats according to their age and qualities, beginning with a price for a kitten before it could see, and enacting that if any one stole or killed the C. that guarded the prince's granary, he was to forfeit a milk ewe, its fleece and lamb; or as much wheat as when poured on the C. suspended by its tail, the head touching the floor, would form a heap high enough to cover the tip of the tail.

It is needless to describe an animal so well known as the domestic C., or to do more than allude to its purring, its mewing, and the other sounds which it makes, its aversion to wet its feet or fur, its love of heat and comfort, its stealthy manners when in quest of prey, its patient watchfulness, so often fatal to mice, and other points of its natural history with which everybody is familiar.

The delight which a C. takes in tormenting a mouse before killing it, has sometimes been mentioned as an apparent exception to the general character of goodness manifest in the instincts of animals. It is an interesting circumstance, however, that when the prey is a bird instead of a mouse, a C. immediately inflicts a mortal wound, as if aware of its greater power of effecting its escape.

The eye of the C. is capable of much contraction and dilatation of its pupil, so that the animal can see in a very feeble light, and is thus adapted for those nocturnal habits to which, even in domestication, it shows so strong a natural tendency.

The fur of the C. is very free from any oily substance, so as to be readily injured by water, and is capable of being rendered highly electrical by friction, particularly in very dry or frosty weather. An electric spark is readily obtained from the tip of the ear.

The strong statements of Buffon gave for a time great currency to the opinion, that the C. is incapable of affection, and retains, even in a domesticated state, its savage ferocity, merely restrained by selfishness, and disguised by cunning. The belief is very prevalent that the C. forms an attachment to places only, and not to persons. There are, however, well authenticated stories which prove the C. to be capable of strong attachment to its master or mistress, although this quality is less frequently and remarkably displayed than by the dog. The instances which have, on the other hand, been recorded to show the attachment of the C. to places are well worthy of attention in connection with the subject of instinct in animals. Some of these instances of cats finding their way back from great distances to their former home, are very wonderful, and indeed cannot be explained on any grounds or principles known. The same instinct and power, however, are displayed by other animals.

The varieties of the domestic C. are neither numerous nor very different. The *Tortoise-shell C.* differs from the most common variety chiefly in color, although it is also particularly elegant and delicate in form. It is much more common in the south of Europe than in Britain.—The *Angora C.* is a beautiful variety, remarkable for its long silky hair.—The *Chinese C.* has a fine glossy fur, and is remarkable for its pendulous ears.—The *Chartreuse* is of a bluish color.—It is supposed that the *Tabby* may have undergone less change by domestication than any other variety.

The wild C. is till to be found in a few of the woods of the north of England, in the mountains of Wales, the Highlands of Scotland, and some parts of Ireland. It has entirely disappeared from districts where it was once common. It is the only beast of prey remaining in Britain the strength and fierceness of which make it at all dangerous to man; but an encounter with a wild C. is safe only to a man well armed. Fortunately, the instances of its attacking when unmolested are rare, but such instances have occurred. The wild C. is an inhabitant of deep thickets and recesses

Wild Cat.

of woods, and of the rocky and bushy ravines of mountainous districts. Its fur is held in considerable estimation. The fur is soft, long, and thick. The color of the face is yellowish-gray, with a band of black spots towards the muzzle; the forehead is brown; the head is gray, with two black stripes passing from the eyes, over and behind the ears; the back, sides, and limbs are gray, darker on the back, paler on the sides, with a blackish longitudinal stripe along the middle of the back, and numerous paler curved ones on the sides; the tail is ringed with light-gray and black, the tip being black. The length of a medium-sized male wild C. is almost two feet, exclusive of the tail, but this length is sometimes very considerably exceeded.—We know no record of any attempt to domesticate the wild cat.

The animal often called wild C. in America is the Bay Lynx. See LYNX. See Mivart, *The Cat* (1881).

Superstitions regarding Cats.—Cats have been objects of superstition from the earliest ages. In Egypt, they were held in the highest reverence; temples were erected in their honor; sacrifices and devotions were offered up to them; and it was customary for the family in whose house a C. died to shave their eyebrows. In the middle ages, they were regarded as the familiars of witches. The favorite shape of Satan was said to be that of a black C.; and the animal was an object of dread instead of veneration. There is or was a belief among sailors, that the frolics of a C. at sea portended a storm. Many people still prophesy rainy weather from a C. washing its face; and a cat-call on the house-top was formerly held to signify death.

Their supposititious connection with witches, and the foolish belief that a C. has nine lives, have led to the perpetration of great cruelties upon this harmless and very useful domestic animal. See Brand's *Popular Antiquities*, Ellis's revised edition.

CAT, on shipboard, is a name for many of the ropes or lines employed. A *cat-fall* is a rope for heaving up the anchor from the water's level to the bow; it works through *cat-blocks*, and is connected with the *cat-head*. *Cat-harpings* are small ropes for tightening the shrouds. The *cat-heads*, just named, are two strong short timbers projecting from the bow on each side of the bowsprit. A *cat-hook* fastens the ring of the anchor to the cat-block.

CAT, or CAT-CASTLE, in the military engineering of the middle ages, was a kind of movable tower to cover the sappers as they advanced to a besieged place. The garrison sometimes poured down burning pitch and boiling oil from the walls upon the C.; but occasionally this stratagem was disastrous, for the besiegers availed themselves of the blazing tower to burn the wooden gates of the town or fortress.

CAT-O'-NINE-TAILS. See FLOGGING.

CATABRO'SA (Gr. *catabrosis*, a gnawing), a genus of grasses formerly included in *Aira* (see HAIR-GRASS), but distinguished by the leathery *paleæ*, which are ribbed, truncated, erose (as if gnawed at the points), awnless, and nearly equal. The glumes are much shorter than the spikelets, membranaceous, and very obtuse. The general appearance is different from that of the genus *Aira*.—*C. aquatica* is a pretty common British grass. It is of very wide geographic and climatic range, being found throughout Europe, from Lapland to the Mediterranean, and also in the torrid regions of South America. It grows only in very moist situations, as the muddy margins of lakes and rivers, ditches, &c., and is only cultivated in irrigated meadows, or on the banks of rivers subject to be overflowed by high tides, where the ground is

Catabrosa aquatica;
a, panicle; *b*, part of stem, with roots and leaves; *c*, a spikelet; *d*, glumes.

always wet and muddy. It is one of the most valuable grasses for such situations, its foliage being peculiarly sweet, and much relished by cattle.

Both its foliage and its seeds, also, afford much food to waterfowl, and to some kinds of fish, particularly carp. Its leaves often float, and its stalks seldom rise, more than a foot or fifteen inches above the surface of the water. It has a stiff branching panicle, with whorled spreading branches, and its seeds are small. When its artificial propagation is attempted, it is more frequently by dropping freshly gathered stems into still waters, or scattering them on the mud, than by sowing the seeds. It is sometimes called WHORL GRASS, and sometimes SWEET WATER GRASS.

CA'TACOMBS (Gr. *kata*, and *kumbos*, a hollow), subterraneous chambers and passages formed generally in a rock, which is soft and easily excavated, such as *tufa*. C. are to be found in almost every country in which such rocks exist, and, in most cases, probably originated in mere quarries, which afterwards came to be used either as places of sepulture for the dead or as hiding-places for the living. The most celebrated C. in existence, and those which are generally understood when C. are spoken of, are those on the Via Appia, at a short distance from Rome. To these dreary crypts it is believed that the early Christians were in the habit of retiring, in order to celebrate their new worship, in times of persecution, and in them were buried many of the saints and martyrs of the primitive church. They consist of long narrow galleries, usually about 8 feet high and 5 wide, which twist and turn in all directions very much resembling mines; and at irregular intervals, expand into wide and lofty vaulted chambers. The graves were constructed by hollowing out a portion of the rock, at the side of the gallery, large enough to contain the body. The entrance was then built up with stones, on which usually the letters D. M. (Deo Maximo), or XP., the first two letters of the Greek name of Christ, were inscribed. Other inscriptions and marks, such as the cross, are also found. The original extent of the C. is uncertain, the guides maintaining that they have a length of 20 miles, whereas about 6 only can now be ascertained to exist, and of these, many portions have either fallen in or become dangerous. When Rome was besieged by the Lombards in the 8th c., many of the C. were destroyed, and the popes afterwards caused the remains of many of the saints and martyrs to be removed and buried in the churches.

Art found its way into the C. at an early period, and many remains of frescoes are still found in them. After being neglected for centuries they were again brought to notice by Father Bosio, who spent thirty years in their exploration. His investigations were published in 1632, two years after his death; but the most

exhaustive treatise on the subject in all its aspects is the *Roma Sotterranea* of De' Rossi (1864—1867), of which an abridgment is published in English by Dr. Northcote. The C. at Naples, cut into the Capo di Monte, resemble those at Rome, and evidently were used for the same purposes, being in many parts literally covered with Christian symbols. In one of the large vaulted chambers there are paintings, which have retained a freshness which is wonderful, considering the time and the dampness of the situation. The palm-tree, as a memorial of Judea, is a prominent object in these pictures. At Palermo and Syracuse there are

Interior of one of the Catacombs of Paris.

similar C., the latter being of considerable extent. They are also found in Greece, in Asia Minor, in Syria, Persia, and Egypt. See NECROPOLIS. At Milo, one of the Cyclades, there is a hill which is honey-combed with a labyrinth of tombs running in every direction. In these bassi-rilievi and figures in *terra cotta* have been found, which prove them to be long anterior to the Christian era. In Peru and other parts of South America, C. have been discovered. The C. in Paris are a species of charnel-houses, into which the contents of such burying-places as were found to be pestilential, and the bodies of some of the victims of 1792, were cast.

CATAFA'LCO (Ital. a scaffold), or CATAFALQUE, a temporary structure of carpentry, intended to represent a tomb or cenotaph, and adorned with sculpture and painting. It was employed in funeral ceremonies. The most magnificent C. ever made, perhaps, was that used at the interment of Michael Angelo, at Florence.

CATALA'NI, ANGE'LICA, a highly celebrated Italian singer, born at Sinigaglia, in Central Italy, some say in 1780, others in 1784, educated in the convent of St. Lucien, near Rome, where, in her seventh year, she displayed such wonderful vocal powers that strangers flocked from all quarters to hear her. She made her first public appearance at Venice, in her 16th year, and experienced a succession of triumphs in every country in Europe for more than 30 years, amassing immense sums of money. The Italian Opera in Paris was twice under her direction; but her husband's interference and extravagance brought her into much trouble. Her large queenly person and fine countenance, the immense volume, range, and flexibility of her voice, her power of sustaining her notes, in contrast with the lightness and facility of her unerring execution, everywhere took her audience by storm. Her expression, although fine, and her whole style, surprised rather than touched the heart.

In concert-singing, her great triumphs were in Rhode's Air with variations, and *God Save the King*—which she would call *shave;* and in Oratorios, Luther's Hymn, her delivery of which, especially when her marvelous voice alternated with the trumpet's sound, was so sublimely awful, that the audience were hushed and pale, and some were borne away fainting. The throat from which these wondrous sounds proceeded was physically of such dimensions, that a physician, when called to look into it, declared he could have passed down a penny-loaf! In 1830, Madame C. purchased a villa near Florence, formerly belonging to the Medici family, where she gave free instructions to girls who had a talent for singing, on condition of their taking the name of Catalani. In the spring of 1849, when political disturbances broke out in Tuscany, she repaired with her daughters to Paris, where she died of cholera on the 13th of June.

CATALAU'NIAN PLAIN (*Campi Catalaunici*), the ancient name of the wide plain surrounding Chalons-sur-Marne, in the old province of Champagne, France, celebrated as the field of battle where the West Goths, and the forces under the Roman general Aëtius, gained a great victory over Attila in 451 A.D. A wild tradition (made the subject of a striking picture by Kaulbach, 'Die Hunnenschlacht, or The Battle of the Huns') tells that three days after the great fight, the ghosts of the fallen myriads appeared on the plain, and renewed the conflict.

CATA'LDO, SAN, a town of Sicily, in the province of Caltanisetta, and 5 miles west of the town of that name. There are productive sulphur-mines in its vicinity. Pop. 12,800.

CA'TALEPSY (*katalepsis*, a taking possession of), a state of more or less complete insensibility, with absence of the power of voluntary motion, and statue-like fixedness of the body and limbs in the attitude immediately preceding the attack, a like position being also retained, unless altered by force, until the return of consciousness. Such is the abridged description of C., as commonly given in works of authority. The patient is usually in good health at the time of seizure, or subject only to nervous affections, such as hysteria (q. v.); sometimes the attack is preceded by disappointment, fear, violent exciting or depressing passions, or even religious emotions, being in such cases only an extreme form of what is otherwise called trance, reverie, or ecstasy (q. v.); on other occasions, the apparent cause is more purely physical, as in some of the hysterical cases, depending on suppressed menstruation.

In all cases of cataleptic rigidity and insensibility, it may be presumed that the brain, as the organ of consciousness, is disturbed; but it does not appear that in any considerable proportion there is structural disease. Patients rarely die during the attack, which may, however, be protracted for an indefinite period, and may even endanger life indirectly by the debility consequent on imperfect nourishment. The circulation and respiration are, in most instances, little affected; cases, however, have been recorded in which, in consequence of their failure, the patient has been supposed to be dead. See DEATH. Many of the recorded cases of C. are little worthy of credit, and it has even been doubted whether this curious disease can ever be said to exist exempt from some degree of deception, or at least voluntary and conscious regulation of the muscles on the part of the person affected. The combination of C. with hysteria, and its frequent association with what are called the higher phenomena of mesmerism (see ANIMAL MAGNETISM), are undoubtedly circumstances of great suspicion; but it would certainly be wrong to suppose that all the cases described were fictitious, and not less so to classify them all under the head of pure imposture. Epidemic C. has been described, and in such cases it would appear plain that the principle of imitation, so powerful in producing nervous disease, must have been at work. The remedies of C. are the same as those of the states to which it is so nearly allied, and of which it may be said to form a part. Moral means form a large part of the treatment, as in hysteria. In some cases, it may become necessary to administer food by means of the stomach-pump, and this even for weeks or months. We have seen such a case end in complete recovery.

CA'TALOGUE (Gr. a list). See BIBLIOGRAPHY, BRITISH MUSEUM, LIBRARY, STARS.

CATALO'NIA (Spanish, *Cataluña*), an old province and principality of Spain, now divided into the provinces of Barcelona, Tarragona, Lerida, and Gerona, the total area being 12,180 miles, and the population (1877) 1,749,710. C. occupies the north-eastern corner of Spain, having France on the north, and the Mediterranean on the east and south-east. It is watered by the Llobregat and the Ter, and by some of the affluents of the Ebro, the last-mentioned river having its embouchure in Catalonia. The coast is rugged, its boldest promontories being Capes Creus and San Sebastian, and its deepest indentations the Bays of Rosas and Tarragona. With the exception of a few low plains of limited extent, the soil of C. is that of a wild mountainous region formed by numerous offsets or terraces of the Pyrenees, one great ridge or series of ridges extending through the center of the province.

The terraces, sloping abruptly down to the coast, or to the narrow coast plains, are divided by the valley of Llobregat into the lower and the upper Catalonian mountains.

The climate of C., though fog and rain are frequent, and extreme and rapid changes of temperature prevail, is on the whole healthy and favorable to vegetation. Near Barcelona, oranges flourish in the open air; the fields in some parts are bounded by aloe-hedges, and olives grow on Montserrat. Cork-trees grow on the mountains, and thickets of thorn-apple, laurel, myrtle, pomegranate, box, rosemary, &c., extend where the cork has its limits. Northern upper C. has a more severe winter than the south; but everywhere, vineyards and olive-gardens cover the slopes, and cornfields extend in the valleys. Among the other products are hemp, flax, madder, barilla, and saffron. Hazel-nuts, a variety called Barcelona nuts, are extensively grown. Meadow-lands and pastures are comparatively rare, and horned cattle are, therefore, mostly confined to the districts bordering on the Pyrenees; while few horses and mules are kept; but sheep, goats, and swine are bred in considerable numbers. Silk-worms and bees are also reared. The coasts abound with fish, and game is plentiful. The minerals are coal, copper, manganese, zinc, lead, cobalt, salt, sulphur, and many varieties of marble.

C. is the principal manufacturing province of the kingdom—is, in fact, 'the Lancashire of Spain.' The inhabitants are neither French nor Spaniards, their language, costume, and habits being

quite distinct from those of either; they have also local coins, weights, and measures. In energy, industry, and intelligence, they greatly surpass the rest of the Spaniards.

C., under the name of *Hispania Tarraconensis*, was one of the earliest, and remained among the last of the Roman provinces. It was invaded and captured by the Alans, who were followed by the Goths, hence its name, *Gothalania*, changed into Gothalunia or Catalonia. In the 8th c., the Arabs gained possession of the southern part. When Charlemagne, in 788, subjugated Spain as far as the Ebro, C. formed the central portion of the Spanish mark, governed by French counts, having Barcelona as their residence. They soon made themselves independent of France. In 1137, Earl Raymund Berengar, by his marriage, united C. with Aragon; and the marriage of Ferdinand and Isabella (1469) united both with Castile, and so C. became a portion of the Spanish monarchy, but never a very peaceable one. In modern times it has repeatedly taken a prominent share in Carlist or other insurrections.

CATA'LYSIS (Gr. dissolution) is a term applied in Chemical Physics to a force supposed to be exerted by one substance upon a second, whereby the latter is subjected to change or decomposition, whilst the former, or acting substance, remains comparatively unaltered, and does not combine with it. The force, indeed, has been ascribed to the mere 'action of contact.' Fermentation is an example of this force (see BEER), when one part of yeast acting upon the sugar of the sweet worts, without entering into combination with it, compels 100 parts of sugar to pass into alcohol and carbonic acid. Germination, or the sprouting of grain when placed in the ground, is another example where one part of *diastase* changes 1000 parts of starch into sugar. No plausible theory has been brought forward to account for these changes, or to define what the force of C. is. Liebig has suggested, as an explanation, 'that a body in the act of combination or decomposition enables another body with which it is in contact to enter into the same-state;' but this view does not explain C., as that force does not act in the majority of cases where changes are proceeding, and, moreover, the acting substance, while changing itself, never throws the body acted upon into the *same state of change*, but causes it to assume a new series of changes different from those pursued by itself.

CATALYSOTYPE, a name given by its inventor, Dr. Wood, to a modification of the calotype process, upon the assumption that light set up a catalytic action (see CATALYSIS) among the ingredients employed. The paper is first washed with very dilute hydrochloric acid, to prevent the formation of yellow patches of insensitiveness, and then treated with syrup of iodide of iron containing a trace of free iodine; it is then partially dried between folds of blotting-paper, and sensitized by brushing over it a solution of nitrate of silver of ten grains to the ounce. Immediate exposure in the camera follows; after which, though no picture be visible at first, if it be allowed to remain in the dark for a period which varies with the length of time it was exposed, and the amount of light, a negative picture of great perfection is gradually developed. It is not necessary, however, for the explanation of this phenomenon, to assume that a catalytic action is set up, inasmuch as the ordinary chemical reactions are quite sufficient to account for it. As soon as *nitrate of silver* comes in contact with the moist *iodide of iron* with which the paper is first imbued, an interchange of elements takes place, *iodide of silver* is precipitated in the pores of the paper, and *protonitrate of iron* is diffused over the surface; and this latter salt is even a more energetic developing agent than the ordinary gallic acid, hence the seemingly spontaneous appearance of the picture. This process is so uncertain in its results, that it is seldom practised.

CATAMARA'N is a raft formed of three planks lashed together, the middle one serving as a keel, and the other two for the sides. The rower stands or kneels on the middle plank, and

Indian Catamaran.

works a paddle. These simple vessels are used by the natives of Madras, to maintain communication between ships and the shore, ordinary boats being rendered unsafe by the surf. By the adoption of a similar construction on a larger scale, some of the catamarans are made large and strong enough to carry goods, and even artillery. Catamarans used in Brazil consist simply of three logs of wood tapered at the end and lashed together; they carry a sail.

CATA'NIA, or CATANEA, a city and seaport of Sicily, situated on the east coast, near the foot of Mount Etna, 31 miles north-north-west of Syracuse. The fertile and well-cultivated neighborhood of C., extending along the south-east base of Mount Etna, is styled 'the granary of Sicily,' and has given to C. the title, 'La Bella Catania.' By eruptions of the great volcano and attendant earthquakes, the city has been several times almost entirely destroyed—especially in the year 1693; but out of its ruins it has always risen with increased beauty, and it is now the finest city in Sicily, being built throughout on a beautiful and consistent plan, from which no deviation is allowed. The harbor of C., formerly good, was choked by a stream of lava in 1693, and the mole was partly destroyed, so that now it has only a roadstead, which is guarded by a fort, and serves as a landing-place. It has several squares, the finest of which, in front of the cathedral, has a statue of an elephant sculptured in lava. Among its chief public buildings are the Benedictine convent and church of San Nicolo, with one exception, the grandest structure of the kind in Europe; the town-hall; the cathedral, with its noble granite columns; and the university, founded in 1445. It has besides many handsome churches and convents, and several educational and charitable institutions, and is the seat of one of the three high courts in the island. The inhabitants, formerly much more numerous, amounted in 1881 to 97,355, and are distinguished by their commercial spirit and industry. C. has manufactures of silk and linen goods, and of articles in amber, lava, wood, &c.

Among the remains of ancient times, that earthquakes have spared, are those of a theater, an odeium, a temple of Ceres, Romon baths, and an aqueduct. C., anciently known by the name *Catana*, was founded by a Greek colony of Chalcidic origin, in the latter part of the 8th c. B.C.; and as early as the beginning of the 5th c. B.C., it was esteemed one of the most flourishing towns in Sicily. It was taken by the Athenians under Nicias, and was desolated by Dionysius I.; but again rose under the Roman sway into its former importance. Augustus here founded a Roman colony. It suffered at the hands of the Goths, but once more, under the Byzantine empire, became one of the principal cities in the island. C. gives name to the province of which it is the capital, and which is one of the richest in Sicily, with an area of 1743 square miles, and a population, in 1881, of 563,217.—C., GULF OF, an inlet of the Mediterranean, on the east coast of Sicily, extends in the form of a semicircle from La Trezza Bay to Cape Santa Croce, a distance of 18 miles. It is about 10 miles deep, and receives the river Giaretta.

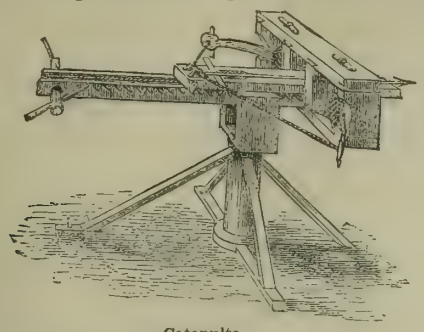
CATANZA'RO, a city of South Italy, in the province of the same name, is beautifully situated on the declivity of a rocky hill, near the Gulf of Squillace, and in the midst of a very fertile district. On account of its agreeable climate, many wealthy families have made it their residence. It has a cathedral, an old castle of the Norman period, a college, one of the largest, as it is one of the best conducted in the country, and is the seat of one of the four great civil courts of the kingdom. C. suffered very severely by an earthquake in 1783. It has manufactures of silk-velvet and woollen fabrics, and an active trade in agricultural produce. Pop. (1881) 20,931.

CA'TAPLASM (a Greek term for a poultice), an application to diseased or painful parts, for the purpose of promoting suppuration, relieving pain, and stimulating or soothing the skin, according to circumstances. A C. may be composed of any moist pulpy substance of sufficient consistence to retain the water without dripping or soaking through the thin muslin covering in which it is generally wrapped. The making of a poultice well is a matter of some nicety, and unless the proper consistence is given to the mass, the application is apt to do more harm than good. The linseed-meal poultice is the most easily made, and most satisfactory of all soothing applications. The meal is stirred gradually into a sufficient quantity of boiling water, placed in the bottom of a small basin or teacup, until a perfectly smooth pulp is formed of the proper consistence, and in quantity sufficient to cover completely, to the thickness of three-quarters of an inch, the whole pained part. The pulp is then folded up in muslin or thin calico, and applied as soon as the heat will permit it to be borne.

The bread and milk, or even bread and water poultice, is also very good; as is also the oatmeal-porridge poultice, to which a little butter may be added with advantage. A spoonful or two of yeast may be added, if there are foul discharges, or peat charcoal may be sprinkled on the surface of the poultice before it is applied. Carrot poultices are in great favor with the people in some parts of the country. Hemlock poultices, made of the fresh leaves, or of the dried leaves, with the aid of some powder of the leaves, form a valuable sedative application in painful diseases; and poppy-heads, or even opium, are sometimes infused in the water of which a poultice is made, for the same purpose. A stimulating C. or poultice may be made by sprinkling oil of turpentine, or chloroform, or mustard in moderate quantity on the surface of any ordinary poultice. When considerable irritation of the skin

in a short time is desirable, a mustard C. or sinapism (*sinapi*, mustard) is used.

CATAPU'LTA, an engine of war used by the ancients, somewhat resembling the crossbow. In the C., a string or rope, suddenly freed from great tension, gave a powerful impulse to an



Catapulta.

arrow placed in a groove. There were great catapultas, fixed upon a scaffold with wheels, which were used in sieges, and small ones, carried in the hand, which were employed in the field. For a description of similar engines of ancient warfare, see articles BALISTA and ARBALEST.

CA'TARACT, an opaque condition of the lens of the eye. It is readily distinguished from opacities of the cornea, or clear front part of the eye, by its position just behind the pupil—that round and varying aperture in the iris through which light is admitted into the back of the eye. C. may affect the lens alone (lenticular C.), or the front or back of the capsule of the lens (capsular C.), or both lens and capsule (capsulo-lenticular C.). Its whiteness varies from that of half-boiled white of egg to that of snow. Heat will produce a like change on the lens out of the body, just as it changes white of egg from transparent to opaque. The rounded lens of the fish is seen at the table in this opaque condition.

C. is painless, and unaccompanied by inflammation. It occasions blindness simply by obstructing the passage of the light; but C. alone does not produce so complete blindness but that the patient can tell light from darkness. It may occur at any age, but is most common in elderly persons, and is not unfrequent in children, who may be even born with it. The catoptric test, as it is called, is an ingenious method of distinguishing incipient C. from certain other deep affections of the eye. When a lighted candle is held before the eye of a person whose back is to the window, three candles are seen in the healthy eye. Two are erect—the large front one caused by the convex cornea, the smaller and fainter one behind by the convex front of the lens. The third, occasioned by the concave back of the lens, is in the middle; is small, bright, and, turned upside down; and, when the candle is moved, goes in the opposite direction, while the two erect images move with the candle. When the back of the lens becomes opaque, the inverted image is obscure or disappears; and when the front of the lens is affected, only the great front image, caused by the cornea remains. This curious experiment may be tried on a large scale, by holding a common bi-convex lens a little way behind a watch-glass. Then, on greasing the back of the lens, to imitate C., the inverted image disappears, and on turning the lens round, all but the image in the watch-glass disappears.

No medical or other treatment has any influence in arresting the progress of C., nor can it be cured but by a surgical operation. A clever imposture used to be practised by quacks. By applying belladonna to the eye—as the surgeon does when he wishes to dilate the pupil for an examination or operation—some little light was temporarily admitted through the less opaque edge of the lens. The patient beginning to see somewhat better, after long and increasing dimness of vision, began to congratulate himself on a cure; the quack, of course, hastened to get his money without waiting for the further result, which was sure to be blank disappointment. So long as there is fair vision with one eye, the operation on the other may be delayed. It is a mistake to delay the operation in children on account of their tender age. The sooner it is done the better, both for the eye and the education of the child.

Three methods of operation are practised. 1. For *absorption* or solution. This is suitable for children, in whom the C., like the natural lens, is soft, and in all other cases in which there is reason to suppose that the C. is soft. An appropriate needle is passed through the cornea; made to open and lacerate the front of the capsule, the rags of which curl out of the way behind the iris, so that their subsequent opacity does not obstruct the light; then the soft cataractous lens is punctured and picked so as more effectually to admit the aqueous humor, which naturally fills the space between the lens and the cornea, and which has the remarkable property of absorbing or dissolving the lens or cataract when admitted within the capsule. This operation may require to be repeated several times, at intervals of a few weeks, before the whole C. is dissolved.

2. *Displacement.* A needle is passed through the fore part of the white of the eye, until it is seen through the upper part of the pupil, lying across the front of the upper part of the lens. This is now pressed back, so as to make the lens sink down and back into the vitreous humor, when it is either slowly absorbed, or may in part permanently remain. The older method of displacement, termed couching, in which the lens was pushed more directly downwards, is now abandoned, as more likely to press on the retina, and cause subsequent evil to the eye. 3. *Extraction.* Half the cornea, through nearly its whole breadth, is divided with Beer's knife, an operation requiring great skill; the front of the capsule is opened, and disposed of with a needle; and the lens is gently assisted out of its place, through the pupil, and out of the opening in the cornea, great care being taken not to allow the vitreous humor to follow. Displacement and extraction are both applicable to hard cataracts, the form it generally takes in old age, as the lens itself becomes naturally harder with age, as well as more flat and amber-tinted. Displacement is more likely to be followed by bad consequences, some time after, from the presence of the displaced lens, while the risk of extraction is greater at the operation. The surgeon must decide which is best for each case. Though not so simple and successful as the operation for absorption through the cornea for soft C., displacement and extraction are generally very successful in restoring vision. The place of the lens is supplied by fluid humor, the refracting power of which is nearly equal to that of the lens, and the restoration of vision may be perfect. All of these operations require minute anatomical knowledge (see EYE), and great nicety and skill in the use of the instruments.

CATA'RRH (Gr. *katarreo*, I flow down), a disease of great frequency in temperate latitudes, especially in changeable moist climates in the winter season. From its well-known connection with sudden falls of temperature, and other epidemic or atmospheric causes (see INFLUENZA), as also from the chill often experienced at the commencement of the disease, it is popularly called *a cold*—a term, however, perhaps somewhat less definite in its meaning than C., which word is usually restricted to the case of a cold affecting the chest, and attended with discharge of mucus by coughing. A 'cold in the head' is termed, in strict scientific language, *Coryza;* we shall, however, keep both forms in view in the present article. C., or cold, commonly begins with a feeling of chilliness, which may or may not be attributable to external causes. Sometimes this is absent, there being only a sense of languor and indisposition; not unfrequently there is no sensation of an unusual kind, until a stuffing is experienced in the nostrils, or severe headache, or hoarseness with cough, or oppression of the breathing.

The regular form of a cold is to attack the nostrils first, and afterwards the air-passages leading to the chest. When it habitually attacks the chest, without running through its ordinary course as indicated above, there is often some special cause of delicacy in the lungs, or some constitutional tendency towards consumption (q. v.). The discharge is in the beginning watery, becoming afterwards more abundant, glairy, and of yellowish color; the early stages of the disease are attended by considerable irritation of the surfaces affected, and probably no one of the little miseries of life is more prostrating and discouraging for the time than a bad cold in the head. The tendency of C. to attack the chest, and thus to pass into Bronchitis or Pneumonia (q. v.), or to lay the foundation of tubercular disease, constitutes almost its only danger. See CHEST.

The treatment of a cold is commonly a simple matter, so far as the particular attack is concerned. Confinement to the house, and, in severe cases, to bed, or to the sofa, for a day or two; a warm hip or foot bath, to remove the chill; light farinaceous diet, and, if the stomach and bowels are at all loaded, a dose or two of some gentle laxative, are commonly sufficient to subdue the disease. Some persons cure their colds by entire abstinence from food, and as much as possible from drink; others by a large opiate, or by a succession of doses of Dover's powder; others by spirit of mindererus and paregoric; some even profess to carry out the popular maxim, 'stuff a cold, and starve a fever,' and maintain that a good dinner, and a tumbler of whisky or brandy toddy, are the best specifics. That colds get well under all these methods, need not be denied; but that any violently perturbative or specific practice assists the cure, or shortens the disease has yet to be proved; and multiplied experience has shown, that 'stuffing a cold' is by no means to be commended. In the later stages, however, a more liberal diet than at first, and in some cases even a moderate allowance of stimulants, affords considerable relief from the feeling of depression that remains for a time on the sub-

sidence of a catarrh. The tendency to this disease, when habitual and when not dependent on any form of constitutional disorder requiring special means for its cure, is best met by the daily use of the cold bath, with frequent exercise in the open air, and proper ventilation of the sleeping apartment; also by friction of the skin, and by clothing, which, without being oppressive, is comfortably warm. Exposure to draughts or sudden chills, when the surface is perspiring, is to be avoided; but a close confined air habitually breathed in a workshop or bedroom, is a fruitful predisposing cause of the disease.

CATAW'BA, a light sparkling wine, of rich Muscadine flavor, produced in the neighborhood of Cincinnati, Ohio, United States. It is made from a grape called the Catawba grape, 'first found growing on the banks of the Catawba River, in Carolina.' This wine, which is scarcely known in England, is now in extensive use in North America, where it is gradually superseding the importation of the Rhenish and French sparkling wines, to which, in general character, it bears a resemblance. The vineyards where the C. is produced, are situated on the steep and beautiful slopes with a southern exposure on the banks of the Ohio river, under the shelter of high hills on the north. The first great grower of the C. was Mr. Longworth, an esteemed and wealthy proprietor in this quarter, who, embarking in the pursuit less on business considerations than as an enthusiast, succeeded, after much patient care and expense, in producing a wine that throughout the States finds more favor, and commands a higher price, than the choicest wines imported. Some of the finer kinds of C. rival the best champagne in delicacy and purity, and are not to be confounded with inferior American imitations.

CATBALO'GAN, or CADVALO'NGA, a town of the Philippines, capital of the island of Samar, on a small bay on the west coast. The houses are mostly constructed of nipa palm, but there are some of stone. Pop. about 7000.

CA'T-BIRD (*Turdus felivox*), an American thrush, of the same group with the mocking-bird, which it resembles in its vocal powers. It is a bird of passage, making its way northward in spring through Georgia and Carolina as far as Massachusetts. It feeds on fruit and berries of all kinds, worms, and insects; builds a large nest of dry twigs, weeds, &c., without any attempt at concealment, in a bush or tree, often in the immediate vicinity of human habitations, and shows extraordinary boldness in the defence of its young. It has its name from a mewing cry which it utters when annoyed by an intruder approaching too near its nest.

CATCH, a species of musical composition peculiar to England, and in the canon style. The words of the C. are generally humorous, and intended to be sung in social parties over a glass. The music is generally for three voices, of which there exist hundreds of specimens from the time of Purcell to the present day. As in the canon, each voice takes up the subject at a certain distance after the first has begun. One of the best specimens of a C. is by Calcott, on Hawkins's and Burney's Histories of Music, where the humour lies in one of the parts repeating 'Burney's history'—sounding like 'burn his history'—while the others are advocating Hawkins.

CA'TCHFLY, the common English name of several plants of the natural order *Caryophyllaceæ*—as *Silene Armeria*, *S. Anglica* *Lychnis Viscaria* &c.—which being clammy, in consequence of a peculiar exudation, on the calyx, on the joints of the stem, &c., often prove fatal to insects settling upon them. See LYCHNIS and SILENE.—The name is sometimes employed by botanists as a sort of popular equivalent to *Silene*.—*Dionæa muscipula* is also sometimes called the Carolina Catchfly. See DIONÆA.

CA'TCHPOLE, a sheriff's officer, or bailiff, is so called in England, probably because he was in use to catch his victim by the *pole*, or head.

CATEAU, LE, or CATEAU-CAMBRESIS, a town of France, in the department of Nord, situated on the Selle, 14 miles E.S.E. of Cambrai. C. has manufactures of shawls, merinoes, calicoes, and leather; it has also breweries and distilleries. Pop. (1876) 9444. It is celebrated as the place where, in 1559, the treaty known as that of Cateau-Cambresis was concluded between Henri II. of France and Philip II. of Spain, by which the former monarch ceded to the latter, Savoy, Corsica, and nearly 200 forts in Italy and the Low Countries.

CA'TECHISM, from a Greek word, *katecheo*, which means to resound, or sound into one's ears; hence to instruct by word of mouth. Persons undergoing instruction in the principles of Christianity were hence called *catechumens* (*katechoumenoi*) and the teacher appointed for this purpose was called a *catechist*. Hence any system of teaching by question and answer is called a Catechism.

Catechisms have long formed one of the principal means employed for popular instruction in the truths and duties of the Christian religion. The composition of the first catechisms was, in all probability, suggested by the ordinary oral instruction of catechumens, and was intended for the help both of teachers and pupils. It appears to have been in the 8th and 9th centuries that the first regular catechisms were compiled, of which that by Kero, a monk of St. Gall, and that ascribed to Otfried of Weissenburg, are among the most noted. At later periods, the use of catechisms prevailed chiefly among the opponents of the hierarchy, as among the Waldenses, the Albigenses, the Wickliffites, and, above all, among the Bohemian Brethren. The term C. appears to have been first employed in its present sense among the latter. At an early period in the history of the Reformation, the Reformers began to avail themselves of this method of popular instruction, and their catechisms became important instruments in that great religious movement. In 1520, Luther published his first short catechism.

In 1525, Justus Jonas and John Agricola were intrusted with the preparation of a catechism. In 1529, Luther published his Larger and Smaller Catechisms, which found a place among the symbolical books or standards of the Lutheran churches. A number of catechisms were published also by the Swiss Reformers, and by those of England and other countries. The Geneva catechisms, Larger and Smaller, were the work of Calvin. They were published in 1536, were speedily translated into various languages, and became acknowledged standards of the Reformed churches, not only in Switzerland but in the Low Countries, in France, and in Hungary. The Church of Geneva has set aside the authority of these catechisms.—The Zurich C. is received as a standard in the Church of Zurich.—The Heidelberg or Palatinate C. is of greater importance, however, than any other as a standard of the Swiss Reformed churches. It was compiled by the Heidelberg theologians, Caspar Olevian and Zacharias Ursinus, at the request of the Elector Frederic III. of the Palatinate; it was published in 1563, was approved by several synods, and was subjected to a revision by the Synod of Dort.—In the Church of Rome, the Romish or Tridentine C. is of a high authority. It was prepared in accordance with the decrees of the Council of Trent, by Archbishop Leon. Marino, Bishop Ægidius Foscorari, and the Portuguese Dominican, Francis Fureiro; revised by Cardinals Borromeo, Sirlet, and Antonian, and sanctioned by Pope Pius V. It was published at Rome in 1566.—The C. of the Orthodox Greek Church was prepared by Peter Mogilas, metropolitan in Kiew, and published in 1642. It received authority as a standard or symbolical book from a synod at Jerusalem in 1672. It is often called the Larger Russian C., to distinguish it from the Smaller C., prepared by order of Peter the Great.—Besides these catechisms, which have a historic interest, or are of importance from their symbolical character, there have appeared at all periods, since the Reformation, many others, both Protestant and Roman Catholic, some doctrinal, some controversial, some devoted to particular subjects, as the sacraments, or to particular purposes, as the preparation of candidates for admission to the Lord's Supper, some adapted to the mental capacity of very young children, &c. The opinion, however, has become prevalent, that doctrinal abstracts are not the best form in which religion can be presented to the young, and the use of catechisms has accordingly been in some measure relinquished in favor of other methods of instruction.

The C. of the Church of England, with which we are most familiar, is the smaller one published in the Book of Common Prayer. It is in two parts: the first contains and explains the Baptismal Covenant, the Creed, the Ten Commandments, and the Lord's Prayer; the second explains the two sacraments, Baptism and the Lord's Supper. It is not known with absolute certainty who was the author of the first part; probably Cranmer and Ridley had the principal hand in framing the questions and answers. It was originally put forth with the 42 Articles in the reign of Edward VI., and condemned as heretical in the reign of Mary. It must not be confounded with Cranmer's C., which was a larger work, differently arranged, and translated chiefly from the German C. used in Nuremberg. This first part of the church C. is spoken of as the *Shorter* Catechism.

There was a *larger* church C. compiled also in the reign of Edward VI., by Ponet, as is supposed, and it corresponds in some degree with the smaller work above described. It was afterwards revised and enlarged by Noel, Dean of St. Paul's, and published in 1570; and though never officially promulgated by the church, it has some authority from having been approved by the lower house of Convocation. At the Hampton Court Conference, in the reign of James I., the *Shorter* C. was considered too short, and the larger one of Noel's too long; and accordingly, at the king's suggestion, an addition was made to the former of that explanation of the two sacraments which now forms the second part of the church catechism. This was drawn up by Dr. Overall. The whole is a work much esteemed by all sections of the church as remarkable for its simplicity, truth, and catholicity. It, however, states the baptismal theory in a way that is not very acceptable to the extreme Low Church party. The rubrics in the Common Prayer Book enjoin the teaching of the C. in the church on

Sundays and holidays after the 2d lesson at Evening Prayer; and the 59th canon contains a like injunction, imposing penalties on the clergy who neglect this. The custom of catechising in the church had fallen into almost universal disuse, but in many parishes it has been revived with excellent results.

The Larger and Shorter Catechisms, which, with the Westminster Confession of Faith, constitute the standards or symbolical books of the Presbyterian churches throughout the British empire and the United States of America, were compiled by the Assembly of Divines at Westminster (q. v.): the Shorter C. 'to be a directory for chatechising such as are of weaker capacity;' the Larger, 'for catechising such as have made some proficiency in the knowledge of the Christian religion.' The Shorter C. was presented to the English House of Commons on 5th November 1647; the Larger on the 14th April 1648; and in July 1648, both received the sanction of the General Assembly of the Church of Scotland—The General Assembly, in the act approving of the Larger C., declaring it to be 'a rich treasure for increasing knowledge among the people of God,' and that 'they bless the Lord that so excellent a catechism has been prepared.'

The Shorter C. has, however, been far more generally used for the purpose of instruction than the Larger, which has been generally felt to be too minute in its statements, and too burdensome to the memory to be employed as a catechism. Even the Shorter C. is regarded by many, who substantially adhere to its doctrine, as carrying the statement of dogmatic theology beyond what is proper for elementary instruction, whilst it has been long felt to be unsuitable for the very young and the very ignorant, and its use is now almost always preceded by that of catechisms more adapted to their capacity. Its influence, however, has been very great in forming the religious opinions, and in exercising and training the intellectual faculties, wherever Presbyterianism has prevailed; for it has been, and still is, in almost universal use among Presbyterians speaking the English language, and to a considerable extent among Independents or Congregationalists both in Britain and America. In Holland also, a translation of it has been much used. It is very generally regarded, by those whose doctrinal views are in accordance with it, as an admirable compend of Christian doctrine and duty.—The authorship of the Westminster Assembly's Catechisms has been the subject of much debate, or at least the authorship of the first drafts of them; it being admitted that they were prepared with great care by committees of the Assembly. But the probability appears to be, that their authorship is to be ascribed entirely to these committees; and that, like the Westminster Confession of Faith, they are thus the result of the joint labors of many. From discoveries made by the late Dr. M'Crie, it seems probable that at least the plan or scheme of the Shorter C. is to be ascribed to Mr. Palmer.

CA'TECHU, a substance employed both as a coloring matter and medicinally as an astringent. The C. of commerce is obtained chiefly from East Indian trees, such as the C. tree (*Acacia Catechu*), betel-nut, &c.; but the greater part of that which is exported from India is made from the C. tree. It is known in India by the name *Kutt;* and C. is said to be a name compounded of two words signifying *the juice of a tree* (*cate*, a tree, and *chu*, juice). CUTCH is another form of one or other of these names, and is a common commercial name. The heart-wood alone of the tree yields C., which is obtained by cutting it into small chips, and boiling it in water, straining the liquid from time to time, and adding fresh supplies of chips, till the extract is of sufficient consistence to be poured into clay moulds, which are usually of a square shape; or when of the thickness of tar, it is allowed to harden for two days, so that it will not run, and is formed into balls about the size of oranges, which are placed on husks of rice or on leaves, and appear in commerce enveloped in them.

The C. manufacturers in Northern India move to different parts of the country at different seasons, and erect temporary huts in the jungles, where they carry on their operations. The C. tree abounds chiefly in the Bombay and Bengal presidencies; is a small, erect, thorny tree, with a roundish head of (generally) prickly branches. Its sapwood is yellow, the heart-wood dark red. C. is brittle, and can readily be broken into fragments; is soluble in water, and possesses an astringent taste, but no odor. It is a very permanent color, and is employed in the dyeing of blacks, browns, fawns, drabs, and greens. It contains much tannin, and an acid called Catechuic Acid, which can be isolated in white silky crystals. It is often adulterated with earthy substances, but its ready solubility in water and alcohol, should at once show the presence of such, by leaving them behind in an insoluble state.—The C. of the betel-nut is obtained by boiling first the nuts, and then the extract to a proper consistency. A first boiling of the nuts for some hours is said to yield a black kind of C., called *Kassu;* and a second boiling, after the nuts are dried, a yellowish-brown kind, called *Coury*, which is considered the best, and is sold for the highest price. The former appears in commerce under the name of Colombo C. or Ceylon C. (or Cutch), in the form of circular flat cakes, covered on one side with husks of rice. The latter does not seem to reach Europe.—Gambir (q. v.) may be regarded as a kind of catechu. Kino (q. v.) is sometimes confounded with catechu. *Terra Japonica*, or JAPAN EARTH, is an old name for C., not quite disused, which was given to it on the supposition of its being an earthy substance brought from Japan.

CATECHU'MENS (Gr. persons undergoing a course of instruction; see CATECHISM), the appellation given, in the early Christian Church, to those converted Jews and heathens who had not yet received baptism, but were undergoing a course of training and instruction preparatory to it. They had a place assigned them in the congregation, but were not permitted to be present at the dispensation of the Lord's Supper. In the apostolic age, converts appear to have been at once admitted to the sacraments; but afterwards this ceased to be the case, and a period of probation was required. The C. were divided into different classes or grades, according to their proficiency—those of the lowest grade were not permitted to be present during the prayers of the congregation; and those only of the highest, and who had been declared fit to be baptized at the next administration of the ordinance, were permitted to witness the dispensation of the Lord's Supper.—The term C. was afterwards employed to designate young members of the Christian Church who were receiving instruction to prepare them for confirmation or for the Lord's Supper, and it is still often used in this sense.

CA'TEGORIES. This designation has come down to us from Aristotle. One of the books of his *Organon* or Logical System is so named. The C., or Predicaments, as the schoolmen call them, are to be understood as an attempt at a comprehensive classification of all that exists, for the purpose of logical affirmation, proof, or disproof. The entire universe may be classified in various ways—as into things celestial and terrestrial; into matter and spirit; into organized and unorganized; into minerals, plants, animals, &c. But the classification contemplated under the C. proceeds on the very general properties or attributes that most extensively pervade all existing things, although in unequal degrees. A good example is Quantity, which pertains to everything that we know or can think of. We give the Aristotelian enumeration—the first column is the original Greek; the second, the Latin rendering of the schoolmen; the third, the nearest corresponding English words:

Οὐσία,	Substantia,	Substance.
Ποσόν,	Quantitas,	Quantity.
Ποιόν,	Qualitas,	Quality.
Πρός τι,	Relatio,	Relation.
Ποιεῖν,	Actio,	Action.
Πάσχειν,	Passio,	Passivity.
Ποῦ,	Ubi,	Position in Space.
Πότε,	Quando,	Position in Time.
Κεῖσθαι,	Situs,	Situation.
Ἔχειν,	Habitus,	Possession.

Mr. J. S. Mill has the following remarks on the above scheme: 'The imperfections of this classification are too obvious to require, and its merits are not sufficient to reward, a minute examination. It is a mere catalogue of the distinctions rudely marked out by the language of familiar life, with little or no attempt to penetrate, by philosophical analysis, to the *rationale* even of these common distinctions. Such an analysis, however superficially conducted, would have shown the enumeration to be both redundant and defective. Some objects are admitted, and others repeated several times under different heads. It is like a division of animals into men, quadrupeds, horses, asses, and ponies. That, for instance, could not be a very comprehensive view of the nature of Relation, which could exclude action, passivity, and local situation from that category. The same observation applies to position in time and position in space; while the distinction between the latter and situation is merely verbal.'—*Logic*, book i., chap. iii., § 1. Some writers have endeavored to save the C. from these objections, by declaring that the fourth, Relation, is to be looked upon as a general head, comprehending the remaining six under it. But there is no evidence that Aristotle had this view in his mind; on the contrary, it appears almost certain that his idea of Relation was too narrow and limited to admit of his giving it so great a comprehension.

Mr. Mill gives as the result of his own analysis the following enumeration and classification of existences or describable things:

1. Feelings, or States of Consciousness; which are the most comprehensive experience that the human mind can attain to, since even the external world is only known as conceived by our minds.

2. The Minds which experience those feelings.

3. The Bodies, or External Objects, which are supposed to excite all that class of feelings that we denominate Sensations.

4. The Successions and Co-existences, the Likenesses and Unlikenesses, between feelings or states of consciousness. Although those relations are considered by us to subsist between the bodies,

or things, external to our minds, we are driven in the last resort to consider them as really subsisting between the states of each one's own individual mind.

Mr. Mill shows that all possible Propositions—and it is with the truth or falsehood of Propositions that the science of Logic has chiefly to do—affirm or deny one or other of the following properties or facts: Existence—the most general attribute of all—Co-existence, Sequence or Succession, Causation—a peculiar case of Succession—and Resemblance. It is to arrive at this classification of Propositions, for the purposes of logic, that the foregoing analysis, corresponding to the Aristotelian C., was made. The properties affirmed of any thing or things, or the things, of which any properties are affirmed, come under some one or other of the four heads above given.

The C. of Kant, which are sometimes brought into comparison with those of Aristotle, are conceived under a totally different point of view. See Sir W. Hamilton's *Discussions on Philosophy*, 2d edit., p. 26. They referred to certain forms supposed to be inherent in the understanding itself, under which the mind embraces the objects of actual experience. The Kantian philosophy supposes that human knowledge is partly made up of the sensations of outward things—Color, Sound, Touch, &c.—and partly of intuitions existing in the mind prior to all experience of the actual world. This is the point of difference between the school of Locke—who rejected all innate ideas, conceptions, or forms—and the school of Kant. No such question was raised under the Aristotelian categories. Kant's enumeration of his innate forms is as follows: 1. Quantity, including unity, multitude, totality; 2. Quality, including reality, negation, limitation; 3. Relation including substance and accident, cause and effect, action and reaction; 4. Modality, which includes possibility, existence, necessity. These indicate the elements of our knowledge *a priori;* it being the opinion of the author, that such notions, as Causation, Necessity, &c., cannot be obtained from the exercise of our senses and intelligence upon the world of realties, but must have been somehow or other imprinted upon the mind originally.

CA'TENARY. The C. is the curve formed by a flexible homogeneous cord hanging freely between two points of support, and acted on by no other force than gravity. If the cord is not homogeneous, and the destiny varies in any regular way, the cord hangs in a curve slightly different in shape from that of the ordinary catenary. The C. possesses several remarkable properties, one of which is, that its center of gravity (q. v.) is lower than that of any curve of equal perimeter, and with the same fixed points for its extremities. Where the cord is such that the weight of any part of it is proportioned to its horizontal projection, the curve is a parabola (q. v.). The latter curve and the ordinary C. are of importance chiefly in the theory of suspension bridges (q. v.). The properties of the C. will be found fully analyzed in all the leading works on mechanics.

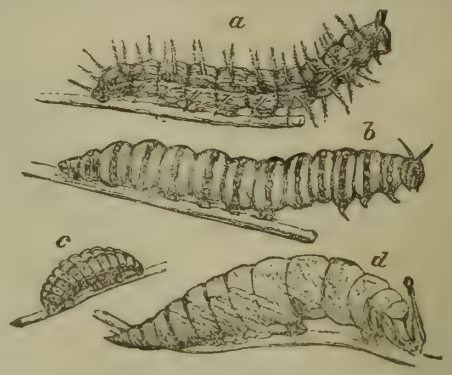
CATENI'PORA, a genus of fossil lamelliferous corals peculiar to Palæozoic strata, confined in Britain to the Silurian measures. The genus is easily recognized. The cells are terminal and oval, arranged like a loose net-work of chains, hence called 'chain coral.' Vertical anastomosing lamellæ united the cells together, and formed a hemispherical polypidom, sometimes of great size.

Catenipora escharoides.

CATERI'NA, SANTA, a town of Sicily, in the province of Caltanisetta, and 7 miles north-north-west of the town of that name. It is situated on a hill near the river Salso, is fortified, has manufactures of fine earthenware; and in the neighborhood are found jaspers and agates of good quality. Pop. 5800.

CA'TERPILLAR, the name given to the larvæ of lepidopterous insects—butterflies, moths, and hawk-moths. Caterpillars exhibit as great differences as subsist among the perfect insects into which they change, and the family, genus, and species may be determined by the characters of the C., as well as of the perfect insect. The body is generally long, nearly cylindrical, soft, and consisting of twelve rings or segments besides the head, with nine spiracles or small openings for respiration on each side. The head is much harder than the rest of the body, of a sort of almost horny substance, and has six small shining points on each side, which are regarded as simple or *stemmatic* eyes, and is also furnished with two very short rudimentary antennæ.

The mouth is adapted for tearing, cutting, and masticating the substances on which the C. is destined to feed, which are very various in the different species, although in all extremely different from the food of the perfect insect: it is provided with two strong *mandibles*, or upper jaws; two *maxillæ*, or lower jaws; a *labium*, or lower lip; and four *palpi*, or feelers. In the mouth also is situated the *spinneret* of those species which, when they change into the chrysalis or pupa state, envelop themselves in silken cocoons. See SILK-WORM. The first three segments of the body are each furnished with a pair of feet, which are hard and scaly, and represent the six feet of the perfect insect; some of the remaining segments are also furnished with feet, varying in all from four to ten in number, the last pair situated at the posterior extremity of the body; but these feet are soft and membraneous or fleshy, and armed at their extremity with a sort of circlet of minute hooks.



Caterpillars of Butterflies:
a, silver-washed fritillary: *b*, swallow-tailed;
c, chalk-hill blue; *d*, purple emperor,

All the feet or legs are very short. Those caterpillars in which the *pro-legs*, as they are sometimes called, or supplementary soft feet, are pretty equally distributed along the body, move by a sort of regular crawling motion; but those which have only four such feet situated near the posterior extremity, move by alternately taking hold by what may be called their fore-feet and their hind-feet, now stretching the body out to its full length, and now bending it into an arch, whilst the hinder part is brought forward almost into contact with the forepart. Caterpillars which move in this way are called *Geometers* or *Loopers*. Some caterpillars have the power of fixing themselves by the two hind feet to a twig, and stretching themselves out as straight as a rod, so that being in color very like a twig of the tree on the leaves of which they feed, they are not readily observed. The muscular power required for this position of rest is very great, and Lyonnet found the number of muscles in a C. to be more than 4000.

The skin of some caterpillars is naked, that of others is covered with hairs, spines, or tubercles. Some make for themselves nests or tents of silk, under which they dwell in societies, protected from the inclemency of the weather. Many construct cases or sheaths by agglutinating various substances together, as the C. of the common clothes-moth. Some roll together leaves, and fix them by threads, so forming a dwelling for themselves; and a few burrow and excavate galleries in the substance of leaves. Many feed on leaves; many being limited to a particular kind of plant, or to a few nearly allied plants. Some feed on flowers, some on seeds, some on roots, and some even on the woody portions of stems; some on wool, hides, furs, and other animal substances; a few on lard, and other kinds of fat. Among the admirable arrangements which make all nature harmonious, is the adjustment of the time of each kind of C.'s appearance to that of the leaf or flower on which it is to feed.

CA'TGUT is employed in the fabrication of the strings of violins, harps, guitars, and other musical instruments; as also in the cords used by clockmakers, in the bows of archers, and in whipcord. It is generally prepared from the intestines of the sheep, rarely from those of the horse, ass, or mule, and *not* those of the cat. The first stage in the operation, is the thorough cleansing of the intestines from adherent feculent and fatty matters; after which they are steeped in water for several days, so as to loosen the external membrane, which can then be removed by scraping with a blunt knife. The material which is thus scraped off is employed for the cords of battle-doors and rackets, and also as thread in sewing the ends of intestines together. The scraped intestines are then steeped in water, and scraped again, when the large intestines are cut and placed in tubs with salt, to preserve them for the sausage-maker, and the smaller intestines are steeped in water, thereafter treated with a dilute solution of alkali (4 oz. potash, 4 oz. carbonate of potash, and 3 to 4 gallons of water, with occasionally a little alum), and are lastly drawn through a perforated brass thimble, and assorted into their respective sizes. In order to destroy any adherent animal matter, which would lead to putrefaction, and the consequent development of offensive odors, it is customary to subject the C. to the fumes of burning sulphur—sulphurous acid, which acts as an antiseptic (q. v.), and arrests decomposition. The best strings are used for musical instruments; and those which come from Italy, and are known as *Roman strings*, are the strongest.

They are remarkable for their clearness and transparency. Cord for clockmakers is made from the smallest of the intestines, and occasionally from larger ones, which have been split longitudinally into several lengths. Whip-cord is fabricated from C. which has been twisted in a manner somewhat similar to single-corded ropes. The C. obtained from the intestines of horses, asses, and mules is principally made in France, and is employed instead of leather belts for driving machinery.

CA'THA, a genus of the natural order *Celastraceæ*. The fruit is a three cornered capsule.—*C. edulis*, sometimes called ARABIAN TEA, the KHAT of the Arabians, is a shrub with erect smooth branches, elliptical obtusely serrated leaves, and small flowers in axillary cymes. It is a native of Arabia, and the Arabs ascribe to its leaves, even carried about the person, extraordinary virtues as a preventive of plague, with probably about as much reason as our forefathers had for esteeming the rowan tree formidable to witches. When fresh, they are stimulant, narcotic, and intoxicating, and are eaten with greediness by the Arabs. They are very antisoporific, so that a man after using them, may keep watch for a whole night without drowsiness.

CA'THARI, or CA'THARISTS (Gr. pure), a name very generally given to various sects which appeared in the church during the middle ages. It appears to have been sometimes assumed in profession of a purity of doctrine and morals superior to that which generally prevailed in the church, sometimes bestowed ironically in ridicule of such a profession, and perhaps was first used as a designation of the Paulicians (q. v.). It became a common appellation of sects which appeared in Lombardy in the beginning of the 11th c., and afterwards in France and the west of Germany. Having some connection with the Bulgarian Paulicians, they were sometimes called *Bulgarians;* sometimes also *Patarenes*, or *Patarines*, sometimes *Publicans* or *Popelitans*, and in the Low Countries, *Piphles*. The names *Albigenses* and C. are often used as equivalent to one another; but we are under the disadvantage of having to depend entirely on the writings of very bigoted adversaries for our knowledge of their doctrines and practices, and considerable obscurity rests on all this interesting part of ecclesiastical history. Manichæism, Gnosticism, and Montanism are ascribed to the C., but there is much reason to think that the errors of a few were often indiscriminately charged upon all, and that such charges indeed sometimes rested on ignorant or wilful misconstruction.

It appears quite certain, that the C. differed considerably in their doctrines and in the degree of their opposition to the dominant church. Some of them advocated and practised a rigid asceticism. There is no good evidence that any of them nearly approached to the doctrines of the Reformation ; although in their rejection of tradition, of the authority of Rome, of the worship of saints and images, &c., there are notable points of agreement with the views of the Reformers.

CA'THARINE is the name of several saints of the Roman Catholic Church. The simple designation of *Saint C.*, however, is given to a virgin, said to have been of royal descent in Alexandria, who, publicly confessing the gospel at a sacrificial feast appointed by the emperor Maximinus, was put to death in 307 A.D., after being tortured on a wheel. Hence the name of 'St. Catharine's wheel.' Very extraordinary legends exist as to her converting 50 philosophers sent by the emperor to convert her in prison, besides a multitude of other persons ; the conveyance of her head by the angels to Mount Sinai, &c. She is regarded as the patroness of girls' schools.—*St. C. of Siena*, one of the most famous saints of Italy, was the daughter of a dyer in Siena, and was born there in 1347 A.D.; practised extraordinary mortifications; and was said to be favored with extraordinary tokens of favor by Christ, whose wounds were impressed upon her body, &c. She became a Dominican, and therefore afterwards a patron saint of the Dominicans. She wrote devotional pieces, letters, and poems, which have been more than once printed: the best edition appeared at Siena and Lucca in 1707—1713, in 4 vols. 4to, under the title of *Opere della serafica Santa Catarina.—St. C. of Bologna* and *St. C. of Sweden* are of less note.

CATHARINE I., Empress of Russia, was originally by name Martha Rabe, and was the posthumous daughter of John Rabe, a Swedish quarter-master in Livonia. Her mother died in 1685, when she was but three years old. Left helpless and destitute, a parish-clerk took compassion on her, and supported her, and a Lutheran clergyman in Marienburg afterwards received her into his house as an attendant on his children. In 1701, she married a Swedish dragoon, who next year was called to active service; and Marienburg being taken by the Russians, she became for some time the mistress of General Bauer; and afterwards entering the service of the Princess Menchikoff, she attracted the notice of Peter the Great. In 1703 she went over to the Greek Church, and took the name of Catharina Alexiewna.

After being for some years the emperor's mistress, she was privately married to him in 1711; the marriage was publicly avowed in 1712; she was proclaimed empress in 1718, and was crowned at Moscow in 1724. She bore eight children to the emperor, all of whom died in childhood, except two daughters, Anne and Elizabeth, the latter of whom was afterwards Empress of Russia, and the former married the Duke of Holstein, and was the mother of the Emperor Peter III. When Peter the Great and his army seemed entirely in the power of the Turkish army on the Pruth in 1717, C., who was with him, sought an interview with the Grand Vizier, and, by employing her jewels to bribe his attendants, succeeded in procuring the deliverance of the Russians. Her conduct on this occasion excited so much admiration and gratitude in the emperor, that he resolved to appoint her his successor. Yet in the end of the year 1724, she became the object of his displeasure and suspicion, on account of an alleged intimacy with a chamberlain, whom he caused to be beheaded. Menchikoff, who had always been attached to her interests, was at this time in disgrace. But she had contrived in a great measure to recover her position, when, on 28th January 1725, Peter the Great died. His death was kept secret as long as possible, that everything might be arranged for her taking possession of the throne; and the Archbishop of Pleskow came forward and declared before the troops and people, that the emperor, on his death-bed, had declared her alone worthy to be his successor. The hostility and hesitation of the nobles were at once overcome, and C. was acknowledged as Empress and sole Ruler of All the Russias. Under Menchikoff's direction, the affairs of government went on well enough for a time; but the empress ere long began to yield to the influence of a number of favorites, addicted herself to drunkenness, and lived such a life as could not fail to hurry her to the grave. She died, however, unexpectedly, 17th May 1727.

CATHARINE II., Empress of Russia, was born at Stettin on 25th April 1729. Her father, the Prince of Anhalt-Zerbst, was a Prussian field-marshal, and governor of Stettin. She received the name of Sophia Augusta; but the Empress Elizabeth of Russia having selected her for the wife of her nephew and intended successor, Peter, she passed from the Lutheran to the Greek Church, and took the name of Catharina Alexiewna. In 1745, her marriage took place. She soon quarreled with her husband, and each of them lived a life of unrestrained vice.

Among his attendants was a Count Soltikow, with whom her intimacy soon became scandalous; and Soltikow was sent on an embassy abroad. But the young Polish count, Stanislaus Poniatowski, almost immediately supplied his place. After the death of the Empress Elizabeth in 1761, Peter III. ascended the Russian throne; but the conjugal difference became continually wider. C. was banished to a separate abode; and the emperor seemed to entertain the design of divorcing her, declaring her only son, Paul, illegitimate, and marrying his mistress, Elizabeth Woronzow. The popular dislike to Peter, however, rapidly increased; and at length, he being dethroned by a conspiracy, C. was made empress. A few days afterwards, Peter was murdered (July 1762). What participation his wife had in his murder, has never been well ascertained.

C. now exerted herself to please the people, and among other things, made a great show of regard for the outward forms of the Greek Church, although her principles were, in reality, those of the infidelity then prevalent among the French philosophers. The government of the country was carried on with great energy; and her reign was remarkable for the rapid increase of the extent and power of Russia. Not long after her accession to the throne, her influence secured the election of her former favorite, Stanislaus Poniatowski, to the throne of Poland. In her own empire, however, discontentment was seriously manifested, the hopes of the disaffected being centered in the young prince Ivan, who was forthwith murdered in the castle of Schlüsselburg. From that time, the internal politics of Russia long consisted in great part of court intrigues for the humiliation of one favorite and the exaltation of another. The first partition of Poland in 1772, and the Turkish war which terminated in the peace of Kainardji in 1774, vastly increased the empire. The Turkish war which terminated in the peace of Jassy in 1792, had similar results, and also the war with Sweden, which terminatad in 1790. The second and third partitions of Poland, and the incorporation of Courland with Russia, completed the triumphs of C.'s reign. She began a war with Persia, however, and cherished a scheme for the overthrow of the British power in India; but a stroke of apoplexy cut her off on November 9, 1796. She was a woman of great ability; but, utterly devoid of principle, she shrunk from no crime; and sensuality and ambition governed all her actions. She was shameless in vice; and always had a paramour, who dwelt in her palace, and might be regarded as filling an acknowledged office of state, with large revenues and determinate privileges. Yet distinguished authors flattered her; and she invited to her court some of the literati and philosophers of France.

She was ever ready to commence great undertakings, but most of them were left unfinished; and little was really accomplished in her reign for the improvement of the country, or the progress

of civilization. On a visit to the southern provinces of the empire in 1787, she was gratified by a perpetual display of fictitious wealth and prosperity along the whole route. This imperial progress was also a triumphal procession of her vile favorite Potemkin (q. v.).

CATHARINE DE' MEDICI, the queen of Henri II. of France, was the daughter of Lorenzo de' Medici, Duke of Urbino, and was born at Florence in 1519. In her fourteenth year, she was brought to France, and married to Henri, the second son of Francis I. The marriage was a part of the political schemes of her uncle, Pope Clement VII., but as he died soon after, she found herself friendless and neglected at the French court. In these circumstances, she conducted herself with a submission which seemed even to indicate a want of proper spirit, but which gained her the favor of the old king, and in some measure also of her husband. It was not till the accession of her eldest son, Francis II., in 1559, that her love of power began to display itself. The Guises at this time possessed a power which seemed dangerous to that of the throne, and C. entered into a secret alliance with the Huguenots to oppose them. On the death of Francis II. in 1560, and accession of Charles IX., the government fell entirely into her hands. Caring little for religion in itself, although she was very prone to superstition, she disliked the Protestants, chiefly because their principles were opposed to the absolute despotism which she desired to maintain. Yet she sought to rally the Protestant leaders around the throne, in order to remove the Guises. This attempt having failed, and the civil war which ensued having ended in the peace of Amboise, highly favorable to the Protestants, she became alarmed at the increase of their power, and entered into a secret treaty with Spain for the extirpation of heretics; and subsequently into a plot with the Guises, in which at the first only the murder of the Protestant leaders was contemplated, but which resulted in the fearful massacre of St. Bartholomew's Day. This event brought the whole power of the state into the hands of the queen-mother, who boasted of the deed to Roman Catholic governments, and excused it to Protestant ones, for she now managed all the correspondence of the court. About this time she succeeded, by gold and intrigues, in getting her third son, afterwards Henri III., elected to the Polish throne. But her arbitrary and tyrannical administration roused the opposition of a Roman Catholic party, at the head of whom was her own fourth son, the Duke of Alençon, who allied themselves with the Protestants. It was very generally believed that she was privy to the machinations that led to his death.

When, after the death of Charles IX., Henri III. returned from Poland to be king of France, his mother still ruled the court, and had the principal share in all the intrigues, treacheries, and political transactions of that woful period. Having betrayed all who trusted them, she and her son found themselves at last forsaken and abhorred by all. The League and the Guises had no more confidence in them, than had the Protestants and Henri of Navarre. Vexation on this account preyed on the proud heart of the queen-mother in her last days; and amidst the confusion and strife of parties, she died at Blois, on 5th January 1589, unheeded and unlamented. Her ruling passion was ambition, and to this she was ready to sacrifice everything. Her unprincipled policy had almost subverted the French monarchy; her extravagance and luxury exhausted the finances of the country. Her influence was powerful in increasing the demoralization of the court and of society. She unscrupulously employed beauties of her train to corrupt men from whose power she apprehended danger.

CATHARINE OF ARAGON, Queen of England, the first wife of Henry VIII., and fourth daughter of Ferdinand and Isabella, king and queen of Castile and Aragon, was born December 1485. She occupies a prominent place in English history, not for what she herself was, but for what she was the occasion of—the Reformation. Married, when scarcely sixteen, to Arthur, Prince of Wales, son of Henry VII., she was left a widow within a year; and in the course of a few months more a second marriage was projected for her by her father-in-law, with his second son Henry, as yet a boy of only twelve years old. The pope's dispensation enabling such near relatives to marry was obtained in 1503, and the marriage took place in June 1509, immediately after Henry's accession to the crown as Henry VIII. Although Henry was very far from being a model husband, he appears to have treated Queen C., who had born him several children, with all due respect, until about 1527, when he conceived a passion for Anne Boleyn (q. v.). He now expressed doubts as to the legality of his marriage, and set about obtaining a divorce. Pope Clement VII. would readily have annulled the marriage permitted by his predecessor, had he not feared Queen C.'s powerful nephew, the Emperor Charles V. He, however, granted a commission to Campeggio and Wolsey, to inquire into the validity of the marriage; but before these prelates Queen C. refused to plead, and appealed to the pope. The king craved judgment. The legates cited the queen, and declaring her contumacious when she was not, went on with the cause; but the wily Campeggio, anxious only for time for his master when the king expected an answer, prorogued the court until a future day.

The king consulted the universities of Europe, many of which declared the marriage invalid. The pope now summoned the king to Rome, but Henry haughtily refused to appear either himself, or by deputy, which he maintained would be to sacrifice the prerogatives of his crown; and setting the pope at defiance, married Anne Boleyn. Cranmer, shortly afterwards (1533), declared the first marriage void, and Pope Clement annulled Cranmer's sentence, making the separation from Rome complete. Queen C. did not quit the kingdom, but took up her residence first at Ampthill, in Bedfordshire, and afterwards at Kimbolton Castle, Huntingdonshire, where she led an austere religious life until her decease in January 1536. Queen C.'s personal character was unimpeachable, and her disposition sweet and gentle.

CATHARINE PARR, the sixth wife of Henry VIII., was the daughter of Sir Thomas Parr, and was born in 1513. Married first to Lord Burgh, and afterwards to Lord Latimer, she, in July 12, 1543, became queen of England by marriage with Henry VIII. She was distinguished for her learning and her knowledge of religious subjects, her discussion of which with the king had wellnigh brought her to the block, like so many of her predecessors. Her tact, however, saved her, and brought rebuke on her enemies; for she made it appear to the king's vanity, that she had only engaged him in discourse about the Reformation, in order to derive profit from his majesty's speech. She persuaded Henry to restore the right of succession to his daughters, and interested herself on behalf of the universities. After Henry's death, she married, 1547, Sir Thomas Seymour, and died the following year, not without suspicion of poison.

CATHARINE'S, St., COLLEGE, or HALL, Cambridge, was founded by Robert Wodelarke, Provost of King's College, 1473, for a master and three or more fellows. The visitors sent down to the university by Edward VI. ordered that there should be then six fellows, and in future a greater or less number as the revenues permitted. The statutes confirmed in May 1860 provide that there shall be a master and nine fellows. There are twenty-five scholars. Edwyn, Sandys, Archbishop of York. Bishop Overall, and Bishop Sherlock, were of this college.

CATHA'RTICS (Gr. *kathairo*, I purify), a name originally for all medicines supposed to purify the system from the matter of disease (*materies morbi*), which was generally presumed by the ancients to exist in all cases of fever and acute disease (see CRISIS), and to require to be separated or thrown off by the different excretions of the body. Ultimately, the term C. became limited in its signification to remedies acting on the bowels, which are popularly called *purgatives*—a mere translation of the Greek word. The principal C. are aloes, gamboge, colocynth, rhubarb, scammony, jalap, senna, Epsom and other salts, and castor oil. Sulphur and cream of tartar forms a well-known mild laxative; magnesia is also useful in many cases of indigestion with acidity. Croton oil and elaterium belong to a more dangerous class of C., as also does the favorite remedy of the ancients—the black hellebore. The doses and use of the more ordinary remedies of this class are explained in all works on medicine. See CONSTIPATION.

CATHA'RTINE, or BITTER OF SENNA, is the essential principle in senna which possesses laxative or purgative properties. It can be isolated as a yellowish-red uncrystallizable solid, which is deliquescent, soluble in water and alcohol, insoluble in ether, has a very bitter nauseous taste, a characteristic odor, and possesses great purging powers, accompanied by nausea and griping. Three grains of C. are a full dose.

CATHCA'RT, WILLIAM SHAW, EARL, a British general and diplomatist, son of Baron Cathcart of Cathcart, county of Renfrew, was born September 17, 1755. Having studied at Glasgow, he entered the army, took a prominent part in the American war, and fought with distinction in Flanders and North Germany. In 1801, he was made lieutenant-general, and in 1803, commander-in-chief for Ireland. In 1805, he was engaged on a diplomatic mission to the Czar Alexander. In July 1807, he received the command of the land-forces employed to co-operate with the fleet in the attack on Copenhagen, and, for his services in this capacity, was made a British peer, with the title of viscount, and received a note of thanks from both Houses of parliament, January 28, 1808. In 1812, he was sent as ambassador to St. Petersburg, accompanied the Czar Alexander in the campaigns of 1813 and 1814, and was present at the congresses of Chatillon and Vienna. He was raised to the rank of earl, June 18, 1814. The latter years of his life were chiefly spent at his country residence, Cartside, near Glasgow, where he died June 17, 1843.—His eldest son, CHARLES MURRAY, EARL CATHCART (formerly known as Lord Greenock), was born 1783; served in Spain and at Waterloo under Wellington; afterwards acted in Canada; and was made a general, and colonel of the 1st Dragoon Guards. He died July 1859.

CATHCART, Sir George, son of William, Earl Cathcart, was born in London, 1794. Educated at Eton and Edinburgh, he in 1810, joined the 2d Life Guards, and fought with the grand army in the campaigns of 1812 and 1813; and as aide-de-camp to the Duke of Wellington, was present at Quatre Bras and Waterloo. In 1828, he was made lieutenant-colonel, and served in British America and the West Indies for about eight years; and in 1837 he proved himself an energetic and efficient officer in quelling the outbreak in Canada, where he remained for more than six years. In 1852, having held the appointment of deputy-lieutenant of the Tower for some years, he was made governor of the Cape of Good Hope, with command of the forces, and in this capacity succeeded in bringing to a successful end the harassing Kafir war. He returned to England in time to be sent out to the Crimea as general of division. His bravery here was conspicuous, especially in the battle of Inkermann, where the odds were so terrible against the British forces, and where he was slain. He was buried on the spot where he fell, and which, in his honor, was named Cathcart's Hill. C. was the author of a very valuable work, entitled *Commentaries on the War in Russia and Germany in* 1812 *and* 1813 (London 1850).

CATHE'DRAL, from a Greek word *cathedra*, signifying a *seat*. Thus, 'to speak *ex cathedrâ*,' is to speak as from a seat of authority. The C. city is the seat of the bishop of the diocese, and his throne is placed in the C. church, which is the parish church of the whole diocese. The diocese was, in fact, anciently called *parochia*, until the application of this name to the smaller portions into which it was divided. A C. town has generally been understood to be entitled to the honors of a city, even although the town be not a borough incorporate; but in the case of Manchester, the claim was disallowed by a court of law. The distinction between C. and collegiate churches consists principally in the see of the bishop being at the former. The governing body of a C. is called the dean and chapter—i. e., the dean and canons who meet for corporate purposes in the chapter-house of the cathedral. The property of the C. vests in this body. They elect the bishop of the diocese on the issue of a *congé d'élire* from the crown, but as the person to be elected is always named, and they may be compelled by a mandamus to elect that person and no other, the election is merely a form.

The bishop is 'visitor' of the dean and chapter. In England, by the act of 1840, all members of cathedrals, except the dean, are styled canons. Their *seat* in the C. is called their *stall*. They are no longer called prebends. Canons must reside 3 months in each year. The act allows to the canons of Durham, Manchester, St. Paul's, and Westminster, an income of £1000 per annum; to those of every other C. in England, £500. The bishop was always considered of common right to have the patronage of canonries, but formerly there were exceptions. Now, the appointment to all canonries is vested either in the bishop, or in the crown. Where the bishop is patron, he 'collates,' and the dean and chapter 'induct,' by placing the new canon in a stall in the church. The crown appoints by letters-patent, and the canon is installed without collation. Honorary canons have no emoluments, but rank after the canons. Minor canons, of whom there are from 2 to 6 in each C., perform the daily choral services. The C. service is the usual Church of England service intoned, with an anthem and the Psalms chanted. For the general plan of C. buildings, see Church. The more remarkable cathedrals will be noticed under the names of the towns in which they are situated. In England, the number of cathedrals is 29.

CATHELINEAU, Jaques, general of the army in La Vendée, in the west of France, was born January 5, 1759, in very humble life, at Pin-en-Mauges, in Lower Anjou. Horrified at the atrocities and despotic acts of the Convention, he placed himself in opposition to it, and soon collected around him a body of loyal peasantry, whom he led against and defeated the Republicans in several conflicts. After the victory of Saumur (q. v.), the council of generals appointed him, as having the greatest influence over his countrymen, commander-in-chief. He immediately determined to make an attack upon Nantes, and managed to penetrate into the town, where he was wounded by a musket-ball, and his troops immediately dispersed. He was carried to St. Florent, where he died July 11, 1793. He was a man of great simplicity and honesty of character, and his piety was such, that he was called the Saint of Anjou.

CA'THERINE-WHEEL (See Catharine, St.) is frequently used as a charge in coats of arms, when it is represented with teeth, thus:

CA'THETER (Gr. *kathiemi*, to thurst into), was a name applied indifferently to all instruments used for passing along mucous canals.

In modern times, however, it has generally been reserved for tubular rods through which fluids or air may pass, and which may give free exit to the accumulated contents of such organs as the urinary bladder. The C. for the latter purpose is a very old surgical instrument. The ancients made theirs of copper, which accumulated verdigris. In the 9th c. silver was substituted by the Arabian surgeons as a cleanlier metal, and is still used by all who are not obliged, for economical reasons, to have their catheters made of German silver or pewter. The urinary C. for the male varies in length from 10 to 11 inches; the female C. need not be more than 4 or 5 inches. The form is a matter of indifference, but most surgeons prefer an instrument straight to within the last few inches of its length; the latter should be curved into the segment of a small circle. Others, however, use a double curve, and, indeed, nearly every surgeon has a peculiar fancy in this respect.

Flexible catheters are made of gum elastic, which may be used either alone or supported on a wire. Many other materials have been proposed. Of late years, gutta percha has been used, but owing to some awkward accidents—such as portions often breaking off in the bladder—it has not been generally adopted by surgeons.

CA'THODE. See Anode.

CATHOLIC CHURCH. The term catholic literally signifies *universal*. The phrase C. C. is therefore equivalent to 'universal church,' and cannot properly be applied to any particular sect or body, such as the Roman, Anglican, Genevan, Reformed Lutheran, or Presbyterian, all of which form merely portions more or less pure of the 'church universal.' It was first employed to distinguish the Christian Church from the Jewish; the latter being restricted to a single nation, whereas the former was intended for the world in general. Afterwards, it served to mark the difference between the orthodox Christian Church and the various sects which sprang from it, such as the Cerinthians, Basilidians, Arians, Macedonians, &c. The name has been retained by the Church of Rome, which was the visible successor of the primitive one; and although Protestant divines have been careful to deny its applicability to a church which they consider buried under the corrupt accretions of centuries, yet the term catholic is still used by the populace of almost every Protestant country as synonymous with Roman Catholic, so that from their minds all conception of the literal meaning of the word has vanished. For an account of the Church of Rome, see art. Roman Catholic Church.

CA'THOLIC CRE'DITOR, in the law of Scotland, is one whose debt is secured over several or the whole subjects belonging to the debtor—e. g., over two or more heritable estates for the same debt. The C. C. is bound so to exercise his right as not unnecessarily to injure the securities of the other creditors. Thus, if he draw his whole debt from one of the subjects, he must assign his security over the others to the postponed creditors.

CATHOLIC (Roman) EMANCIPATION ACT (10 Geo. IV. c. 7). To render this famous measure intelligible, and still more to convey a conception of its importance to younger readers, it is necessary that we should preface our account of it by a slight sketch of the position of our Roman Catholic fellow-subjects before it was passed. From first to last, the sufferings of the Roman Catholics were the fruit of political tyranny quite as much as of religious rancor or fanaticism, and their release was effected by a change in the political rather than in the religious views or feelings of the dominant party. The first occasion on which even a promise of a different line of policy from that which had been originally adopted was held out to the Roman Catholics of Ireland, was on the termination of the revolutionary war in 1691; and had King William been able to carry out the views which his personal enlightenment and liberality dictated, it is probable that Catholic emancipation would have been hastened by more than a century. But the English parliament, which was intensely anti-Roman Catholic, enacted, on the 22d of October 1691, that Irish members of both Houses should take the oaths of supremacy; and three years later, a set of acts were passed, which placed the Roman Catholics in a worse position than at any previous period of their history. The whole population was disarmed, and the priests banished from the country. But what must have been still more intolerable, was the interference with the private arrangements of their families. All Roman Catholics were prohibited from acting as guardians not only to Protestant, but to Catholic children. At a somewhat later date (1704), it was enacted that if a son chose to turn Protestant, he should be entitled to dispossess his father, and at once to take possession of the family estate. Though Catholics were not directly declared incapable of holding land, they were deprived of the right of acquiring it by purchase, or even by long lease; and if a Catholic chanced to occupy a place in a line of entail, he was passed over in favor of the next Protestant heir. No office of trust, civil or military, was now open to a Catholic; he was forbidden to vote at elections, to intermarry with a Protestant, or even to dwell in Limerick or Galway, except under certain conditions. But perhaps the most demoralizing provision of all, was that which empowered the son of a Catholic to bring his father into Chancery, to force him to declare on oath the value of

his property, and to settle such an allowance on him as the court should determine, not only for the father's life, but the son's.

Amongst the other burdens of this heavy time, may be mentioned the exclusion of Catholics from the profession of the law, and the regulation that if a Protestant lawyer married a Catholic, he should be held to have gone over to her faith: the prohibition against Catholics acting as schoolmasters, under the penalty of being prosecuted as convicts, by which the whole body was virtually excluded from the benefits of education: and the still more summary enactment, that if a priest celebrated marriage between a Protestant and a Catholic, he should be hanged. But as years passed away, the memory of the foul deeds of the Inquisition and the confessional, and of the other enormities of which Roman Catholics had been guilty in their days of power, waxed fainter; milder feelings began to prevail; and when Grattan appeared as the champion of their rights, the field was already in some degree prepared for his labors. Favored by such influences, of which no one knew better how to avail himself, he succeeded, in 1780, in carrying, in the Irish parliament, the famous resolution, 'that the king's most excellent majesty, and the Lords and Commons of Ireland, are the only competent power to make laws to bind Ireland.' Many of the disqualifying statutes were now repealed, and the claim for complete equality with Englishmen and Protestants, or complete separation from the sister-country, was now formally urged. From this period till the final liberation was achieved, there was no rest. The Irish rebellion of 1798 brought home to the English nation the dangers to which it would constantly be exposed till the question was finally adjusted. The Act of Union of 1800 was the immediate consequence of that outbreak; and to this act the Irish were induced to consent by a virtual pledge entered into by Mr. Pitt, to the effect that the Catholic disabilities should be at once removed. But, like William of Orange, Pitt had pledged himself to more than he was able to accomplish. The king was seized with scruples regarding the obligations imposed upon him by his coronation oath, and made a vigorous stand against the proposals of his minister.

At a subsequent period, efforts were made in the direction of emancipation by Mr. Canning and Lord Castlereagh. About 1824, the press began to take up the question warmly; a Catholic Association was formed, to prepare petitions to parliament; the Irish priests stimulated their flocks to subscribe for the purposes of agitation; O'Connel rapidly became a power; and as early as March 1825, the importance of the question was so deeply felt, that Sir F. Burdett ventured to introduce a relief bill, which passed the Commons by a majority of 268 to 241, but was rejected by the Lords.

A slight temporary reaction now took place, the superstitious fears of ignorant Protestants being excited by a 'no-popery' cry, and in consequence, a new relief bill, introduced in 1827, though supported by the last effort of Canning's eloquence, was lost in the Commons by a majority of 4. But the liberal view of the Roman Catholic claims was essentially the popular one—at least among the enlightened classes; and as a proof of this, under the hostile administration of the Duke of Wellington, the very same resolution which had been lost in 1827 by a minority of 4, was carried in 1828 by a majority of 6. The duke himself now began to waver in opinion, so that the beginning of the end was manifestly near. During O'Connell's famous canvass for the county of Clare, the duke declared in the House of Lords, 'if the public mind were now suffered to be tranquil, if the agitators of Ireland would only leave the public mind at rest, the people would become more satisfied, and I certainly think it would then be possible to do something.' O'Connell's return for Clare, notwithstanding the existence of the oaths which precluded him from taking his seat in the House, and the events which now followed in quick succession, made it clear that the 'something' of which the duke had spoken must be the passing of the emancipation bill in the ensuing session. The king's speech, which was read on the 5th February of the following year, accordingly contained a recommendation to parliament, to consider whether the civil disabilities of the Catholics could not be removed, 'consistently with the full and permanent security of our establishments in church and state.'

On the 5th March, Mr. Peel brought forward the great measure. The majority on the motion in the Commons for going into committee was 188, in a house of 508 members; the debate on the second reading issued in a majority of 180; and the final majority after the bill had passed through committee, in which not one of the many amendments proposed was carried, was 178 in a House of 462. In the Lords, the debate lasted three nights, the majority being 106 in favor of the second reading of a bill which, nine months before, the same House had refused, by a majority of 45, even to entertain—so rapid and threatening had been the progress of the agitation. On the 13th April 1829, this famous measure became the law of the land. It now only remains, that by mentioning the provisions of the act, we sum up the results of one of the most important controversies that ever agitated the inhabitants of this country. For the oath of supremacy, another oath was substituted, by which all Catholic members of parliament bound themselves to support the existing institutions of the state, and not to injure those of the church (see ABJURATION).

Catholics were admitted to all corporate offices, and to an equal enjoyment of all municipal rights. The army and navy had already been opened to them. On the other hand, they were excluded from the offices of Regent, of Chancellor of England or Ireland, and of Viceroy of Ireland; from all offices connected with the church, its universities and schools, and from all disposal of church patronage. The most important security related to the franchise, in which a £10 was substituted for a 40*s*. qualification in Ireland. The clergy of the R. C. Church were left in the position of other dissenters, the government having declined either to endow them, or to introduce any machinery for prying into their relations to the pope. But the public use of their insignia of office, and of episcopal titles and names, was denied them; the extension of monachism was prohibited; and it was enacted that the number of Jesuits should not be increased, and that they should henceforth be subject to registration. The Ecclesiastical Titles Assumption Act (q. v.), the outcome of Protestant panic in 1854, has been since repealed. See Miss Martineau's *History of England during the Peace*.

CATHOLIC EPISTLES, the name given, according to Clemens Alexandrinus and Origen, to certain epistles, addressed not to particular churches or individuals, but either to the church universal or to a large and indefinite circle of readers. Originally, the C. E. comprised only the first epistle of John and the first of Peter, but, at least as early as the 4th c. (as evinced by the testimony of Eusebius), the term was applied to all the apostolic writings used as 'lessons' in the orthodox Christian churches. But this included the Epistle of James, of Jude, the 2d of Peter, and the 2d and 3d of John. These seven thus constituted the C. E., although the genuineness and authenticity of the last-mentioned five were not universally acknowledged; but this very incorporation with epistles whose canonicity was not questioned, naturally had the effect of confirming their authority, so that in a short time the entire seven came to be considered a portion of the canon.

CATHO'LICOS, the title of the patriarchs or chief ecclesiastics in the hierarchy of the Armenian Church, and of the Christians of Georgia and Mingrelia.

CATILI'NA, LU'CIUS SE'RGIUS, descended from a patrician but impoverished family, was born about the year 108 B.C. During his youth, he attached himself to the party of Sulla. His bodily constitution, which was capable of enduring any amount of labor, fatigue, and hardship, allied to a mind which could stoop to every baseness and feared no crime, fitted him to take the lead in the conspiracy which has made his name infamous to all ages. In the year 68 B.C. he was elected prætor; in 67 B.C., governor of Africa; and in 66 B.C., he desired to stand for the consulship, but was disqualified on account of the accusations brought against him of maladministration in his province.

Disappointed thus in his ambition, and burdened with many and heavy debts, he saw no hope for himself but in the chances of a political revolution, and therefore entered into a conspiracy, including many other young Roman nobles, in morals and circumstances greatly like himself. The plot, however, was revealed to Cicero by Fulvia, mistress of one of the conspirators. Operations were to commence with the assassination of Cicero in the Campus Martius, but the latter was kept aware of every step of the conspiracy, and contrived to frustrate the whole design. In the night of November 6 (63 B.C.), Catiline assembled his confederates, and explained to them a new plan for assassinating Cicero; for bringing up the Tuscan army (which he had seduced from its allegiance), under Manlius, from the encampment at Fæsulæ; for setting fire to Rome, and putting to death the hostile senators and citizens. In the course of a few hours, everything was made known to Cicero. Accordingly, when the chosen assassins came to the house of the consul, on pretense of a visit, they were immediately repulsed. On the 8th of November, Catiline audaciously appeared in the senate, when Cicero—who had received intelligence that the insurrection had already broken out in Etruria—commenced the celebrated invective beginning: *Quousque tandem abutêre, Catilina, patientia nostra?* &c. ('How long now, Catiline, will you abuse our patience?') The scoundrel was abashed, not by the keenness of Cicero's attack, but by the minute knowledge he displayed of the conspiracy. His attempt at a reply was miserable, and was drowned in cries of execration. With curses on his lips, he abruptly left the senate, and escaped from Rome during the night. Catiline and Manlius were now denounced as traitors, and an army under the consul, Antonius, was sent against them. The conspirators who remained in Rome, the chief of whom was Lentulus, were arrested, tried, condemned, and executed, December 5. The insurrections in several parts of Italy were meanwhile suppressed; many who had resorted to Catiline's camp in Etruria, deserted when they heard what had taken place in Rome, and his intention to proceed into Gaul was frustrated.

In the beginning of January (62), he returned by Pistoria (now Pistoja) into Etruria, where he encountered the forces under Antonius, and, after a desperate battle, in which he displayed almost superhuman courage and enthusiasm, was defeated and slain. The appearance of Catiline was in harmony with his character. He had a daring and reckless look; his face was haggard with a sense of crime; his eyes were wild and bloodshot, and his step unsteady, from nightly debauchery. The history of the Catiline conspiracy is given by Sallust in a remarkably concise and nervous style.

CA'TION. See ANODE.

CA'TKIN (*amentum*), in Botany, a spike of numerous, small, unisexual flowers, destitute of calyx and corolla, and furnished with scale-like bracteæ instead, the whole inflorescence finally falling off by an articulation in a single piece. Examples are found

Catkin of Willow. Catkin of Birch.

in the willow, hazel, oak, birch, alder and other trees and shrubs, forming the natural order AMENTACEÆ (q. v.). In some, as in the oak and hazel, the male flowers only are in catkins.

CA'TMINT (*Népeta cataria*), a plant of the natural order *Labiatæ*, pretty common in England, in chalky and gravelly soils, but rare in Scotland and Ireland, widely diffused throughout Europe and the middle latitudes of Asia, and of North America; remarkable for the fondness which cats display for it. It appears to act upon them in a similar way to Valerian root; and when its leaves are bruised so as to be highly odoriferous, they are at once attracted to it, rub themselves on it, tear at it, and chew it. Its odor has been described as intermediate between that of mint and that of pennyroyal. It has erect stems, 2—3 feet high, dense whorls of many whitish flowers, tinged and spotted with rosecolor, and stalked heart-shaped leaves of a velvety softness, whitish and downy beneath.—Other species are numerous in the south of Europe, and middle latitudes of Asia.

CA'TO, MARCUS PORCIUS, surnamed *Censorius* and *Sapiens* ('the wise'), afterwards known as CATO PRISCUS or CATOR MAJOR—to distinguish him from Cato of Utica—was born at Tusculum in 234 B.C. He inherited from his plebeian father a small farm in the country of the Sabines, where he busied himself in agricultural operations, and learned to love the simple and severe manners of his Roman forefathers, which still lingered round his rural home. Induced by Lucius Valerius Flaccus to remove to Rome when that city was in a transition epoch, from the old-fashioned strictness and severe frugality of social habits, to the luxury and licentiousness of Grecian manners, C. appeared to protest against this, to denounce the degeneracy of the Philo-hellenic party, and to set a pattern of sterner and purer character.

He soon distinguished himself as a pleader at the bar of justice, and after passing through minor offices, was elected consul. In his province of Nearer Spain, where an insurrection had broken out after the departure of the elder Scipio (206 B.C.), C. was so successful in quelling disturbances and restoring order, that in the following year he was honored by a triumph. C. exhibited extraordinary military genius in Spain; his stratagems were brilliant, his plans of battle were marked by great skill, and his general movements were rapid, bold, and unexpected. In 187 B.C., a fine opportunity occurred for the display of 'antique Roman' notions. M. Fulvius Nobilior had just returned from Ætolia victorious, and sought the honor of a triumph. C. objected. Fulvius was indulgent to his soldiers, a man of literary taste, &c., and C. charges him, among other enormities, with 'keeping poets in his camp.' These rude prejudices of C. were not acceptable to the senate, and C.'s opposition was fruitless. In 184 B.C., C. was elected censor, and discharged so rigorously the duties of his office, that the epithet *Censorius*, formerly applied to all persons in the same station, was made his permanent surname. Many of his acts were highly commendable. He repaired the water-courses, paved the reservoirs, cleansed the drains, raised the rents paid by the publicans for the farming of the taxes, and diminished the contract prices paid by the state to the undertakers of public works. More questionable reforms were those in regard to the price of slaves, dress, furniture, equipage, &c. His despotism in enforcing his *own* idea of decency may be illustrated from the fact, that he degraded Manilius, a man of prætorian rank, for having kissed his wife in his daughter's presence in open day. C. was a thoroughly dogmatic moralist, intolerant, stoical, but *great*, because he manfully contended with rapidly swelling evils; yet not *wise*, because he opposed the bad and the good in the innovations of his age with equal animosity.

In the year 175 B.C., C. was sent to Carthage to negotiate on the differences between the Carthaginians and the Numidian king Masinissa; but having been offended by the Carthaginians, he returned to Rome, where, ever afterwards, he described Carthage as the most formidable rival of the empire, and concluded all his addresses in the senate-house—whatever the immediate subject might be—with the well-known words: '*Ceterum censeo, Carthaginem esse delendam*' ('For the rest, I vote that Carthage must be destroyed').

Though C. was acquainted with the Greek language and its literature, his severe principles led him to denounce the latter as injurious to national morals. He died 149 B.C., at the age of 85. C. was twice married. In his eightieth year, his second wife, Salonia, bore him a son, the grandfather of Cato of Utica. C. treated his slaves with shocking harshness and cruelty. In his old age, he became greedy of gain, yet never once allowed his avarice to interfere with his honesty as a state-functionary.

He also composed various literary works, such as *De Re Rustica* (a treatise on agriculture)—much corrupted, however. The best editions are by Gesner and Schneider in their *Scriptores Rei Rusticæ*. His greatest historical work, *Origines*, has unfortunately perished; but some few fragments are given in Krause's *Historicorum Romanorum Fragmenta* (Berlin, 1833). Fragments of C.'s orations—of which as many as 150 were read by Cicero—are given in Meyer's *Oratorum Romanorum Fragmenta* (Zurich, 1842).

CATO, MARCUS PORCIUS, named CATO THE YOUNGER, or CATO UTICENSIS (from the place of his death), was born 95 B.C. Having lost, during childhood, both parents, he was educated in the house of his uncle M. Livius Drusus, and, even in his boyhood, gave proofs of his decision and strength of character. In the year 72 B.C., he served with distinction in the campaign against Spartacus, but without finding satisfaction in military life, though he proved himself a good soldier. From Macedonia, where he was military tribune in 67, he went to Pergamus in search of the Stoic philosopher, Athenodorus, whom he brought back to his camp, and whom he induced to proceed with him to Rome, where he spent the time partly in philosophical studies, and partly in forensic discussions. Desirous of honestly qualifying himself for the quæstorship, he commenced to study all the financial questions connected with it. Immediately after his election, he introduced, in spite of violent opposition from those interested, a rigorous reform into the treasury offices. He quitted the quæstorship at the appointed time amid general applause. In 63 B.C., he was elected tribune, and also delivered his famous speech on the Catiline conspiracy, in which he denounced Cæsar as an accomplice of that political desperado, and determined the sentence of the senate. Strongly dreading the influence of unbridled greatness, and not discerning that an imperial genius—like that of Cæsar—was the only thing that could remedy the evils of that overgrown monster, the Roman Republic, he commenced a career of what seems to us blind pragmatical opposition to the three most powerful men in Rome—Crassus, Pompey, and Cæsar. C. was a noble but strait-laced *theorist*, who lacked the intuition into circumstances which belongs to men like Cæsar and Cromwell. His first opposito Pompey was successful; but his opposition to Cæsar's consulate for the year 59 not only failed, but even served to hasten the formation of the first triumvirate between Cæsar, Pompey, and Crassus. He was afterwards forced to side with Pompey, who had resiled from his connection with Cæsar, and become reconciled to the aristocracy.

After the battle of Pharsalia (48 B.C.), C. intended to join Pompey, but hearing the news of his death, escaped into Africa, where he was elected commander by the partisans of Pompey, but resigned the post in favor of Metellus Scipio, and undertook the defence of Utica. Here, when he had tidings of Cæsar's decisive victory over Scipio at Thapsus (April 6, 46 B.C.), C., finding that his troops were wholly intimidated, advised the Roman senators and knights to escape from Utica, and make terms with the victor, but prohibited all intercessions in his own favor. He resolved to die rather than surrender, and, after spending the night in reading Plato's *Phædo*, committed suicide by stabbing himself in the breast.

CATO, DIONYSIUS, is the name prefixed to a little volume of moral precepts in verse, which was a great favorite during the middle ages. Whether or not such a person ever existed, is a point of the greatest uncertainty. The title which the book itself commonly bears, is *Dionysii Catonis Disticha de Moribus ad Filium*. Its contents have been differently estimated: some scholars have considered the precepts admirable; others, weak and vapid:

some have found indications of a superior scriptural knowledge; others, of a deep-rooted paganism. The style has been pronounced the purest Latin and the most corrupt jargon. The truth would seem to be, that on a groundwork of excellent Latin of the Silver Age, the illiterate monks of a later period have, as it were, inwoven a multitude of their own barbaric errors, which preclude us from determining precisely the period when the volume was composed. It begins with a preface addressed by the supposed author to his son, after which come 56 injunctions of rather a simple character, such as *parentem ama*. This is followed by the substance and main portion of the book—viz., 144 moral precepts, each of which is expressed in two dactylic hexameters. During the middle ages, the *Disticha* was used as a text-book for young scholars. In the 15th c., more than 30 editions were printed. The best edition, however, is that published at Amsterdam in 1754 by Otto Arntzenius. Caxton translated it into English.

CA'TODON and CATODO'NTIDÆ. See CACHOLOT.

CATO'PTRICS. The divisions of the science of optics are laid out and explained in the article OPTICS (q. v.). C. is that subdivision of geometrical optics which treats of the phenomena of light incident upon the surfaces of bodies, and reflected therefrom. All bodies reflect more or less light, even those through which it is most readily transmissible; light falling on such media, for instance, at a certain angle, is totally reflected. Rough surfaces scatter or disperse (see DISPERSION OF LIGHT) a large portion of what falls on them, through which it is that their peculiarities of figure, color, &c., are seen by eyes in a variety of positions; they are not said to *reflect* light, but there is no doubt they do, though in such a way, owing to their inequalities, as never to present the proper phenomena of reflection. The surfaces with which C., accordingly, deals, are the smooth and polished.

It tracks the course of *rays* and *pencils* of light after reflection from such surfaces, and determines the positions, and traces the forms, of images of objects as seen in mirrors of different kinds.

A ray of light is the smallest conceivable portion of a stream of light, and is represented by the line of its path, which is always a straight line. A pencil of light is an assemblage of rays constituting either a cylindrical or conical stream. A stream of light is called a converging pencil when the rays converge to the vertex of the cone, called a focus; and a diverging pencil, when they diverge from the vertex. The axis of the cone in each case is called the axis of the pencil. When the stream consists of parallel rays, the pencil is called cylindrical, and the axis of the cylinder is the axis of the pencil. In nature, all pencils of light are primarily diverging—every point of a luminous body throwing off light in a conical stream; converging rays, however, are continually produced in optical instruments, and when light diverges from a very distant body such as a fixed star, the rays from it falling on any small body, such as a reflector in a telescope, may, without error, be regarded as forming a cylindrical pencil. When a ray falls upon any surface, the angle which it makes with the normal surface at the point of incidence is called *the angle of incidence;* and that which the reflected ray makes with the normal is called *the angle of reflection.*

Two facts of observation form the groundwork of catoptrics. They are expressed in what are called the laws of reflection of light: 1. In the reflection of light, the incident ray, the normal to the surface at the point of incidence, and the reflected ray, lie all in one plane. 2. The angle of reflection is equal to the angle of incidence. These laws are simple facts of observation and experiment, and they are easily verified experimentally. Rays of all colors and qualities follow these laws, so that white light, after reflection remains undecomposed. The laws, too, hold, whatever be the nature, geometrically, of the surface. If the surface be a plane, the normal is the perpendicular to the plane at the point of incidence; if it be curved, then the normal is the perpendicular to the tangent plane at that point. From these laws and geometrical considerations may be deduced all the propositions of catoptrics. In the present work, only those can be noticed whose truth can in a manner be exhibited to the eye, without any rigid mathematical proof. They are arranged under the heads *Plane Surfaces* and *Curve Surfaces.*

Plane Surfaces.—1. When a pencil of parallel rays falls upon a plane mirror, the reflected pencil consists of parallel rays. A glance at the annexed figure (fig. 1), where PA and QB are two of the incident rays, and are reflected in the directions AR and BS respectively, will make the truth of this pretty clear to the eye. The proposition, however, may be rigidly demonstrated by aid of Euclid, book xi., with which, however, we shall not presume the reader to be acquainted. The reader may satisfy himself of its truth practically by taking a number of rods parallel to one another and inclined to the floor, and then turning them over till they shall again be equally inclined to the floor, when he will again find them all parallel.—2. If a diverging or converging pencil is incident on a plane mirror, the focus of the reflected pencil is situated on the opposite side of the mirror to that of the incident pencil, and at an equal distance from it. Suppose the pencil to be diverging from the focus Q (fig. 2), on the mirror of the surface of which CB is a section. Draw QNq perpendicular to CB, and make qN=QN, then q is the focus of the reflected rays. For let QA, QB, QC be any of the incident rays in the plane of the figure; draw the line AM perpendicular to CB, and draw AR, making the angle MAR equal to the angle of incidence, MAQ. Then AR is the reflected ray. Join qA. Now it can be proved geometrically, and indeed is apparent at a glance, that qA and AR are in the same straight line; in other words, the reflected ray AR proceeds as if from q. In the same way, it may

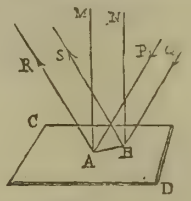


Fig. 1.

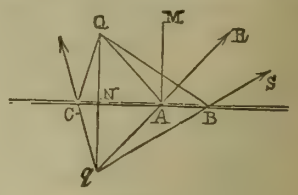


Fig. 2.

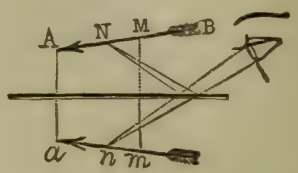


Fig. 3.

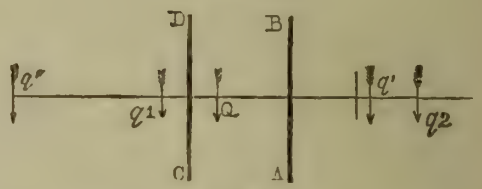


Fig. 4.

be shown that the direction of any other reflected ray, as BS, is as if it proceeded from q; in other words, q is the focus of reflected rays; it is, however, only their *virtual* focus. See art. FOCUS. If a pencil of rays converged to q, it is evident that they would be reflected to Q as their real focus, so that a separate proof for the case of a converging pencil is unnecessary. The reader who has followed the above, will have no difficulty in understanding how the position and form of the image of an object placed before a plane mirror—as in fig. 3, where the object is the arrow AB, in the plane of the paper, to which the plane of the mirror is perpendicular—should be of the same form and magnitude as the object (as *ab* in the fig.), and at an equal distance from the mirrow, on the opposite side of it, but with its different parts inverted with regard to a given direction.

The highest point *a*, for instance, in the image, corresponds with the lowest point, A, in the object. He will also understand how in the ordinary use of a looking-glass, the right hand of the image corresponds to the left hand of the object.

When two plane mirrors are placed with their reflecting surfaces towards each other, and parallel, they form the experiment called the Endless Gallery. Let (in fig. 4) the arrow, Q, be placed vertically between the parallel mirrors, CD, BA, with their silvered faces turned to one another, Q will produce in the mirror CD the image q^1. This image will act as a new object to produce with the mirror BA the image q^2, which, again, will produce with the mirror CD another image, and so on. Another series of images, such as q', q'', &c., will similarly be produced at the same time, the first of the series being q', the image of Q in the mirror BA. By an eye placed between the mirrors, the succession of images will be seen as described; and if the mirrors were perfectly plane and parallel, and reflected all the light incident on them, the number of the images of both series would be infinite. If, instead of being parallel, the mirrors are inclined at an angle, the form and position of the image of an object may be found in precisely the same way as in the former case, the image formed with the first mirror being regarded as a new (virtual) object, whose image, with regard to the second, has to be determined. For a curious application of two plane mirrors meeting and inclined at an angle an aliquot part of 180°, see art. KALEIDOSCOPE.—3. The two propositions already established are of extensive application, as has partly been shown. They include the explanation of all phenomena of light related to plane mirrors. The third

proposition is one also of considerable utility, though not fundamental. It is: When a ray of light has been reflected at each of two mirrors inclined at a given angle to each other, in a plane perpendicular to their intersection, the reflected ray will deviate from its original course by an angle double the angle of inclination of the mirrors. Let A and B (fig. 5) be sections of the mirrors in a plane perpendicular to their intersection, and let their directions be produced till they meet in C. Let SA, in the plane of A and B, be the ray incident on the first mirror at A, and let AB be the line in which it is thence reflected to B. After reflection at B, it will pass in the line BD, meeting SA, its original path, produced in D. The angle ADB evidently measures its deviation from its original course, and this angle is readily shown to be double of the angle at C, which is that of the inclination of the mirrors. It is on this proposition that the important mathematical instruments called the Quadrant and Sextant (q. v.) depend.

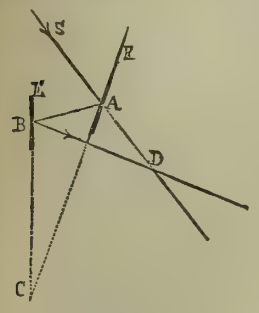


Fig. 5.

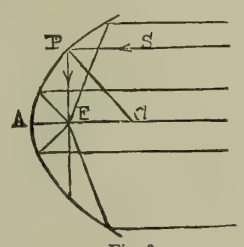


Fig. 6.

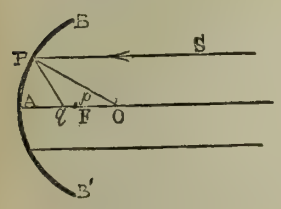


Fig. 7.

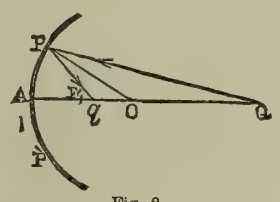


Fig. 8.

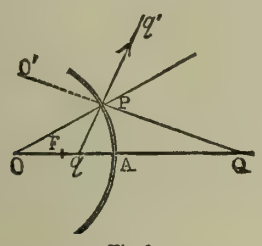


Fig. 9.

Curved Surfaces.—As when a pencil of light is reflected by a curved mirror, each ray follows the ordinary law of reflection, in every case in which we can draw the normals for the different points of the surface, we can determine the direction in which the various rays of the pencil are reflected, as in the case of plane mirrors. It so happens that normals can be easily drawn only in the case of the sphere, and of a few 'surfaces of revolution,' as they are called. These are the paraboloid, the ellipsoid, and the hyperboloid of revolution. The paraboloid of revolution is of importance in optics, as it is used in some specula for telescopes. See arts. SPECULUM and TELESCOPE. The three surfaces last named are, however, all of them interesting, as being for pencils of light incident in certain ways what are called surfaces of accurate reflection—i. e., they reflect all the rays of the incident pencil to a single point or focus. We shall explain to what this property is owing in the case of the parabolic reflector, and state generally the facts regarding the other two.

1. The concave parabolic reflector is a surface of accurate reflection for pencils of rays parallel to the axis or central line of figure of the paraboloid. This results from the property of the surface, that the normal at any point of it passes through the axis, and bisects the angle between a line through that point, parallel to the axis, and a line joining the point to the focus of the generating parabola. Referring to fig. 6, suppose a ray incident on the surface at P, in the line SP, parallel to the axis AFG. Then if F be the focus of the generating parabola, join PF. PF is the direction of the reflected ray. For PG, the normal at P, by the property of the surface, bisects the angle FPS, and therefore $\angle$ (angle) FPG = $\angle$ GPS. But SPG is the angle of incidence, and SP, PG, and FP are in one plane, and therefore, by the laws of reflection, FP is the reflected ray. In the same way, all rays whatever, parallel to the axis, must pass through F after reflection. If F were a luminous point, the rays from it, after reflection on the mirror, would all proceed in a cylindrical pencil parallel to the axis. This reflector, with a bright light in its focus, is accordingly of common use in light-houses.

2. In the concave ellipsoid mirror there are two points—viz., the foci of the generating ellipse, such that rays diverging from either will be accurately reflected to the other. This results from the property of the figure, that the normal at any point bisects the angle included between lines drawn to that point from the foci.

3. Owing to a property of the surface similar to that of the ellipsoid, a pencil of rays converging to the exterior focus of a hyberbolic reflector, will be accurately reflected to the focus of the generating hyperbola.

The converse of the above three propositions holds in the case of the mirrors being convex.

Though the sphere is not a surface of accurate reflection, except for rays diverging from the center, and which on reflection are returned thereto, the spherical reflector is of great practical importance, because it can be made with greater facility and at less expense than the parabolic reflector. See art. TELESCOPE. It is necessary, then, to investigate the phenomena of light reflected from it.

4. *Spherical Mirrors.*—It is usual to treat of two cases, the one the more frequent in practice, the other the more general and comprehensive in theory. First, then, to find the focus of reflected rays when a small pencil of parallel rays is incident directly on a concave spherical mirrior. Let BAB′ (fig. 7) be a section of the mirror, O its center of curvature, and A the center of its aperture. AO is the axis of the mirror, and therefore of the incident pencil, because it is incident directly on the mirror; a pencil being called oblique when its axis is at an angle to the axis of the mirror. As the ray incident in the line OA will be reflected back in the same line—OA being the normal at A—the focus of reflected rays must be in OA. Let SP be one of the rays; it will be reflected so that $\angle qOP = \angle SPO$. But $\angle PO q = \angle OPS$ by parallel lines. Therefore, $\angle qPO = \angle qOP$, and Pq and Oq are equal. If, now, the incident pencil be very small—i. e., if P be very near A—then the line Pq will very nearly coincide with the line OA, and Pq and Oq will each of them become very nearly the half of OA. Let F be the middle point of OA—the point, namely, to which q tends as the pencil diminishes. Then F is called the principal focus of the mirror, and AF the principal focal length, which is thus $= \frac{1}{2}$ radius of the mirror. It will be observed that when AP is not small, q lies between A and F. Fq is called the aberration of the ray.

When AP is large, the reflected rays will continually intersect, and form a luminuous curve with a cusp at F. This curve is called the caustic (q. v.). We shall now proceed to the more general case of a small pencil of diverging rays, incident directly on a concave spherical mirror. Let PAP′ (fig. 8) be a section of the mirror, A the center of its aperture, O of its curvature, and let F be its principal focus. Then, if Q be the focus of incident rays (as if proceeding from a candle there situated), q, the focus of the reflected rays, lies on QOA, since the pencil is incident directly, and the ray QOA, being incident in the line of the normal OA, is reflected back in the same line. Let PQ be any other ray of the pencil. It will be reflected in Pq, so that $\angle qPO = \angle OPQ$; and on the supposition that PA is very small, so that QP becomes nearly equal to QA, and qP to qA, it can be shown by Euclid, vi 3, that $\frac{QO}{QA} = \frac{qO}{qA}$ very nearly. From this equation is deduced the formula $qA = \frac{QA \times AF}{QA - AF}$, which enables us to find qA, when QA and AF are known. Thus, let the radius of curvature be 12 inches, and the distance of the source of the rays, or QA, 30 inches, the focal length $qA = \frac{30 \times 6}{30 - 6} = 7\frac{1}{2}$ inches. If the rays had diverged from q, it is clear they would have been reflected to Q. The points Q and q, accordingly, are, called conjugate foci.

If the mirror be convex, as in fig. 9, instead of concave, and a pencil of diverging rays be incident directly on it from Q, we should find, proceeding in exactly the same way as in the former case, the equation $qA = \frac{QA \times AF}{QA + AF}$; or taking the same numbers as before; $qA = \frac{30 \times 6}{30 + 6} = 5$ inches.

For information regarding the formation of images by spherical mirrors, the reader may consult Potter's *Elements of Optics*. See also the arts. MIRRORS and IMAGES.

By considering fig. 8, it is easy to see how the relative positions of the two *conjugate* foci, as they are called, Q, and q, vary as the distance AQ, of the origin of the rays is changed. As Q is advanced towards O, q also approaches O, since the angles QPO and qPO always remain equal; and when the source of the light is in

the center, O, of the sphere, the reflected rays are all returned upon the source. As Q, again, recedes from O, *q* moves towards F, which it does not quite reach until the distance of Q is infinite, so that the incident rays may be considered as parallel, as in fig. 7. If Q is placed between O and F, then *q* will be to the right of O; and when V coincides with F, the reflected rays will have no focus, but will be parallel. If Q is between F and A, the reflected rays will diverge, and will have their virtual focus to the left of A. The correctness of these deductions may easily be verified. The positions of the conjugates are traced in precisely the same way for the convex mirror, and the reader who is interested will find no difficulty in tracing them for himself.

CATO'PTROMANCY, divination by the mirror or looking-glass. At Patras, in Greece, the sick foretold their death or recovery by means of a mirror let down with a thread until its base touched the water in a fountain before the temple of Ceres. The face of the sick person appearing healthy in the mirror, betokened recovery; if it looked ghastly, then death was sure to ensue. More modern superstitions attach ill-luck to the breaking of a looking-glass, and to seeing one's face in a glass by candle-light.

CATS, JACOB, a Dutch statesman and poet, was born at Brouwershaven, in Zeeland, in 1577, and after studying law, finally settled at Middleburg. He rose to high offices in the state, and was twice sent as ambassador to England, first in 1627, and again in 1652, while Cromwell was at the head of affairs. He died 1660. As a poet, he enjoyed the highest popularity. His poems are characterized by simplicity, rich fancy, clearness, and purity of style, and excellent moral tendency. The most highly prized of his productions were the *Huwelyk, Trouwringh* (a series of romantic stories relating to remarkable marriages), and the *Spiegel van den Ouden en Nieuwen Tyd.* The best edition of his works appeared at Amsterdam, in 19 vols., 1790—1800.

CA'T'S-EYE, a beautiful mineral, a variety of quartz receiving its name from the resemblance which the reflection of light from it, especially when cut *en cabochon*, or in a convex form, is supposed to exhibit to the light which seems to emanate from the interior of the eye of a cat. It has a sort of pearly appearance, and is *chatoyant* or characterized by a fine play of light, which results from the parallel arrangement of the minute fibres of the stone itself, or from an intimate mixture of some foreign substance, such as amianthus. It has been supposed that C. is silicified wood. It is of various colors, and is obtained chiefly from Malabar and Ceylon. The Singhalese are especially proud of it, believing it, although erroneously, to be only found in their island. It is often brought from that island, cut to resemble a monkey's face, from the idolatrous regard entertained for the monkey. A chatoyant variety of felspar has been sometimes confounded with C., and is also found in Ceylon.

CA'TSKILL MOUNTAINS, a group of the Alleghany chain, in its largest sense, situated near the right bank at once of the Hudson and of the Mohawk, in the state of New York. The loftiest points, Round Top and High Peak, are respectively 3800 feet and 3720 above tide-water; and, on a third eminence, a terrace of 2500 feet above the same level presents Catskill Mountain House, a favorite retreat in summer. The group is drained chiefly by Catskill Creek, which, at a village of its own name, enters the Hudson 111 miles above its mouth, and 34 below the confluence of the Mohawk.

CA'T'S-TAIL. See TYPHA.

CA'T'S-TAIL GRASS. See TIMOTHY GRASS.

CA'TTARO, a town of Austria, in the crown-land of Dalmatia, is situated at the head of the Gulf of Cattaro, about 36 miles south-east of Ragusa. It is strongly fortified, and surrounded on all sides by mountains. The castle, a massive and almost inaccessible building, stands on a precipitous rock immediately behind the town. C. has a cathedral, several churches and hospitals, and a population of 3000. C., which was at one time the capital of a small republic, was in 1807 annexed to the kingdom of Italy, but was handed over to Austria in 1814 by the treaty of Vienna.—CATTARO, GULF OF, or BOCCA DI CATTARO, an inlet of the Adriatic, near the south extremity of the Dalmatian coast. It consists of three basins or lakes, connected by straits of about half a mile in breadth. The outer entrance is only a mile and a half wide, and the total length of the gulf is about 30 miles. Mountains protect it from all winds, and it has a depth of from 15 to 20 fathoms.

CA'TTEGAT, or KATTEGAT (*Sinus Codanus*), the bay or arm of the sea situated between the east coast of Jutland and the west coast of Sweden to the north of the Danish islands. It is connected with the Baltic Sea by the Great and Little Belt (q. v.), and by the Sound. The Skager Rack (q. v.) connects it with the North Sea. The length of the C. is about 150 miles, and its greatest breadth 85 miles. It is of unequal depth, and has dangerous sand-banks. The principal islands are Lasöe, Samsöe, and Anhalt. The Danish shores of the C. are low, but the Swedish shore is very steep and rocky.

CA'TTERMOLE, GEORGE, one of the most distinguished of English painters in water-colors, was born at Dickleburgh, Norfolk, in 1800. His pictures, which embrace a wide range of subjects, are remarkable for their striking originality of conception, vigorous execution, and fine color and tone. One of his best known and greatest pictures is 'Luther at the Diet of Spires,' containing 33 portraits of the principal characters, copied from the authentic originals by the old masters. He also designed the engravings for his brother's *History of the Civil Wars*, and illustrated many scenes in Scott's novels and in Shakspeare. His later works are chiefly oil-paintings. He died July 24, 1868.

CA'TTI, or CHATTI, a German people, included by Cæsar under the name Suevi (q. v.), who inhabited a country pretty nearly corresponding to the present Hesse. The south-western part of their territory, around *Mattiacum*, was conquered by the Romans under Drusus. The C. took part in the general rising of the Germans under Hermann. Tacitus praises them as excellent foot-soldiers. During the reign of Marcus Aurelius, in the end of the 2d c., they made incursions into Roman Germany and Rhætia. Caracalla failed in an expedition against them and the Alemanni in the 3d century. About the middle of that century, their name began to give place to that of the Franks (q. v.), and is last mentioned by Claudian in the latter part of the 4th century.

CA'TTLE. See OX.

CATTLE, in English Law. See CHATTEL.

CATTLE-PLAGUE, RINDERPEST (Ger.), or STEPPE MURRAIN, is a contagious eruptive fever, or exanthema, of the bovine species; sheep, goats, deer, and other allied species occasionally, however, catch it from cattle. It occurs indigenously on the plains of Western Russia, whence it has at various times overspread most parts of the Old World. The specific virus from diseased or infected animals is the only source of cattle-plague; no filth, overcrowding, or other health-depressing cause has hitherto produced it. As in smallpox, scarlatina, and other eruptive fevers, an incubative stage, varying between two and twenty days, intervenes between the introduction of the virus into the system, either by inoculation or contagion, and the development of the characteristic symptoms. These consist essentially of congestion of the mucous and cutaneous surfaces, with a sort of aphthous eruption, and thickening, softening, and desquamation of the superficial investing membrane. The disease runs a tolerably fixed and definite course, which is not materially altered by any known remedial measures. It seldom attacks the same individual a second time.

History.—The cattle-plague has been recognized for upwards of a thousand years. It appears to have destroyed the herds of the warlike tribes who overran the Roman Empire during the 4th and 5th centuries. About 810, it traveled with the armies of Charlemagne into France, and about the same period is also supposed to have visited England. Several times throughout the course of every century it spread from the plains of Russia over the western countries of Europe, and is stated to have again visited England about 1225. Although occasioning, every few years, great losses on the continent of Europe, the plague does not appear to have again shown itself in England until 1714, when it appeared at Islington about the middle of July, was very destructive for about three months, but was again got rid of towards Christmas.

In 1744, it was in Holland, destroying there, in two years 200,000 cattle; in Denmark, from 1745—1749, it killed 280,000; in some provinces of Sweden it spared only 2 per cent. of the horned cattle. It made terrible havoc throughout Italy, destroying 400,000 beasts in Piedmont alone. In April 1745, the plague was again imported into England, probably by some white calves from Holland, where, as already stated, it had for some time prevailed. It continued its devastations for twelve years, but it is now impossible accurately to discover the losses it occasioned. In the third and fourth years of its ravages, 80,000 cattle were slaughtered, and double that number are supposed to have died. In 1747, 40,000 cattle died in Nottingham and Lancashire alone; whilst, so late as 1757, 30,000 perished in Cheshire in six months. In March 1770, the disease was brought with some hay from Holland to Portsoy, in the Moray Firth; several cattle died, and others, to the value of £799, 12*s.* 2*d.*, being destroyed, the further spread of the pest was prevented. By the wars which wasted Europe towards the close of the last and first eighteen years of the present century, cattle-plague was spread widely over the continent, and occasioned, wherever it occurred, terrible losses. Since then, at short intervals, it has spread—always being traceable to its source on the Russian plains—over Poland, Hungary, Austria, Prussia portions of Germany and Italy, and has extended to Egypt. It has also reached China and Japan.

The British outbreak of 1865—1867, like its predecessors, undoubtedly came from Russia. The steamer *Tonning* from Revel, brought 331 cattle and 330 sheep into Hull on 29th May 1865. A

portion of the cattle had come from the interior of Russia, where the plague then was, or recently had been; the cargo was rapidly landed, and very hurriedly inspected. Nearly half of the cattle were distributed in various lots to butchers in Leeds, Derby, and Manchester, but, curiously, these do not appear to have left any contagion in their trail. One hundred and seventy-five came to London, remained from the Monday evening until Thursday's market in lairs at York Road, adjoining the cattle-market. It was stated, in a leader in the *Times* of the 15th August, that rinderpest was seen in the metropolitan market as early as 12th June. Certain it is that more than one lot purchased on 19th June carried the disease to several dairies in and about London. The first cases were mistaken for cases of poisoning, the cows they had stood beside were sent into market, and thus the subtile disorder in a few weeks spread into many dairies both in town and country. Twenty-three Dutch cattle, having stood over for several markets, were sent back to Holland on 2d July, carried with them the contagion, were placed in a field near Schiedam, but soon sickened and died, thus spreading the disease in Holland.

During the next six months, plague was repeatedly reimported thence into England. Until 11th August 1865, no restrictions whatever were put upon the removal of cattle; diseased and infected animals were freely taken to fairs and markets, were openly traveled by road and rail; whilst the metropolitan market continued every week to send forth infected cases, not only to the neighboring counties, but to Southampton, Birmingham, Hereford, Liverpool, Edinburgh, and even to Aberdeenshire. As early as 18th July, the pest was brought from London to Huntly by four calves; subsequent outbreaks occurred in the same way. The stamping-out system was, however, early and rigidly enforced in Aberdeenshire, and eight distinct outbreaks were promptly got rid of.

In Edinburgh, it appeared probably about 9th August, was brought from London by some low-priced foreign cows; in six weeks, about 800, or one half the dairy cows in Edinburgh, had died—200 having been buried in one trench. By the end of January, four-fifths of the dairy cows had perished, but Edinburgh was reported clear. In Glasgow, the first case occurred on 19th August, in a cow sent from Edinburgh. By 30th September, 432 cases were reported, and it continued to spread. By the middle of October, it was in Mr. Harvey's valuable stock of 800, of which 25 died in one night, and to save further loss, 50 healthy animals were in one day disposed of to the butcher. From Falkirk Trysts, as from Barnet, Norwich Hill, and other large English fairs, the disease was transmitted into fresh localities. From the autumn trysts, it was carried into Perthshire, Forfarshire, and Fifeshire. Diseased cattle passing along in railway trucks, appear to have spread the contagion over the fields adjoining the line at Thornton, Fifeshire. Into West Lothian it was conveyed early in September by lambs from the Edinburgh market.

The rapid spread of the insidious disorder may be gathered from the fact that, whilst, during the week ending 24th June 1865, there was only out outbreak at Mrs. Nicholl's dairy at Islington, and 30 animals affected, by 30th September there were 1702 farms, sheds, or other places in which the pest had appeared, and 13,263 animals had been attacked. Three months later, 8252 separate places had been visited, and 62,743 animals attacked. During six months, the aggregate of cattle attacked was 76,002.

During the three months to 30th March, 13,443 farms and other premises had been infected, and 147,275 cattle attacked. In December 1865, the fresh cases each week reached 9000; but in spite of remedial and preventive measures, of orders in council, and restrictions on the movement of stock, the number of weekly cases steadily increased to 15,706 in the third week of February. 'The cattle Diseases Prevention Act' passed 20th February 1866, and the advantages flowing from the restrictions thus tardily imposed on the trade in cattle, and the slaughter of diseased and infected animals, were speedily apparent. In four weeks, the number of cases was reduced by one half. During the three months ending 30th June, 28,276 cases were reported; during the next three months to 30th September, the numbers fell to 2108; whilst to 29th December, the three months' cases were but 149; to 30th March 1867, 89 new cases were noted. Throughout April and May the number of cases continued steadily to decline; but during the week ending 25th May a fresh outbreak occurred in the Finsbury district of the metropolis, and 81 animals died, or were slaughtered to prevent the further spread of the pest. With the exception of an isolated outbreak in Essex, which was promptly stayed by slaughter of the ailing and suspected animals, the country was free of plague during August. The following are the records of its destructive career during 1865—1867:

	Attacked.	Killed.	Died.	Recovered.
England.....	223,672	102,740	90,450	21,589
Wales.....	8,388	1,180	5,794	1,117
Scotland.....	46,863	6,263	28,088	10,707
Total..	278,923	110,183	124,332	33,413

To this sad total must be added 11,000 cases known to have been attacked and unaccounted for, and upwards of 60,000 healthy cattle slaughtered to prevent the spread of the disease. Plague was again imported into Hull in August 1872; it was brought with cattle from Cronstadt; it spread into several districts of the East Riding, attacked 72 animals, 51 of which were killed, and 21 died. In 1877, an outbreak took place in Germany, but by energetic measures was speedily suppressed without extensive losses.

Causes.—The development of cattle-plague by filth, overcrowding, miasmata, hot weather, or other such causes, is untenable. Faulty hygiene, by lowering vitality, probably renders the animal more prone to the attack, and less able to bear up against it, but it cannot originate plague. Like hydrophobia, smallpox, or syphilis, it is developed only by the special virus, which appears to have its habitat on the Russian steppes. This virus occurs abundantly in the blood of every plague-stricken beast, in the discharges from its nostrils, mouth, or eyes, in the off-scourings from the bowels, probably even in the breath. It may be transferred to healthy beasts by inoculation. A little of the blood or nasal or other mucous discharges of a plague case, if introduced underneath the skin of a healthy cow, develops the disease within a few days. The transference of the virus or contagion from the sick to the sound animal, is not always so direct and evident. As with other catching diseases, the virus may be carried considerable distances in the air; its particles are minute, but they have powerful vitality; it may adhere to the food that has lain before infected beasts; to the litter from the stalls, or even after it has been heaped for weeks; to the clothes of attendants; to the floors, walls, or stalling of buildings; to imperfectly cleansed cattle-trucks. So subtile and potent is the plague-poison, and so endowed with the power of self-multiplication and growth, that a very minute portion of it finding access to the blood of a healthy animal of the bovine race increases so rapidly, that, to use the words of the Commissioners' Report, No. III. p. 4, 'the whole mass of the blood, weighing many pounds, is infected; and every small particle of that blood contains enough poison to give the disease to another animal.' It may gain access to the blood probably through the air-passages, perhaps also by absorption through the mucous surface of the bowels, or even through the skin.

Symptoms.—In from three to six days after an animal has been exposed to the virus of cattle-plague, or about 36 to 48 hours after being purposely inoculated, the temperature of the body is raised by several degrees. A delicate thermometer introduced into the vagina or rectum, instead of marking about 102° F., indicates 104° to 106°. As yet, the appetite, secretion of milk, breathing, and pulse are scarcely if at all affected, and but for the elevation of temperature, accompanied sometimes by dulness, the animal might be supposed to be in the best of health. Two or three days later, or usually within six or eight days after the beast has taken in the subtile virus, the mucous membrane of the mouth is generally observed to be slightly reddened, and soon a granular yellowish-white eruption, consisting of thickened epithelium cells and granules, appears on the gums round the incisor teeth, and by and by on the lips and dental pad. Some hours later, the same eruption extends to the cheeks, tongue, and hard palate.

Within 48 hours, or about the sixth day of attack, a crust of epithelium covers the gums, lips, and mouth, and when wiped away, or accidentally rubbed off, leaves the abraded membrane red and vascular, and exhibiting patches of erosion. The membrane lining the vagina indicates very similar appearances; it is reddened and vascular, dotted with grayish translucent elevations about the size of rape-seeds, covered with a whitish-yellow, usually sticky discharge, and occasionally marked with patches of excoriation. The skin, like the mucous surfaces, is congested; there is hence a perverted development of scarf skin, and of the oleaginous secretion of the irritated sebaceous glands. The skin is thus invested with a furfuraceous desquamation; whilst on its thinner portions about the lips, between the thighs, and on the udder, there are popular eruptions or elevations. About two, or even three days after the temperature has been increased, and usually one, or even two days after the appearance of the characteristic eruption on the gums, the constitutional symptoms present themselves. The animal is dull, hangs its head, arches its back, the eyes are leaden and watery, and from both eyes and nose there latterly comes a dirty slimy discharge. Appetite and rumination are irregular, and in dairy cows, the secretion of milk rapidly abates. The breathing, especially towards the sixth day, is oppressed, expiration is prolonged, and accompanied by a peculiar grunt. The pulse is small and thready, and quickened as death approaches. The bowels, usually at first confined, become, towards the sixth or seventh day, much relaxed; the discharges passed, often with pain and straining, are profuse and liquid, offensive, acrid, pale colored, and occasionally mixed with blood. The patient loses weight and strength, totters if it attempts to walk, and prefers to lie rather than to stand. Death usually occurs about the seventh day, and is preceded by muscular twitchings, a peculiar sickly, often offensive smell, a cold clammy state

of body, moaning, grinding of the teeth, and rapidly increasing prostration.

Prognosis.—Cases usually terminate unfavorably when about the fifth or sixth day the animal temperature falls rapidly; the pulse becomes small, quick, and weak; the breathing more difficult, distressed, and moaning; the diarrhœa increased; and the depression more notable. A more favorable termination may be anticipated when, after the fifth day, the heightened temperature, so notable even from the earliest stages, abates gradually; the breathing becomes easier; the pulse firmer; the visible mucous membranes appear healthier; and patches of extravasation, or erosion speedily disappear.

Sheep do not take rinderpest spontaneously, and even when kept with diseased cattle, or inoculated with cattle-plague virus, they do not catch the disease so certainly as cattle do. When diseased, they exhibit, however, very similar symptoms, but Professor Röll, and other observers, record that upwards of 40 per cent. recover. Goats, deer, antelopes, gazelles, yaks, and indeed all animals taking rinderpest, exhibit with tolerable uniformity the same characteristic symptoms.

Post-mortem Appearances.—The mucous membranes are generally deeper colored than natural, are congested, softened, marked in places with the same granular patches discoverable during life within the mouth and the vagina, and in bad cases exhibit œdema, hæmorrhage, and sloughing. The first three stomachs sometimes contain a good deal of food, but show less declension from health than the fourth stomach, of which the mucous membrane is dotted with spots of congestion and extravasation. The coats of the bowels are thinned and easily torn. The mucous coat, especially towards the middle of the small intestines, the opening into the cæcum, and posterior half of rectum, is much congested, bared of epithelium, and sometimes ecchymosed, but never ulcerated. Peyer's glands, so generally inflamed in the somewhat analogous typhoid fever of man, are perfectly healthy. The liver, spleen, and pancreas seldom present any special appearances. The respiratory mucous membrane, like the digestive, is vascular, and marked with submucous hæmorrhage; the lungs are generally emphysematous, the heart often marked with petechial spots. The urino-genital, like the other mucous membranes, is congested in females, especially towards the lower part of the vagina and vulva; the kidneys are sometimes rather softened; the serous membranes and nervous centers are perfectly unchanged. Dr. Beale, by his microscopical observations, discovers in the capillaries a great increase of nuclear or germinal matter, and white blood-corpuscles, which he believes may account for the local congestion. The blood itself is dark in color; in the later stages it contains less water, probably owing to the draining diarrhœa, and about double its usual proportion of fibrine. The muscular tissues are softened, easily broken down, and contain an abnormal amount of soluble albumen. The urine is little altered in quantity, but from the first rise in the animal temperature, it contains an increase of urea varying from 5 to 15 per cent. The chief change in the milk is its rapid diminution in quantity, and the increase of its fatty matters. The bile is watery, offensive, and prone to decomposition.

Treatment.—Cattle-plague is proved to be an eruptic fever. When the specific poison, on which such disorders depend, has entered the body of a susceptible subject, no remedy has yet been discovered which can destroy it, or even materially shorten or mitigate its effects. Until such an antidote is found, there can be no hope of certain cure. The Cattle-plague Commissioners have collected information regarding the four following methods of treatment—namely, the antiphlogistic, the tonic and stimulant, the antiseptic, and the special. Diverse as are these systems, the percentages of recoveries, varying from 25·83 to 27·45, were so nearly alike, that it is fair to conclude that no one of the systems tried exercised any notable influence in checking the mortality. Partly, perhaps, from the varying violence of the plague, partly from differences in the nursing and care bestowed on the animals, the proportion of recoveries has varied greatly in different localities. Up to the end of 1865, in Huntingdon they were only 4·668 per cent.; in Norfolk they were 12·102; in Flint, 15·909; in Scotland, 19·889; whilst in Fifeshire they reached 24·552; and in Yorkshire, 29·731 per cent.

Like smallpox, measles, and other eruptive fevers in man, rinderpest runs a definite course which cannot safely be interfered with. Rational treatment is therefore limited to warding off untoward symptoms, to careful nursing, and husbanding the failing strength. It must, however, be remembered that throughout the progress of the disease there is constantly given off from the sick body minute particles, which are capable of developing the disorder in healthy cattle. Hence plague-subjects, by the orders in council, are very properly desired to be immediately destroyed. Except, therefore, for purely scientific purposes, and with careful precautions to prevent the spread of the poison, it is unwise to attempt remedial treatment. Where, however, a beast is to have a chance of recovery, so soon as the elevated temperature indicates the accession of the disease, solid indigestible food should be withheld, and the patient restricted to mashes, gruel, boiled linseed, malt, and other food, which can be digested without the necessity for rumination. The paramount importance of such a dietary is clearly demonstrated in the returns of the Edinburgh Cattle-plague Committee to the government commissioners.

The recoveries amongst 310 cattle 'fed with dry food, and treated medicinally with drugs,' were 13·6. Amongst 303 cattle treated with mixed food and hay, 22·2 recovered. Where mashes were given during sickness, but dry food supplied during convalescence, the recoveries reached 51·5; whilst in 95 cottagers' cows, whose chief ordinary dietary consisted of mashed food, and which were fed in the same manner throughout both sickness and convalescence, and were besides carefully nursed but not doctored, the recoveries reached 73·7. Where the bowels at the outset are costive, a dose of oil, or a very small quantity of some saline purgative, may be required. Cold water, gruel, mashes, or stale bread soaked either in water or beer, should be offered at short intervals throughout the attack. The animal, kept in an atmosphere of about 60°, should be comfortably clothed, and have its legs bandaged. The hot-air bath and wet-packing has been repeatedly tried, but although probably useful in the earlier stages, appear, when the disease is fully established, to harass and weaken the patient. Small and repeated doses of sulphite of soda have in some cases proved useful, and may be conjoined with carefully regulated moderate doses of such stimulants as ale, whisky and water, sweet spirit of nitre, spirit of ammonia, or strong coffee. It is most important, however, that these and other such medicines should be drunk by the animal of its own accord in its gruel, water, or mashes, as the forcible horning over of drenches always disturbs the patient. The inhalation of chloroform, although temporarily relieving the distressed breathing, does not appear to exert any permanent benefit.

Prevention.—From what has been stated regarding the nature of cattle plague, it must be evident that its prevention can only be effected by the destruction of the specific virus, or by removing beyond its influence all animals on which it might fasten. Sparks fall harmless where no inflammable materials lie within reach, and there are many such materials. Neither should sheep, fresh hides, hay, nor any other fodder and litter from countries where this ruinous plague exists, or has recently visited, be allowed to enter British ports. This very obvious precaution took strong hold of the public mind, and the practical result is, that importations of cattle plague are guarded against by the provisions of the Contagious Diseases (Animals) Acts, 1869 and 1878. Neither cattle, sheep, nor pigs, fodder, litter, or hides, can be landed from countries where the plague exists, or from places in direct communication with such infected countries. All foreign stock is inspected at the ports of debarkation, and inspectors have orders for the immediate slaughter and disinfection of cattle-plague subjects, and of any animals with which they have been in contact.

But even with such precautions, foreign cattle frequently bring with them catching disorders, notably foot-and-mouth disease. Since they constitute, however, less than 5 per cent. of the total cattle stock of the country, such risks should be removed by converting the foreign cattle traffic into a dead-meat trade.

Rinderpest being found to resemble smallpox in men and sheep, it was thought that its propagation and virulence might be abated by vaccination with cowpox lymph; but cattle, even when effectually vaccinated, which is often a difficult task, readily take rinderpest, often in its most mortal forms. Inoculation with the discharges from mild cases and from young calves has been tried as a palliative; but the disease, thus artificially developed, loses nothing either of its severity or of its dangerous contagious character. Cattle in Oxfordshire receiving for several weeks daily doses of sulphite of soda are stated to have had the plague in a mild form.

Where an outbreak occurs, the diseased animals must be promptly destroyed, and all cattle in immediate contact with them should likewise be slaughtered. This 'stamping-out system' prevents the multiplication and diffusion of the virus, and hence saves still further losses. It is rigidly and successfully carried out in many continental countries. By stamping out and strict isolation, eight or ten outbreaks in Aberdeenshire were got rid of without serious loss. A French outbreak on the Belgian frontier in September 1865 was stamped out with the sacrifice of forty-three animals. The disease was imported to Paris in November by two gazelles purchased in London by the French Acclimatization Society. Before it was stayed by slaughter and segregation, thirty-four animals, including yaks, antelopes, deer, gazelles, goats, and peccari, died or were destroyed. The determined slaughter of diseased and infected animals, and the restrictions on the movement of all stock, were the only means that reduced the number of attacks during the British outbreak of 1865 and 1866. As is officially recorded in the Commissioners' Report, No. IV., p. 6, 'where the percentage of killed is high, the ratio of increase

of the disease is low, and *vice versâ*. This has generally been noticed under each county and district.'

When plague is in the neighborhood, it is desirable daily to sprinkle the walls, wood-work, and floor of the sheds and hoveling with carbolic acid solution, and to keep up throughout the premises a continual odor of this useful antiseptic, and with a diluted solution of the acid, or with M'Dougall's disinfecting soap, to wash over the cattle daily. The animals should be carefully fed on digestible soft food; receive daily about an ounce of sulphite of soda in a mash; and, in order to note the first access of the disease, should have their temperature examined by the thermometer every night and morning.

The recommendations of the Cattle-plague Commissioners for the purifying of infected sheds, litter and manure must receive careful attention. In whatever premises infected beasts have stood, the walls should be lime-washed, a pint of carbolic acid being added to each pailful of the whitewash. The floors and wood-work, after being washed and scrubbed with boiling water, should be sprinkled with a strong solution of carbolic acid. The sheds being emptied of their living inhabitants, and the doors and windows closed, sulphur should be burned, and the vapors allowed to float about for a couple of hours before the sheds are again thrown open to the purifying influences of abundance of fresh air. A pound of sulphur placed on a shovel of burning coals suffices for a twelve-stalled shed or byre. Where cattle-plague has raged, this cleansing and fumigation should be repeated, and, if possible, several weeks allowed to elapse before the premises are again occupied by sound animals. All shovels, forks, buckets, or brooms that have either directly or indirectly come in contact with diseased or infected animals, should be washed with the carbolic acid solution. The clothes and boots of attendants, inspectors, and others coming in contact with plague-stricken animals must be similarly cleansed. The manure should be sprinkled with carbolic acid at intervals of a few days, and then covered over with a foot of earth, freely mixed with soil, or carted away and ploughed in. It is safer thus to put the manure on the arable land than to use it as a top-dressing for the pastures.

Authorities.—Official Reports of Commissioners, Nos. I., II., III., and IV.; *The Cattle Plague*, by Prof. Gamgee; *Die Rinderpest*, by Roloff (2d ed., 1877); and numerous monographs by German authorities.

CATTO'LICA, a town of Sicily, in the province of Girgenti, and 14 m. N.W. of the city of that name. It has extensive sulphur-works, and a pop. of 7200.

CATU'LLUS, VALE'RIUS, a celebrated Roman lyrist, was born at Verona, 87 B.C. His father was an intimate friend of Julius Cæsar, and the young poet must have frequently met the great warrior at the paternal residence, when the latter was on his way to Gaul. In early life, he went to Rome, where his career was that of an Epicurean, and the expense of this kind of living soon involved him in pecuniary difficulties. To release himself from these, he followed the prætor Memmius to Bithynia, with the intention, like his superior, of wringing a fortune out of the provincials. This fashionable but felonious method of acquiring money did not succeed in C.'s case, mainly, however, through the more dexterious cupidity of Memmius. After his return, C. appears to have lived mostly in Rome, and in very straightened circumstances. When he died is unknown. His poems, 116 in number, chiefly consisting of lyrics and epigrams—first brought to light by Benvenuto Campesani of Verona in the beginning of the 14th c.—have always been justly admired for their exquisite grace and beauty of style; but are, in many places, grossly indecent. In higher styles of writing, C. was equally successful, especially in his odes, of which, unfortunately, only four have been preserved.

His heroic or narrative poem on the marriage of Peleus and Thetis—consisting of more than 400 hexameter lines—and the wild enthusiastic poem entitled *Atys*, are especially worthy of notice. Most of the earlier editions of C. include the works of Tubullis and Propertius. The best modern editions are by Sillig (1823), Lachmann (1829), and Ellis (1867 and 1878). There are English translations by Lamb (1821), Martin (1861), Cranstoun (1867), &c. See Munro's *Criticisms* (1878).

CAUB, a town of Nassau, North Germany, on the right bank of the Rhine, 21 m. W.N.W. of Wiesbaden. It is noteworthy as the place where Blücher crossed the Rhine with his army, Jan. 1, 1814; and also as the place where, till 1866, toll was levied by the Duke of Nassau—the only ruler who kept up this feudal privilege—from vessels navigating the Rhine. C. has underground slate-quarries; and opposite, on an island in the river, where Louis le Débonnaire died, 840, is a castle called the Pfalz, built in 1326, and which is said to have been resorted to for safety by the Countesses Palatine during their confinement. C. is threatened with destruction by the disintegration of the mountains behind, and in March 1876 a destructive landslip took place. Pop. 2200.

CAU'CA, a river of the United States of Colombia, in South America, which, after flowing 500 miles to the N.E., joins the Magdalena on the west, 150 m. from the Caribbean Sea. It gives name to a department of 260,000 sq. m., and (1880) 445,000 inhabitants.

CAUCA'SIAN VARIETY OF MANKIND, an ethnological division adopted by Blumenbach, which included all the inhabitants, ancient and modern, of Europe (except the Finns); in Asia, the Hindus (of high class at least), Persians, Assyrians, Arabians, Jews, Phœnicians, inhabitants of Asia Minor and of the Caucasus, &c.; and in Africa, the Egyptians, Abbyssinians, and Moors. What Blumenbach had called Caucasians, Dr. Prichard, who may be said to have laid the real foundation of ethnology, makes to consist of two independent groups or varieties, grounding on a radical difference of language. One of these is the Syro-Arabian or Semitic (q. v.) race, and the other the Indo-European or Aryan (q. v.) race. The inhabitants of the Caucasus, so long held to be types of the European variety, are now by some excluded from it altogether, and classed with the sallow flat-faced Mongols, to which it is considered the nature of their language and other facts ally them more closely than the symmetry of their shape and complexion do to the European variety.

The narrow basis upon which the theory of the Caucasian type was first formed is thus stated by Dr. Latham: 'Blumenbach had a solitary Georgian skull; and that skull was the finest in his collection—that of a Greek being the next. Hence it was taken as the type of the skull of the more organized divisions of our species. More than this, it gave its name to the type, and introduced the term *Caucasian*. Never has a single head done more harm to science than was done in the way of posthumous mischief by the head of this well-shaped female from Georgia.' See ETHNOLOGY.

CAU'CASUS, a mountain-range of great geographical and ethnographical importance, occupying the isthmus between the Black Sea and the Caspian, its general direction being from west-north-west to east-south-east—from the peninsula of Taman on the Black Sea, in lat. 45° 10′ N., long. 36° 45′ E., to the peninsula of Apsheron on the Caspian, in lat 40° 20′ N., long 50° 20′ E.—a length of about 750 miles. The breadth, including the secondary ranges and spurs, may be stated at about 150 miles, but the breadth of the higher C. is much less, not much exceeding 60 or 70 miles. This range, formerly belonging entirely to Asia, now forms part of the boundary-line between Europe and Asia. The higher and central part of the range is formed of parallel chains, not separated by deep and wide valleys, but remarkably connected by elevated plateaus, which are traversed by narrow fissures of extreme depth. The highest peaks are in the most central ridge or chain—Mount Elburz attaining an elevation of 18,000 feet above the sea, while Mount Kasbeck reaches a height of more than 16,500 feet, and several others rise above the line of perpetual snow, here between 10,000 and 11,000 feet high; but the whole amount of perpetual snow is not great, nor are the glaciers very large or numerous. This central chain is formed of trachyte. The secondary parallel chains are, on the inner side, mostly formed of argillaceous slate and Plutonic rocks, on the outer side, of limestone. The spurs and outlying mountains or hills are of less extent and importance than those of almost any other mountain-range of similar magnitude, subsiding as they do until they are only about 200 feet high along the shores of the Black Sea. Some parts are entirely destitute of wood, but other parts are very densely wooded, and the secondary ranges, near the Black Sea, exhibit most magnificent forests of oak, beech, ash, maple, and walnut; grain is cultivated in some parts to a height of 8000 feet, while in the lower valleys, rice, tobacco, cotton, indigo, &c., are produced. As might be expected from the geographical situation of the C., the climate, though it is generally healthy, is very different on the northern and southern sides, the vine growing wild in great abundance on the south, which is not the case on the north. The S. declivity of the mountains, towards Georgia, presents much exceedingly beautiful and romantic scenery.

There are no active volcanoes in Mount C., but every evidence of volcanic action. There are mud volcanoes at each end of the range, and there are also famous naphtha springs in the peninsula of Apsheron. See BAKU. Mineral springs also occur in many places. The bison, or aurochs, is found in the mountains; in the forests are many fur-bearing animals; and game abounds. Bears, wolves, and jackals are among the carnivorous animals. Lead, iron, sulphur, coal, and copper are found.

The waters of the C. flow into four principal rivers—the Kuban, and the Rion, or Faz (the *Phasis* of the ancients), which flow into the Black Sea; and the Kur and the Terek, which flow into the Caspian. The Russians have carried a military road, with great labor and danger, through a valley somewhat wider than most of the Caucasian valleys, between the sources of the Kuban and the Terek. This road passes over a height of about 8000 feet, and is protected by many forts, but is exposed to other dangers besides those which arise from the hostility of the mountain tribes. The only other road is by the Pass of Derbend, near the Caspian Sea.

The resistance which the Caucasian tribes, for more than half a century, offered to the arms of Russia, attracted to them the attention of the world. But with the capture (1859) of the prophet-chief of the Lesghians—Schamyl, the most active and determined of the foes of Russia, who for a quarter of a century withstood and harassed the armies sent against him—the power of the Caucasians was greatly shattered; and after his death in 1871 the Russians regarded the territory as virtually subjugated. A large number of the Circassians elected to migrate to Turkish territory, where they were welcomed. The general name Circassians (q. v.) is often, but not very correctly, applied to the tribes which inhabit the Caucasus, and whose whole number is not above 1,300,000 or 1,500,000. From the situation of Mount C., there have gathered together in it tribes belonging to a greater number of distinct races than can perhaps be found within the same space anywhere upon the earth. There are more than 100 different languages or dialects spoken; the Turkish-Tartar language, however, serving for a general medium of communication. The different tribes inhabiting the C., long believed to be the purest type of the Indo-European family, are now considered not to belong to it at all, but to have more affinity with the Mongolian races. See CAUCASIAN VARIETY OF MANKIND. The principal tribes are the Tsherkesses or Circassians, Ossetes, Lesghians, Abchasians, Georgians, Suans, and Tchetches. The Georgians and Ossetes are at least nominally Christians; the Lesghians are fanatical Mohammedans.

The Byzantine emperors and kings of Georgia planted Christian churches throughout this region, and many ruins of them remain, some of which are very beautiful. But the present Christianity of the nominally Christian tribes is more akin to heathenism than to true Christianity. In character, they are distinguished by their valor and love of freedom, but also by cruelty and treachery. They carry on a little agriculture, but live more by the care of their flocks, and by hunting.—The Russian lieutenancy of the C., lying on both sides of the mountain range, has an area of 172,170 sq. miles, and a pop. (1880) of 5,546,554.

CAU'CUS. See AMERICANISMS.

CAUDEBEC-LÈS-ELBEUF, a town of France, in the department of Seine-Inférieure, 12 miles south of Rouen. It has manufactures of cloth, and a pop. of (1876) 11,338.—CAUDEBEC is also the name of a town in the same department, situated on the right bank of the Seine, 26 miles east of Havre. It is one of the prettiest and most picturesque little towns on the Seine, with its old wooden houses and elm-shaded quays. It has a fine Gothic church of the 15th c., and manufactures of cotton, sail-cloth, leather, and soap. Formerly the capital of the Pays de Caux, C. was strongly fortified; and in 1419, so obstinate was its resistance, that it took the great English general, Talbot, six months to capture it. Pop. (1876) 1951.

CAUDE'TÉ, a town of Murcia, Spain, 50 miles east-south-east of Albacete. The inhabitants, 5500 in number, are chiefly engaged in agricultural pursuits.—C. is also the name of a small place in New Castile, a few miles from Teruel, where there are some of the largest bone-deposits, fossilized and unfossilized, in Europe.

CAU'DINE FORKS (*Furculæ Caudinæ*), two high, narrow, and wooded mountain-gorges near the town of Caudium, in ancient Samnium, on the boundary towards Campania. These gorges are celebrated on account of the defeat here suffered by the Romans in the second Samnite war (321 B.C.). Four Roman legions, commanded by the two consuls Titus Veturius and Spurius Postumius, after marching through a narrow pass, found themselves locked in a spacious valley, surrounded on all sides by lofty mountains, with no way out save that by which they entered, and another pass on the opposite side. Attempting to defile through the latter, they found it blocked up with trees and stones, and commanded by the Samnites, who had also in the meantime made themselves masters of the other pass. Consequently, the four legions were compelled to encamp in the valley. After some days, famine compelled them to surrender unconditionally. The Samnite general, Caius Pontius, according to old custom, compelled the Romans to pass under the yoke, and then permitted them to march back. This submission was regarded as too ignominious for Rome, and consequently the two consuls and the other commanders were delivered again into the hands of the Samnites, who, however, refused to have them.

CAUL is a thin membrane encompassing the heads of some children when born, and is mentioned here on account of the extraordinary superstitions connected with it from very early ages down to the present day. It was the popular belief that children so born would turn out very fortunate, and that the C. brought fortune to those purchasing it. This superstition was so common in the primitive church, that St. Chrysostom felt it his duty to inveigh against it in many of his homilies. In later times, midwives sold the C. to advocates at enormous prices, 'as an especial means of making them eloquent,' and to seamen, as an infallible preservative against drowning. It was also supposed that the health of the person born with it could be told by the C., which, if firm and crisp, betokened health, but if relaxed and flaccid, sickness or death. During last century, it was common to find advertisements in the newspapers of cauls to be sold—from £10 to £30 being the prices asked for them. So recently as 8th May, 1848, there was an advertisement in the *Times* of a C. to be sold, which 'was afloat with its late owner thirty years in all the perils of a seaman's life, and the owner died at last at the place of his birth.' The price asked was six guineas. Sir John Offley, of Madeley Manor, Staffordshire, by his will, proved at Doctors' Commons, 1658, devised a C. set in jewels, which had covered him when he was born, to his daughter, thereafter to her son, and then to his own heirs-male. The C. was not to be concealed or sold out of the family. See Brand's *Popular Antiquities*, vol. iii.; *Notes and Queries*, 1st series, vol. vii.

CAULAINCOURT, ARMAND AUGUSTIN LOUIS DE, Duke of Vicenza, a statesman of the French empire, was born at Caulaincourt, a village in the department of Somme, December 9, 1772. He entered the army at the age of fifteen, rapidly attained promotion, and, as colonel of a regiment of carbineers, distinguished himself in the campaign of 1800. He was made a general of division in 1805, and shortly after created Duke of Vicenza. In 1807, he was appointed ambassador at St. Petersburg, where he soon gained the confidence of the czar, who often made use of his advice. Disputes having arisen between Alexander and Napoleon, C. endeavored to restore amity and prevent war; but his proposals being rejected, he, in 1811, asked permission to resign his post, and received an appointment in the army of Spain. During the events of 1813, he was frequently employed as plenipotentiary in diplomatic affairs. In November of 1813, he was made Minister for Foreign Affairs, and in this capacity attended the congress at Chatillon, January 1814. When Napoleon abdicated, C. endeavored to make use of his influence with Alexander to obtain the most favorable conditions for the fallen emperor, and, chiefly through his intervention, the island of Elba was ceded to Napoleon.

During the Hundred Days, C. resumed office as Minister of Foreign Affairs, and was made a peer. On the second Restoration, he retired into private life. He died in Paris, February 19, 1827. —His brother, AUGUST JEAN GABRIEL, Count of Caulaincourt, born 1777, served with distinction in all the campaigns from 1792 to 1812, when he fell in battle.

CAU'LIFLOWER, a variety of the common kale or cabbage, affording one of the most esteemed delicacies of the table. It was cultivated as a culinary vegetable by the Greeks and Romans. Its culture was, however, little attended to in England till the end of the 17th c.; but after that time it rapidly increased, and prior to the French Revolution, C. formed an article of export from England to Holland, whilst English C. seed is still preferred on the continent. The C. is entirely the product of cultivation. The leaves are not in this, as in other varieties of the same species generally, the part used, nor are they so delicate and fit for use as those of most of the others, but the flower-buds and their stalks, or, properly speaking, the inflorescence of the plant deformed by cultivation, and forming a head or compact mass generally of a white color. There are many subvarieties, but all of them are rather more tender than the ordinary forms of the species, and in Britain generally require more or less protection during winter, whilst the seed is sown on hotbeds, that the plants may be ready for planting out in spring. Later sowings are made in the open ground. The C. requires a moist rich loamy soil, with abundance of manure, and above all, very careful cultivation which is directed to the object of having the heads not merely large, but as compact as possible. Great care is bestowed on the selection of proper plants for seed. In Scotland, C. plants almost always require the protection of the frame during winter. C. may be preserved for some time fit for use by pulling the plant up by the roots, and hanging it in a cold and dry place.—BROCCOLI (q. v.) may be regarded as another kind of cauliflower.

CAULKING is the operation of driving oakum or untwisted rope into the seams of a ship, to render them watertight. The quantity thus driven in depends on the thickness of the planking; it varies from 1 to 13 double threads of oakum, with 1 or 2 single threads of spun-yarn. The caulker first *raims* or *reems* the seam —that is, drives a C. iron into it, to widen the seam as much as possible, and close any rents or fissures in the wood; he then drives in a little spun-yarn or white oakum with a mallet and a kind of chisel, and afterwards a much larger quantity of black or coarse oakum. The fibres are driven in until they form a densely hard mass, which not only keeps out water, but strengthens the planking. The seam is finally coated with hot pitch or resin.

CAU'LO'PTERIS, a generic name for the stems of fossil tree-ferns found in the Carboniferous and Triassic measures. They are hollow, and covered with the markings similar to the leaf-scars on recent tree-ferns. Twelve species have been described.

CAUSE. The words 'Cause,' 'Causality,' and 'Causation,' although familiar and intelligible in ordinary speech, have given rise to some of the most subtle questions in philosophy and theology. We shall here advert briefly to the chief meanings of these terms, and in so doing, we shall indicate the disputes that have arisen in connection with them.

In common language, we are accustomed to describe as the C. of an event, the one event immediately preceding it, and but for which it would not have happened. A man slips his foot on a ladder, falls, and is killed: we give the slipping of the foot as the C. of the fatality. A legislative assembly decides a question of great moment by the casting vote of the president, who is then not unfrequently spoken of as the C. of all the good or evil that followed on the decision. Now, a slight examination shows that this mode of speaking is defective, as not expressing the whole fact, or, in other words, presumes a great deal that is not stated. In the supposed death from a fall, there are many conditions necessary to the result besides the slipping of the foot: the weight of the body, the height of the position, the hardness of the ground, the fragility of the human frame, all enter into the C. strictly represented; but for practical purposes, we leave out of account all those elements that are not at the moment under our control, and allude to the one that is so. And when we speak of the decision of an assembly being the effect of the president's vote, we mean that his share in the responsibility is peculiarly great, or that, in order to turn the vote in one way, all that is necessary is to secure his individual opinion. If we do not enumerate all the conditions of the event, it is because some of them will, in most cases, be understood without being expressed, or because, for the purpose in view, they may without detriment be overlooked.

When, however, we aim at strict accuracy, as in the investigations of science, we must not be content with singling out the one turning event, but must enumerate everything that is necessary to the result. A *Scientific* C. is the full assemblage of *conditions*, failing any one of which, the effect would not happen.

In a full explanation of the phenomenon of the tides, we must enumerate all the circumstances connected with their production —the attraction of the sun and moon, the motions of the earth and the moon in their orbits, the globular form and rotation of the earth, the liquidity of the sea, the mode of distribution of the sea over the earth—every one of which facts is an essential in the full causation. The effect cannot be adequately accounted for without adverting to every one of those conditions, and it is therefore the sum-total of them that is rightly described as the C. of the tides. Taking this complete view of causation, it is found that every event that happens is the sequel to some previous event, in whose absence it would not have been, but which being present it is sure to occur. Between the phenomena existing at any instant, and the phenomena existing at the succeeding instant, there is an invariable order of succession; to certain facts, certain facts always do, and, as we believe, will continue to succeed. The invariable antecedent is terméd the C.; the invariable consequent, the effect. What is termed the *Law of Universul Causation*, consists in this, 'that every consequent is connected in the manner now described with some particular antecedent, or set of antecedents.'—Mill's *Logic*, book iii. chap. 5.

The physical philosopher—the chemist or physiologist—trusts to the uniformity with which the same C. yields the same effect; and if he can find out the true succession in one instance, he is satisfied that the same succession will always hold. In the physical sciences, therefore, there is no dispute as to the law of causation itself; the controversies on that head occur only in *metaphysics*. It is made a serious problem by mental philosophers, and also by theologians, to determine how we come by the irresistible belief that we are said to possess, that every event has, and must have a cause. There are many answers to this question; *eight* are enumerated by Sir William Hamilton (*Discussions on Philosophy*, p. 611, 2d edit.). It is only necessary, however, to advert to the two radically opposite points of view from which the subject is now surveyed.

The one view is that we have an instinct or *intuition* of the mind by which we are compelled to recognize this law, so that to us it is a necessary truth which we cannot escape from if we would. Our experience of the outer world, doubtless, shows us that things follow one another in an orderly and uniform manner, that the stone that sinks in water to-day does not float to-morrow, but no experience could give us the sense of commanding necessity that we have of the law of C. and effect. 'Causation is not the mere invariable association of antecedent and consequent; we *feel* that it implies something more than this.' The philosophers who maintain this side give forth two different affirmations: the *one*, that we actually possess an intuitive belief of necessary causation; and the *other*, that our possession of the belief is a sufficient proof that the law actually pervades the universe.' Experience operates to confirm us in those instinctive tendencies, but no amount of experience would have been able to create them.

The latest modification of the theory that ascribes our belief in causation to an intuition of the mind, is the doctrine promulgated by Sir W. Hamilton, to the effect that 'we are unable to think that the quantity of existence, of which the universe is the conceived sum, can be either amplified or diminished. We are able to conceive, indeed, the creation of a world; this, in fact, as easily as the creation of an atom. But what is our thought of creation? It is not a thought of the mere springing of nothing into something. On the contrary, creation is conceived, and is by us conceivable, only as the evolution of existence from possibility into actuality, by the fiat of the Deity. And what is true of our concept of creation, holds of our concept of annihilation. We can think no real annihilation—no absolute sinking of something into nothing.'—*Discussions*, p. 619. Thus, every effect must have a C., and every C. must have its effect, because, if it were not so, there would be either a pure creation or a pure annihilation, neither of which, according to Sir W. Hamilton, is thinkable or conceivable by the human mind. This doctrine, however, has not found acceptance even by those who, if not actual disciples of the author, are most disposed to receive his philosophy generally, as may be seen by referring to Professor Fraser's *Essays in Philosophy*, p. 170; M'Cosh *On the Divine Government*, p. 529, 4th edition; and Mansel, art. Metaphysics, *Encyclopædia Britannica*. So far from the creation or annihilation of matter or force being inconceivable, it may be said with truth, that until the end of last century, it was not known as a fact that the materials of the globe are absolutely indestructible. The effects of combustion and evaporation could hardly suggest anything else than the annihilation of a certain portion of material. Combustion merely transformed the material consumed into other shapes, nothing being absolutely lost. So much for ponderable matter. As regards force, or moving power, the demonstration that this is never absolutely lost, even on the many occasions when it is so to all appearance, is a still later result of laborious scientific inquiries, being, in fact, one of the conclusions arrived at within the last few years. See FORCE. To represent, therefore, one of the latest achievements of experimental science as a primitive intuition of the human mind, is to violate, in the strongest manner, our sense of propriety and consistency.

As opposed to the intuitional doctrine of causation, we have a variety of views by Hume, Dr. Thomas Brown, and others, which need not be specified in detail. One may be given as an example. It has been seen that there are two affirmations in the theory just discussed; that the mind possesses an intuitive belief of causation, and that the possession of this belief is evidence of the existence of the law. Now, one or both of these affirmations may be denied; and the *denial* of either, by even a small minority of the human race, is held to be fatal to the theory, because *unanimity* is essential to the establishment of a universal instinct. Now, many men may possess an instinctive belief in the necessity of a cause to all effects, and of an effect to all causes; some, it is affirmed, do not; it cannot, therefore, be a universal or essential part of human nature.

In like manner, the second affirmation—namely, that the possession of an instinctive belief is a proof of the truth of the thing believed—is denied, on the ground that our instincts often dispose us to believe things that experience shows us to be untrue. We have a strong natural tendency to believe in the universality and continuance of the exact order of things that we are ourselves born into, and are only put right by seeing the contrary. 'A mere disposition to believe, even if supposed instinctive, is no guarantee for the truth of the thing believed. If, indeed, the belief ever amounted to an irresistible necessity, there would be then no *use* in appealing from it, because there would be no possibility of altering it. But even then the truth of the belief would not follow: it would only follow that mankind were under a permanent necessity of believing what might possibly not be true; just as they were under a temporary necessity—quite as irresistible while it lasted—of believing that the heavens moved, and the earth stood still. But, in fact, there is no such permanent necessity. Many of the propositions of which this is most confidently stated, great numbers of human beings have disbelieved. The things which it has been supposed that nobody could possibly help believing, are innumerable; but no two generations would make out the same catalogue of them.'—*Mill's Logic*, book iii. chap. 21. Mr. Mill and others hold that the proof of the law of causation rests exclusively on the uniform and growing experience of the human race. This, however, is not inconsistent with our possessing the natural instinct above alluded to, by which we are led to suppose that what is will continue, and what has been will be repeated; an instinct that *coincides*, to a certain extent, with the law of C. and effect, and is therefore a predisposition on our part to accept what experience teaches on this head.

It is only maintained that the instinct is of itself *no proof*, although useful in so far as it prepares us for what there is real evidence for believing. By yielding to the instinct in its crudest shape, the inhabitant of the tropics scouts the idea that water can ever be solid; the African would deny the existence of white men; and even an intelligent European could not be persuaded

that any metal would float. Experience must correct the instinctive tendencies, otherwise no reliance can ever be placed upon them; by which we acknowledge it as the sole test of truth, while intuitive dispositions are no test whatever.

Even those who maintain the instinctive necessity of the conviction we are discussing, admit two great exceptions—viz., the existence of a FIRST C., itself uncaused, and the Liberty of the Will, or the exemption of human actions from the rule that applies so strictly to physical nature.

It is further contested between the two opposite schools of philosophy, whether or not MIND be the sole ultimate C. of all phenomena, as it is the C. most familiar to us—namely, the source of our voluntary exertions. On one side, it is affirmed to be 'inconceivable that dead force could continue unsupported for a moment beyond its creation. We cannot even conceive of change or phenomena without the energy of a mind.' 'The word action has no real significance, except when applied to the doings of the intelligent agent.' 'Phenomena may have the semblance of being produced by physical causes, but they are in reality produced by the immediate agency of a mind; if they do not proceed from the human, they are the result of the divine will.' To this it is replied, that we are here taking for granted that every kind of power is analogous to that which we happen to be first acquainted with; but it is a pure assumption without proof or relevance, to suppose that all modes of energy must conform to this one type.—Mill, book iii. chap. 5. It is further pointed out that even in ourselves, pure mind, or mind acting by itself, is not known to be an efficient C.; it must be mind together with body. The laborer cannot sustain a day's toil merely because of his *wish* to do so; he must be fed, and rested, and have all his bodily organs in good condition, in order to do his work. The human system, when employed as a prime mover, can no more dispense with the material conditions, than a steam-engine can work without coal, or when out of repair.—Bain *On the Emotions and the Will*, p. 472.

The subject of causation was very particularly studied by Aristotle. He enumerated four different kinds of causes, which have ever since had a place in philosophy. These are the *material*, the *formal*, the *efficient*, and the *final*. The first, or *material*, is what anything is made of; brass or marble is the material C. of a statue. The *formal* is the form, type, or pattern according to which anything is made; the drawings of the architect would be the formal C. of a house.

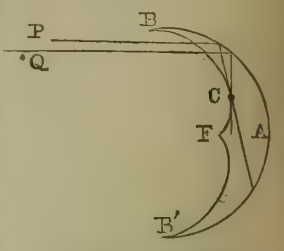
The *efficient* is the power acting to produce the work, the manual energy and skill of the workman, or the mechanical prime mover, whether that be human or any other. The *final* C is the end or motive on whose account the work is produced, the subsistence, profit, or pleasure of the workman. Aristotle mentions the case of a physcian curing himself, as exemplifying all the causes in one and the same subject. It is obvious that these are what we should now term the aggregate of *conditions* necessary to the production of any work of man; it being essential that there should be a motive for the work (final), a material to operate upon (material), a plan to proceed by (formal), and an exertion of energy to do what is wanted (efficient). When nature is viewed as the result of a creative mind, these causes are considered as inhering in the Divine contriver.

In popular language, C. is held as identical with *explanation*. In other words, when a phenomenon which we are puzzled to account for is explained to our satisfaction, we say that we know its cause, but we often seek for, and are satisfied with, explanations that have no value in the view of science; and on the other hand, refuse to rest content with such as are scientifically valid. People occasionally insist on knowing the C. of gravity itself, something deeper than the discovery of Newton, and whatever explanation satisfies the mind, would be accepted as the cause. Sometimes a theological explanation is offered, and at other times, a metaphysical necessity is put forth.

CAU'STIC (Gr. burning), in Medicine and in Chemistry, is the term applied to such substances as exert a corroding or disintegrating action on the skin and flesh. *Lunar C.* is nitrate of silver and *common C.* is potash. When used as a C. in medicine, the substance is fused and cast into moulds; which yield the C. in small sticks the thickness of an ordinary lead pencil, or rather less. —*Caustic* is also used in chemistry in an adjective sense—thus C. lime or pure lime (CaO), as distinguished from mild lime, or the carbonate of lime (CaO,CO_2), C. magnesia (MgO), and mild magnesia (MgO,CO_2) &c.

CAUSTIC, CATACAUSTIC and DIACAUSTIC. In Optics, Caustic is the name given to the curved line formed by the ultimate intersections of a system of rays reflected or refracted from a reflecting or refracting surface, when the reflection or refraction is inaccurate. When the caustic curve is formed by reflection, it is called the Catacaustic—sometimes simply the Caustic; when formed by refraction, it is called the Diacaustic Curve. In mathematical language, a curve formed by the ultimate intersection of a system of lines drawn according to a given law is called the *envelope*, and is such that the lines are all tangents to it. As in a system of rays reflected or refracted by the same surface *all* follow the same law, it follows that the C. is the envelope of reflected or refracted rays.

An example of the catacaustic is given in the annexed figure for the case of rays falling directly on a concave spherical mirror, BAB', from a point so distant as to be practically parallel. The curve may be said to be made up of an infinite number of points, such as C, where two very near rays, such as P, Q, intersect after reflection. This catacaustic is an epicycloid. The curve varies, of course, with the nature of the reflecting surface. In the case represented in the figure, the cusp point is at F, the principal focus. No such simple example can be given of the diacaustic curve as that above given of the catacaustic. It is only in the simplest cases that the curve takes a recognizable form. In the case of refraction at a plane surface, it is shown that the diacaustic curve is the evolute either of the hyperbola or ellipse, according as the refractive index of the medium is greater or less than unity.



The reader may see a catacaustic on the surface of tea in a teacup about half full, by holding the circular rim to the sun's light. The space within the caustic curve is all brighter than that without, as it clearly should be, as *all* the light reflected affects that space, while no point without the curve is affected by more than the light reflected from half of the surface.

CAU'TION, in the Law of Scotland, like Guaranty (q. v.) in England, is an obligation undertaken by a second party, whereby he binds himself, failing the primary obligant, to fulfil his obligation, whether it be of a pecuniary nature or otherwise. Cautionary obligations, like engagements of guaranty, are thus essentially of a secondary nature; and previous to the passing of the Mercantile Law Amendment Act (19 and 20 Vict. c. 60), it was customary in Scotland to distinguish between what was called *cautionary proper*, where the cautioner was bound avowedly as such, and *improper cautionary*, where both cautioner and principal were bound as principals. Since this period (1856), however, cautionary proper has ceased to exist otherwise than as the result of positive stipulation, under the saving-clause attached to the eighth section of the statute referred to, which enacts that 'nothing herein contained shall prevent any cautioner from stipulating, in the instrument of caution, that the creditor shall be bound, before proceeding against him, to discuss and do diligence against the principal debtor.

Cautionary obligations are generally gratuitous, being, for the most part, undertaken from motives of friendship; but it is by no means uncommon for them to be entered into in consideration of a premium paid by the person guaranteed, or by those interested in his fortunes. The existence of such a consideration has always been optional in Scotland, and this rule has recently been adopted in England (19 and 20 Vict. c. 97, § 3). Where a premium is paid, the transaction becomes a mere insurance of solvency, honesty, or efficiency; and associations of great public utility (see GUARANTEE ASSOCIATION) have been formed, both in England and Scotland, for the purpose of undertaking, as a speculation, to guarantee the good conduct of persons employed either in public or private offices of trust. The tendency of judicial decisions, both in England and Scotland, for many years past, has been to require greater strictness than formerly in the constitution of cautionary obligations; and latterly, the legislature itself has stepped in with the same object in view. By the statute which we have already quoted, it is enacted that all such engagements shall be in writing, subscribed by the person undertaking or making them, or by some person duly authorized by him, otherwise they shall have no effect. If a cautionary obligation is dependent on a condition, it will, of course, be ineffectual unless the condition be complied with. The cautioner may, in general, plead every defence which was competent to the principal debtor, and the extinction of the primary obligation extinguishes the secondary one. The discharge of one cautioner, moreover, unless consented to by the rest, is a discharge to all. Cautioners bound subsequent to the passing of the act mentioned, have, in consequence of the eighth section already referred to, no right to what in Scotland was called Discussion (q. v.); but those bound prior to that act are entitled, as formerly, to require that the creditor shall first call on the principal debtor, and compel him to pay in so far as he is able, or, in law language, *discuss* him. The cautioner is entitled, on payment of the obligation, to an assignation of the debt and diligence, by which means he comes, in all respects, into the creditor's place; and, moreover, if the solvency or other conditions of the principal debtor should seem precarious, he may adopt legal measures for his relief. Co-cautioners, or persons bound together, whether

their obligations be embodied in one or several deeds, are entitled to mutual relief. But where a co-cautioner obtains relief from the others, he must communicate to them the benefit of any deduction or ease which may have been allowed him in paying the debt.

Cautionary obligations are often undertaken in behalf of persons in situations in which the engagements and liabilities are prospective. In order that such obligations may be binding, the nature and extent of the liability must be fairly and fully disclosed to the cautioner. But while the cautioner must not be exposed to the danger arising from any transaction not in his view in entering into the contract, he is not entitled to withdraw without due notice and a reasonable time being given for entering into a new arrangement. The question whether the effects of a bond are prospective, or retrospective merely, will depend on its terms; the *presumption*, where these are in any way doubtful, being always in favor of the latter alternative. The creditor is bound to exercise a certain degree of vigilance over the conduct and circumstances of the person guaranteed, and not to permit any very gross departure from the terms of the contract, to the prejudice of the cautioner. Should this obligation be neglected, the cautioner will be freed from his obligation.

CAUTION, for a cash credit. See CASH ACCOUNT.

CAUTION, JUDICIAL, in the Law of Scotland, is of two kinds —for appearance, and for payment. If a creditor makes oath before a magistrate, that he believes his debtor to be meditating flight (*in meditatione fugæ*), he may obtain a warrant for his apprehension; and should he succeed in proving the alleged intention to flee, he may compel him to find C. to abide the judgment of a court (*judicio sisti*). The second kind of judicial C. is by *Bond of Presentation*, which is granted when the creditor is about to execute personal diligence, or has done so, and the cautioner, on condition of an indulgence to the debtor, binds himself that the debtor shall be forthcoming at the appointed time, otherwise he himself will pay the debt. The object of this form of C. is simply to protect the debtor from imprisonment, and allow him time.

CAUTION, JURATORY. See POOR'S ROLL, and 13 and 14 Vict. c. 36, § 34.

CAUVERIPU'RAM, a town of the district of Coimbatoor, in the presidency of Madras, on the right bank of the Cauvery, in lat. 11° 54′ N., and long. 77° 48′ E. It takes its name from the neighboring gorge of 30 miles in length through the Eastern Ghauts, along which the Cauvery finds a passage. Pop. of C. (or *Kauveripuram*) in 1871, 6532.

CAU'VERY, or KAVERI, a river in the south of Hindustan, rising in Curg, and flowing through Mysore and Madras, with a course of 472 miles, into the Bay of Bengal by various mouths. Its delta, with a coast of 80 miles, and a depth of 70, lies almost wholly in the district of Tanjore. The C. is peculiarly available for irrigation; and for improving it in this respect, a grant of £50,000 was sanctioned in 1841. During the rainy season, the stream is navigable for small-craft.

CA'VA, LA, a town of Italy, in the province of Salerno, 3½ miles N.W. of the town of Salerno. It is a flourishing place, with manufactures of silk, cotton, linen, and pottery. Pop. 6397. About a mile from C. is the celebrated Benedictine monastery of the Trinity, with its magnificent archives, containing 60,000 MSS. and 40,000 parchment rolls. Its library, at one time also rich in MSS. and rare printed books, has been dispersed. In the monastery church are the tombs of Queen Sibilla and of various antipopes.

CAVAIGNAC, LOUIS EUGENE, was born in Paris 1802, and was educated in the Polytechnic School, and the *Ecole d'Application* at Metz. He first served in the Morea, and afterwards in Africa (whither he was sent in 1832 into a kind of honorable exile, in consequence of a too free expression of opinion in favor of republican institutions), where he acquired great distinction by his energy, coolness, and intrepidity. He was made chef de bataillon in 1837, and rose to the rank of brigade-general in 1844. In 1848, he was appointed governor-general of Algeria, but in view of the impending revolutionary dangers, was called to Paris, he having also been elected as a delegate to the National Assemby by the two departments of Lot and Seine. In the insurrection of June which followed, C., as Minister of War, had a most difficult task to play, and he displayed, during the four days and nights of the contest, remarkable presence of mind, firmness, and activity. His plan of action appeared strange and almost traitorous at the time. In opposition to the wishes of the National Assembly, who desired that the troops should be dispersed over Paris, he divided his men into three separate bodies, which had to clear their several routes from obstacles, in order to effect a reunion, streets and even quarters of the city being left for some time without military protection. Regarding the outbreak more as the beginning of a civil war than a mere insurrection, he, in fact, met the insurgents in true order of battle. His operations were successful, and his clemency was as remarkable as his generalship. When he had the power of assuming the dictatorship, he resigned it into the hands of the National Assembly, which appointed him President of the Council.

As a candidate for the presidency of the republic, when Louis Napoleon was elected, he received about a million and a half of votes. On the *coup d'état* of December 1851, C. was arrested, but released after a short detention; and though he consistently refused to give in his adhesion to the Empire, he was permitted to reside in France without molestation. He died very suddenly of heart disease in October 1857, at his country house near Tours, and was buried in the cemetery of Montmartre, Paris, in presence of many thousand spectators, including several republican leaders. In debates, C. was remarkably unlike his countrymen, being not voluble and declamatory, but sober, clear, and moderate.

CAVALIE'R, in Fortification, is a defence work constructed on the *terre-plein* or level ground of a bastion. It rises to a height varying from 8 to 12 feet above the rampart, and has a parapet about 6 feet high. Its uses are to command any rising ground held by the enemy, within cannon-shot; and to guard the curtain or plain wall between two bastions, from being enfiladed. For these purposes, it mounts heavy ordnance. It may be either curved or bounded by straight sides.

CAVALIE'R (Fr. *chevalier*; Ital. *cavaliere*; Span. *caballero*, probably from the Latin *caballus*, a horse), originally meant any horse-soldier, but in English history is the name given to the party which adhered to King Charles I., in opposition to the Roundheads (q. v.) or friends of the Parliament.

CAVALLER-MAGGIO'RE, a town of North Italy, in the province of Cuneo, 24 miles north-east of Coni. It was formerly fortified and defended by two castles, but of these there is now hardly a vestige remaining. It is a busy place, with a population of 5300.

CA'VALRY is a general name for horse-soldiers or troopers. The subdivisions are very numerous; such as Guards, Dragoons, Lancers, Hussars, Cuirassiers, Mounted Rifles, &c. The C. force of the British army is usually divided into *Household* and *Line*. The numbers voted for 1881—1882 were:

	Household Cavalry.	Line Cavalry, Home Service.	Line Cavalry in India.
Officers	75	506	207
Non-commissioned Officers	168	1027	369
Rank and File	1053	9553	3726
	1296	11,086	4302

The difference between the household C. and the line is this: The former belong to the *Guards*, a specially favored body of troops; while the latter comprise all who are *not* Guards. The regiments are 31 altogether. During more than half a century, the number was 26; but in 1858, two new regiments were created —to restore the 5th and 18th Dragoons, which had been struck out of the army list in 1799 for disloyalty in the Irish Rebellion; and in 1862, 3 regiments were taken over from the abolished local European army of India. The list comprises 2 regiments of Life Guards (red), 1 of Horse Guards (blue), 7 of Dragoon Guards, and 21 of Dragoons. Of these last-named 21 regiments, the 1st, 2d, and 6th are simply called Dragoons; the 5th, 9th, 12th, 16th, and 17th, Lancers; the 3d, 4th, 7th, 8th, 10th, 11th, 13th, 14th, 15th, 18th, 19th, 20th, and 21st, Hussars. A distinction is often made between *heavy* and *light* C.; and, in continental armies, this distinction is very marked; but in England, the men and horses are not selected with much reference to this matter; the heavy being often too light, and the light too heavy, to correspond with their designations. In so far as the distinction holds in the British army, the Dragoon Guards, Horse Guards, and Life Guards are classed and equipped as heavy C., the Dragoons medium, and the Lancers and Hussars as light C., for scouring a country. It was in the capacity of light C. that the Prussian Uhlans played so important a part in the late war between Prussia and France, acting as wide-stretching feelers to the main bodies to which they were attached.

The line C. regiments in the British service have generally 8 troops of 55 rank and file each, with 88 commissioned and non-commissioned officers to the regiment. The officers for a full C. regiment comprise 1 colonel (as general officer), 1 lieutenant-colonel, 1 major, 8 captains, 18 subalterns and other commissioned officers, and 59 non-commissioned officers. A lieutenant-colonel in the Guards C. takes rank with a full colonel in the line C.; and a major in the former with a lieutenant-colonel in the latter —an arrangement that gives rise to some favoritism and jealousy; for the Guards are in no sense more meritorious soldiers than the line. See CAVALRY in AM. SUPP.

Nine months of drilling is the least time requisite to made a recruit fit to mount on duty, during which period he is drilled for eight hours a day. Londoners and agricultural laborers are

mostly sought for; provincial mechanics are not found so available. The purchase of C. horses is an important matter. The veterinary surgeon of the regiment is sent to buy; but no horse is paid for till approved by the commanding officer. The usual maximum of price fixed is £33 for a horse 3 to 5 years old; but the horse costs the nation £50 or £60 by the time it is thoroughly fit for service. See DRAGOONS, GUARDS, LANCERS, &c.

CAVALRY TACTICS. Authorities differ concerning the proportion that ought to be observed between cavalry and infantry in an army. In France and Austria, the ratio is about 1 to 5; in Prussia, and Bavaria, 1, to 4; in Russia, 1 to 6; in England, 1 to 8.

So far as concerns actual duties, heavy cavalry charge the enemy's cavalry and infantry, attack the guns, and cover a retreat; while the light cavalry make reconnaissances, carry dispatches and messages, maintain outposts, supply pickets, scour the country for forage, aid the commissariat, pursue the enemy, and strive to screen the movements of the infantry by their rapid manœuvres on the front and flanks of their army. At the battle of Balaklava, the heavy cavalry charge was within the reasonable duties of the troops, but that of the light cavalry was not, the former succeeded, the latter failed. A cavalry horse will walk 4 miles in an hour on general service, trot 8 miles in manœuvring, and gallop 11 miles in making a charge. The cavalry usually attack in line against cavalry, *en échelon* against artillery, and in column against infantry. When an attack is about to be made, the cavalry usually group into three bodies—the attacking, the supporting, and the reserve. Close combat and hand-to-hand struggle are the province of cavalry; infantry and artillery may fight at a distance, but cavalry cannot. It is rare that two bodies of cavalry stand to fight each other; the weaker of the two, or the less resolute, usually turns and gallops off. The work to be done by the horse is to pursue, to overwhelm, to cut down. They cannot wait to receive an attack like infantry; they must either pursue or retreat; and on this account it has been said, 'rest is incompatible with cavalry.' The infantry and artillery more frequently win the victory; but the cavalry prepare the way for doing this, capture prisoners and trophies, pursue the flying enemy, rapidly, succour a menaced point, and cover the retreat of infantry and artillery, if retreat be necessary. Cavalry is necessary to finish off work mainly done by others; and, without its aid, signal success is seldom obtained on the field. Many of the brilliant achievements of the British in 1857 and the following year, in India, were rendered almost nugatory by the paucity of cavalry, while as a contrast, the German victories of 1870 were enhanced by the splendid services of their Uhlans and other light cavalry.

CA'VAN, the capital of Cavan county, Ireland, is situated on a branch of the Annalee, 70 miles N.-W. of Dublin, with which it is connected by the Irish N.-W. Railway. The suburbs are chiefly wretched cabins. The principal buildings are in the west outskirts. A public garden was bequeathed by a late Lady Farnham, and the beautiful demesne of Lord Farnham lies between C. and Lough Oughter, which is about 5 miles W. Pop. (1881) 3050. Agriculture forms the chief industry of the people.

CAVAN, an inland county in the S. of Ulster, Ireland. It lies in the narrowest part of Ireland, 18 miles from the Atlantic, and 20 from the Irish Sea. Area, 746 sq. m. About three-fourths is arable. Bogs and hills, with many small lakes, are found in the N.-W. The chief rivers are the Erne, the Woodford, and the Annalee. The E. half of C. rests on clay-slate and grauwacke; the mountain-district in the W. is carboniferous formation. Of minerals, C. affords coal, iron, lead, and copper, with many mineral springs. The climate is cold and damp; and the soil is poor, wet, and clayey, except along the streams. In 1881, of 466,261 acres, 148,219 were in crop, the chief crops being oats, potatoes, turnips, and flax. The farms are small. The population, which had fallen to 153,996 in 1861, was 140,735 in 1871, and only 129,476 in 1881, of whom 104,328 are Roman Catholics, and 18,990 Episcopalians. Agriculture forms the chief industry, but linen is manufactured to a considerable extent. Chief towns—Cavan, Bailieborough, and Belturbet. C. returns two members to parliament. The number of children attending school in the year ending March 31, 1880, was upwards of 30,000.

CAVARZE'RE, a town of Northern Italy, province of Venice, 22 miles south-south-west of Venice city. Pop. 12,400. It is situated on the Adige, which divides it into two parts called C. *destro* and C. *sinistro*. Its soil is fertile, and its inhabitants carry on an active trade in cattle, silk, and wood for fuel.

CAVATI'NA, a short form of operatic air, of a soft character, differing from the ordinary aria in consisting only of one part, and that spun out more in the form of a song. Modern composers have, however, disregarded this difference. Rossini mixes both. Weber, in his operas, adds an introduction or a recitative. The most perfect specimen of the C. is that in Meyerbeer's opera of *Robert the Devil*.

CAVE, EDWARD, deserves mention as the founder of the *Gentleman's Magazine*, the first literary journal of the kind ever established. He was born at Newton, in Warwickshire, in 1691; obtained a good education at Rugby; and after many vicissitudes, became apprentice to a printer. Obtaining money enough to set up a small printing-office, he projected the *Gentleman's Magazine*, which has now existed more than a century and a quarter. He was the friend and early patron of Samuel Johnson. C. died January 1754.

CAVE, WILLIAM, an English divine and scholar of distinction, was born at Pickwell, Leicestershire, December 1637. He studied at Cambridge; was appointed to the vicarage of Islington in 1662; afterwards to the rectory of Allhallows the Great, London; and in 1690 to the vicarage of Isleworth, Middlesex. He died at Windsor, August 4, 1713. He was the author of many works of a religious character, the most important of which are the *Lives of the Apostles*, *Lives of the Fathers*, and *Primitive Christianity*, which were once standard works.

CA'VEÄT (Lat. *caveo*, to beware), a judicial warning or caution. Caveats, in England, are used to stop the enrolment of decrees in Chancery, the issuing of lunacy commissions, &c. It consists in an intimation by the party interested to the proper officer, to prevent him from taking any step without such intimation being made to the said party as shall enable him to appear and object.

CA'VENDISH, HENRY, a distinguished philosopher of the 18th c., son of Lord Charles Cavendish, and nephew of the third Duke of Devonshire, was born at Nice, October 10, 1731. He studied at Cambridge, and devoted his whole life to scientific investigations. The large fortune which was bequeathed to him by an uncle, enabled him to follow uninterruptedly his favorite pursuits. He almost secluded himself from the world, and was so averse to meet with strangers, that he had his library—a magnificent one—built at a distance from his house, so that he might not encounter persons coming to consult it; and his female domestic servants had orders to keep out of his sight, on pain of dismissal. His dinner he ordered daily by a note placed on the hall-table. He died, unmarried, February 1810, leaving considerably more than a million sterling to his relatives. As a philosopher, C. is entitled to the highest rank. To him it may almost be said we owe the foundation of pneumatic chemistry, for prior to his time it had hardly an existence.

In 1760, he discovered the extreme levity of inflammable air, now known as hydrogen gas—a discovery which led to balloon experiments, and projects for aërial navigation; and later, he ascertained that water resulted from the union of two gases—a discovery, however, to which Watt (q. v.) is supposed to have an equal claim. The accuracy and completeness of C.'s processes are remarkable. So high an authority as Sir Humphry Davy, declared, that they 'were all of a finished nature, and though many of them were performed in the very infancy of chemical science, yet their accuracy and their beauty have remained unimpaired.' C. also wrote on astronomical instruments; and his *Electrical Researches* (1771—1781) were edited by Professor Clerk Maxwell (1879).

CAVENDISH, WILLIAM, Duke of Newcastle, a distinguished loyalist of the 17th c., son of Sir Charles Cavendish, younger brother of the first Earl of Devonshire, was born 1592. His learning and winning addres made him a favorite at the court of James I., who, in 1610, made him a Knight of the Bath. Other honors rapidly succeeded. In 1620, he was made a peer of the realm. Charles I., about 1628, gave him the title of Earl of Newcastle-upon-Tyne, and in 1638 intrusted him with the tuition of his son, afterwards Charles II. His support of the king during the contest with the parliamentary forces was munificent. He contributed £10,000 to the treasury, and raised a troop of 200 knights and gentlemen, who served at their own cost. As general of all the forces raised north of the Trent, he had power to issue declarations, confer knighthood, coin money, and raise men; and the last part of his commission he executed with great zeal. The banquets C. gave to the king when he went north were magnificent enough to find record in history; one of them cost no less than £15,000, even in those days when money was more valuable than it now is. After the battle of Marston Moor, C. retired to the continent, where he resided, at times in great poverty, until the Restoration. On his return, he was created Duke of Newcastle. He died December 25, 1676. On the continent he devoted himself to literature, and wrote a book on the management of horses, and several plays, not of a character to increase any man's reputation for intelligence.

CAVENDISH, MARGARET, Duchess of Newcastle, second wife of the above, born about the end of the reign of James I., is perhaps one of the most remarkable instances on record of a person afflicted with the *cacoëthes scribendi*, who had no capacity whatever for writing. She produced no less than 13 folio volumes, 10 of which were printed, treating, indifferently, on all subjects in prose and poetry, and careless in all, both as to grammar and style.

Her mania for scribbling kept up her maids at night, so that, if she chanced to wake with anything on her mind, they might be ready to note it down at once. The duchess was relieved, but a dead-weight fell upon the field of literature. She died in 1673.

CAVES, or CA'VERNS (Lat. *cavus*, hollow), are hollow places in the earth. They are either natural or artificial. Natural C. have been produced by the fracture and dislocation consequent on the upheaval of the strata, by water, or by both causes combined. The denuding or eroding power of water, which has produced the materials of stratified rocks, has formed caverns in the courses of rivers and on the coast-line of the sea. The moving waters, carrying with them gravel and sand, enter natural cracks and crevices, and by abraiding their walls, increase their size, so as to form C.; or they attack less indurated portions of the solid strata, and form cavities bounded by the harder rock. Such caverns are of frequent occurrence round the shores of Britain, and indicate, where they occur, an ancient sea-margin of the island. In limestone rocks, the destroying power of water is increased when it contains chemical agents which have the power of dissolving the substance of the rock, and so causing it to be carried off in solution by the water.

C. most frequently occur in limestone rocks. They especially abound in the oolitic limestone, which on this account was called by the earlier continental geologists 'cavern limestone.' The celebrated C. of Franconia in Germany, of Kentucky (q. v.) in America, that of Kirkdale in Yorkshire, and many others, occur in this formation. Next to limestone, the triassic measures, containing rock-salt, a material easily removed by water, most abound in caverns. They are also frequently met with in igneous rocks—the picturesque cave of Fingal, in Staffa, is formed in basalt; and in South America and Iceland the modern lava contains large caverns.

Many caverns have a calcareous incrustation lining their interior, giving them a gorgeous appearance. Sometimes this deposit is pure white, and has, when the cave is lighted up, a richness and transparency that cannot be imagined. It is, however, more generally colored by the impurities which the water has taken up from the superincumbent strata. To the incrustations which are suspended from the roof, like icicles, the name stalactite is given, while those rising from the floor are designated stalagmites. Sometimes the pendant stalactite is produced so as to meet the ascending stalagmite, and form pillars, as if to support the roof. as in the 'Organ' in the Blue John Mine, Derbyshire. The source and origin of this deposit has been satisfactorily explained by Liebig as follows:

The mould of the superficial soil, being acted upon by moisture and air, evolves carbonic acid, which is dissolved by rain. The rain-water thus impregnated, permeating the calcareous strata, has the power of taking up a portion of the lime, which it retains in a liquid condition, until from evaporation the excess of carbonic acid is parted with, when the lime again returns to its solid state, and forms the incrustation.

C. have an additional interest to the geologist, from the occurrence in many of osseous remains under the calcareous incrustations of the floor. The bones are imbedded in mud, and frequently concreted into a firm calcareous breccia. They belong to the Pleistocene period, when the C. in Europe were inhabited by large hyenas and bears. Portions of other animals inhabiting the neighborhood were dragged by them into their dens, to serve as food. In this way the bones of herbivorous and other animals are found mixed with those of the beasts of prey; they have a broken and gnawed appearance, similar to that which is produced on recent bones by the teeth of a hyena. No less than 33 species of mammals and 5 species of birds have been discovered in the C. of the British Islands, of which about the half still survive in Europe, while the remainder are extinct. The mammals are species of ox, deer, horse, wolf, dog, hare, fox, weasel, water-rat, mole, bat, hippopotamus, and rhinoceros, besides the hyena and bear; and the birds are species of lark, partridge, pigeon, goose, and crow.

The most productive ossiferous cavern in Britain is that at Kirkdale, 25 miles from York, in which the remains of about 300 hyenas have been detected, besides innumerable gnawed bones of those animals on which they preyed. The carboniferous limestones of Glamorganshire abound in caves, which have been explored by Buckland, and more recently and thoroughly by Dr. Falconer. At the meeting of the Geological Society in June 1860, Dr. Falconer thus describes the contents of one of them, called Bacon Hole. On the limestone floor of the cave are—(1.) a few inches of marine sand, abounding with *Litorina rudis*, *L. litoralis*, and *Clausilia nigricans*, with bones of an *Arvicola* and Birds; (2.) a thin layer of stalagmite; (3.) two feet of blackish sand, containing a mass of bones of *Elephas antiquus*, with remains of *Meles taxus* and *Putorius;* (4.) two feet of ochreous earth, limestone breccia, and sandy layers, with remains of *Elephas antiquus*, *Rhinoceros hemitœchus*, *Hyœna Canis lupus*, *Ursus spelœus*, *Bos*, and *Cervus;* (5.) irregular stalagmite; (6.) two feet of limestone breccia and stalagmite, with bones of *Ursus* and *Bos;* (7.) a foot or so of irregular stalagmite, with *Ursus;* and (8.) dark-colored superficial earth, kept sloppy by abundant drip, with bones of *Bos*, *Cervus*, *Canis*, *vulpes*, horns of Reindeer and Roebuck, together with shells of *Patella*, *Mytilus*, *Purpura*, and *Litorina* (probably brought into the cavern as food by birds), and also pieces of ancient British pottery.

After a review of the Fauna of the bone caves of this country and of Europe, Dr. Falconer concludes that the caves of Glamorganshire have probably been filled up with their mammalian remains since the deposition of the boulder-clay, and that there exist no mammalian remains in the ossiferous caves of England and Wales referrible to a fauna of a more ancient geological date. See KENT'S CAVERN, MAN.

Ossiferous C. occur in all parts of the globe. The fossils of those in Australia show that the fauna of the Pleistocene period had a remarkable resemblance to that of the present day. The remains consist chiefly of kangaroos and allied genera of Marsupials.

CA'VIARE, the salted roes of the common sturgeon (*Accipenser Sturio*) and other fishes of the same genus. See STURGEON. It is chiefly prepared in Russia, where it is greatly esteemed as an article of food. It is also used to a considerable extent in Italy and France. The species of sturgeon from the roe of which it is chiefly prepared, inhabit the Caspian and Black Seas and their tributary rivers. Among them are the Bielaga, or Great Sturgeon (*Accipenser Huso*), the Osseter (*A. Guldenstadtii*), the Scherg or Sevruga (*A. stellatus*), and the Sterlet (*A. Ruthenus*). The C. made from the roe of the last-named species is esteemed particularly delicious, and is reserved for the Russian court. Astrakhan is a principal seat of the preparation of caviare. More than 400,000 lbs. of C. have been prepared in the Caspian fishery in a single year.

CAVITÉ, a town of considerable importance on the island of Luzon, one of the Philippines. It is situated on the bay of Manila, 10 miles south-south-west of the city of that name, of which it forms the quarantine station. It has a large cigar manufactory, is the chief naval dépôt of the Spanish possessions in the East, and gives name to a province with a population of 57,000. The population of the town itself is some 6000 or 7000.

CAVOR, or CAVOU'R, a town of North Italy, situated at the foot of the Alps, 7 miles south-south-east of Pinerolo. It has manufactures of silk-twist, linens, leather, &c., and marble and slate quarries. Pop. 6000 or 7000.

CAVO-RILIE'VO (Ital.). In this peculiar kind of rilievo, which was extensively employed by Egyptian artists, the highest surface of the object represented is only on a level with the plane of the original stone, the rounded sides being cut into it. The effect resembles that of a concave seal. It is correctly described as *intaglio rilievato*. A wood-cut is given in Fairholt's *Dictionary of Terms in Art* of the Egyptian king Amunoph III. in hieroglyphics.

CAVOUR, COUNT CAMILLA BENSO DI, a distinguished Italian statesman of the 19th century, the descendant of a noble and wealthy family of Piedmont, was born at Turin, August 10, 1810. He was educated for a military career, but his liberal tendencies being likely to prove an insuperable barrier to his promotion, he retired during the stirring events of 1830—1831, and devoted himself to agriculture, in which he introduced great improvements. He was the first to use guano in Piedmont; and, at his instigation, a national agricultural society was formed. During a residence in England, he made himself intimately acquainted with the political organization of the country, and also with its industrial institutions; knowledge of which he made good use on his return to his own country in 1842. In conjunction with Count Cesare Balbo, he in 1847 established a political daily journal, in which he advocated the interests of the middle classes—a representative system, somewhat after the pattern of the English constitution, as opposed alike to absolutism on the one hand, and mob rule on the other. On his suggestion, the king was petitioned for a constitution, which was granted in February 1848. As a member of the Chamber of Deputies, during the stormy period which succeeded Charles Albert's declaration of war against Austria in March, C. strenuously opposed the ultra-democrats, and counselled an alliance with England as the surest guarantee for the success of the Italian arms. In the Marquis d'Azeglio's ministry, formed soon after the fatal battle of Novara, C. was successively Minister of Agriculture and Commerce, Minister of Marine, and Minister of Finance; and in 1852 he was appointed to succeed D'Azeglio as premier. From this time until his resignation in 1859, in consequence of the conclusion of the peace of Villafranca, C. was the originator as well as the director of the Sardinian policy. Taking upon himself at different times, in addition to the premiership, the duties of the Ministers of Finance, Commerce, and Agriculture, and latterly of Home and Foreign Affairs, he greatly im-

proved the financial condition of the country, introduced free-trade, consolidated constitutionalism, weakened clerical influence, and made Sardinia a power of some accouut in Europe, by bringing her into alliance with England and France against Russia. The dispatches which C. penned in reply to those of Austria, prior to the outbreak of the Italian war, are on all hands acknowledged as master-pieces of astute diplomacy. In January 1860, C. was again called upon to preside over the Sardinian government, the duties of Foreign Minister likewise devolving upon him, and temporarily those of the Minister of the Interior also. He continued to direct the Sardinian policy until his death, June 1861.

CA'VY (*Cavia*), a genus of quadrupeds of the order *Rodentia*, regarded as the type of a family, *Cavidæ*, differing from the Hare family (*Leporidæ*) in the complete want of clavicles, in the want of growing roots to the molar teeth, and in having the incisors situated as in other quadrupeds generally, and not in the peculiar manner so characteristic of the hares. There are four molar teeth in each jaw, and in the genus C. these are compound; and the genus is further characterized by four toes on each of the fore-feet, and three on each of the hind-feet, by the feet not being webbed, by the females having only two teats, and by the want of a tail. One species, *Cavia Cobaya*, has been long well known as a domesticated animal, and has been a common pet and plaything of children in Europe, almost from the time of the discovery of America. It is sometimes called the COMMON C. or RESTLESS C., but much more frequently receives the name of GUINEA-PIG, although it is neither nearly related to pigs, nor a native of Guinea. Perhaps *Guinea*,

Cavy, or Guinea-pig.

in this name, may be a corruption of *Guiana*, the cavies, and indeed the whole family of the *Cavidæ*, being exclusively South American. The colors which the domesticated C. exhibits have never been seen in any of the wild cavies of South America; and as it is known to have exhibited the same variations of color from about the time of its introduction into Europe, it is supposed to have been long domesticated by some of the South American tribes. The Guinea-pig multiplies with a rapidity exceeding that of any other known quadruped, producing young ones when only two months old, and afterwards at intervals of two months, and from four to twelve in a litter. This extraordinary fecundity is probably not so much the result of domestication, as a provision for the preservation of the race in a wild state, the little animal being very defenceless and destitute of means of escape, the ready prey of every carnivorous beast and bird.—The other species of C. much resemble the Guinea-pig. Some of them are very numerous in some parts of South America, and are sought for food, although no such use is made of the domesticated cavy. The Agouti (q. v.) and the Capybara (q. v.) are ranked among the *Cavidæ*.

CAWK, a popular name for a massive variety of the mineral called Heavy Spar or Sulphate of Baryta. See BARYTA.

CAWNPO'RE, a city of the Doab, on the right bank of the Ganges, about 140 miles above Allahabad, at the junction of the Jumna, being separated by the river from Oude, whose capital, Lucknow, lies 53 miles to the north-east. The lat. is 26° 29′ N., and the long. 80° 25′ E. The stream in front, varying, according to the season, from 500 yards in width to more than a mile, presents a large and motley assemblage of steam-vessels and native craft. C., at least as a place of note, is of recent origin, being indebted for its growth, besides its commercial facilities, partly to military and political considerations. In 1777, being then an appendage of Oude, it was assigned by the nawab as the station of a subsidiary force; and in 1801 it became, in name as well as in fact, British property. Its cantonments, having accommodation for 7000 troops, have gradually accumulated about 50,000 native inhabitants; while the city itself contains a somewhat larger population of similar origin. During the mutiny of 1857, C. was the scene of Nana Sahib's massacre of his English captives. Though C. is only 379 feet above the sea, yet, during winter, considerable quantities of ice are made for preservation, through the exposing of water by night in shallow vessels. Pop. (1881) of C. (spelt also *Khanpur*) 119,603.

CAWNPORE, the district of the above-described city, in the lieutenant-governorship of the North-west Provinces. Occupying the entire breadth of the Doab, it touches at once the Jumna and the Ganges; while to the eastward it has Futtehpore, and, to the westward, Etawah and Furruckabad. With a pop. in 1871 of 1,155,439, it has an area of 2353 square miles, stretching in lat. from 25° 55′ to 27° N., and in long. from 79° 34′ to 80° 37′ E. It is an alluvial plain of great fertility. The vine is cultivated, and indigo grows wild. Besides its two mighty rivers and their navigable tributaries, the Ganges Canal traverses the country for about 60 miles.

CAXAMA'RCA, or CAJAMARCA, a province in the north-west of Peru, with a capital of its own name. It is on the east side of the Andes, forming part of the basin of the Maranon. The province has 214,000 inhabitants, and the city (1876) 7215.

CAXAMARQUI'LLA, a town of North Peru, in the province of Libertad, one hundred miles east-north-east of Truxillo. Pop. about 10.000.

CAXATA'MBO, or CAJATAMBO, a town of North Peru, in the province of Ancachs, 120 miles N.N.E. of Lima, with a pop. of about 2000. There are siver-mines in the neighborhood.

CAXTON, WILLIAM, who introduced printing into England, was born in the Weald of Kent, about 1422. The particulars of the life of this great benefactor of his country are scanty. He was apprenticed in 1439 to Robert Large, a wealthy London mercer. At the death of the latter in 1441, he went to Bruges, where in 1462 or 1463 he seems to have become governor of a chartered association of English adventurers trading to foreign parts. In 1471 C. entered the service of Margaret, the Duchess of Burgundy, formerly an English princess; and apparently towards the end of 1476 he set up his wooden printing-press at the sign of the Red Pale in the Almonry at Westminster. The art of printing he had acquired during his sojourn in Bruges, doubtless from Colard Mansion a well-known printer of that city; and in 1474 he put through the press the first book printed in the English tongue, the *Recuyell of the Historyes of Troye*, a translation of Raoul le Fevre's work. The *Game and Playe of the Chesse* was another of C.'s earliest publications; but the *Dictes and Notable Wise Sayings of the Philosophers*, published in 1477, is the first book which can with certainty be maintained to have been printed in England. All the eight founts of type from which C. printed may be called Black Letter. Of the ninety-nine known distinct productions of C.'s press, no less than thirty-eight survive in single copies or in fragments only. C., who was an accomplished linguist, and translated many of the works that issued from his press, was diligent in the exercise of his craft or in translation till within a few hours of his death, which seems to have happened about the close of the year 1491. In 1877 the printer and his work were fittingly commemorated by a typographical exhibition in London. See *The Old Printer and the New Press*, by Charles Knight (1854), *Life and Typography of William C.* (1861—1863), by W. Blades; and the *Biography and Typography of C.* (1877), by the same author.

CAYENNE, a fortified seaport, capital of French Guiana, on the west point of an island of the same name at the mouth of the river Oyak. The roadstead is excellent, and the port commodious but shallow. C., though it is the entrepôt of all the trade of the colony, is chiefly known as a great French penal settlement. The island, 32 miles in circumference, is separated from the mainland by a narrow channel; its soil is fertile, but the climate is extremely unwholesome for Europeans, large numbers of the convicts having been carried off by various malignant fevers. C. became a French colony about 1635; deportation hither began during the first French Revolution. Pop. about 8000.

CAYE'NNE CHE'RRY. See EUGENIA.

CAYENNE PEPPER consists of the powder of the dried pods, and more especially of the dried seeds of different species of CAPSICUM (q. v.), particularly of *C. frutescens*.

CAY'MAN, a name somewhat variously used, either as the distinctive appellation of some, or as a common name for all the *Crocodilidæ* of South America. See ALLIGATOR. The genus *Alligator* is by some naturalists of the present day divided into three genera, to one of which the name C. (*Caiman*) is appropriated, and of which the type is the species called the Eye-browed C. (*Alligator palpebrosus*), to which the name C. is distinctively applied in Surinam and Guiana, a species very abundant there, but not one of the largest or more dangerous of its tribe. It is remarkable for the three bony plates, separated by sutures only, which form each eyebrow or eyelid, projecting as large knobs like a man's fist; and this, and the scarcely webbed-feet, constitute the most important characters of the genus or sub-genus Cayman. To this sub-genus belongs also *A. trigonatus*, regarded by Cuvier as a mere variety of the same species, and *A. gibbiceps*.

CAY'MANS—in English, *Alligators*—three low islets of the Caribbean Sea, which form a dependency of Jamaica, being 130 miles to the north-west of it. Discovered by Columbus, they were by him called Tortugas, from the abundance of turtle—still the staple production of the group. On an area of about 2000

acres, the population does not exceed 1500 or 1600. The soil yields corn and vegetables; and the people rear hogs and poultry.

CAZA'LLA DE LA SIE'RRA, a town of Spain, in the province of Seville, 39 miles north-east of the city of that name. It is situated on a declivity of the Sierra Morena; the district around is mountainous and well wooded, and abounds in minerals of various kinds, including iron, silver, copper, sulphur, and marble. The inhabitants, numbering between 7000 and 8000, are chiefly employed in smelting metals, manufacturing cannon, machinery, and agricultural implements. Some tanning, weaving, &c., are also carried on.

CAZE'MBÉ, or KAZEMBE, an important country of Africa, the limits of which have not been clearly determined, but its center has been fixed at about lat. 12° S., and long. 31° E. The king's rule, extends over a great portion of the established route across the continent of Africa, from the Congo, up the valley of Lulúa, and down the valley of Luapúla. Vegetation is generally luxuriant. Its chief products are manioc, maize, salt, copper, iron, and ivory. The people are called Balonda or Baloi.

CAZO'RLA, a town of Andalusia, Spain, 40 miles east-north-east of Jaen. C., which is a place of considerable antiquity, is pleasantly situated on a declivity, and is well watered by the Vega; has two old castles—one an Arab structure—manufactures of leather, earthenware, soap, and bricks, and a trade in agricultural produce. Pop. 7500.

CEANO'THUS. See RED ROOT.

CEARA, a province of Brazil, on the N. coast, situated in lat. 2° 40′—7° 25′ S., long. 37° 40′—41° 30′ W. It has an area of 42,600 sq. m., with (1872) 700,000 inhabitants. It abounds in balsams, guns, resins, and fruits; and among its minerals are gold, iron, copper, and salt. The *port* of C. had a trade with Great Britain in 1874 amounting to £969,584.

CEBADI'LLA. See SABADILLA.

CE'BUS (Gr. an ape or monkey), a genus of American monkeys, characterized by a round head and short muzzle, a facial angle of about 60°, long thumbs, and a long prehensile tail entirely covered with hair. The species are numerous, all of very lively disposition and gregarious habits, living in trees. They feed chiefly on fruits, but also on insects, worms, and mollusks. They are included under the popular designation SAPAJOU in its wider sense, and some of them are the monkeys to which this name is sometimes more strictly appropriated. The names SAJOU and SAI are also given to some of them, and some are called Capuchin (q. v.) monkeys. One of the most common species in Guiana is the WEEPER MONKEY, or WEEPER SAPAJOU (*C. Apella*).—The name Capuchin is perhaps most frequently given to *C. Capuchinus*, a brownish species, with head, feet, and hands generally black, and front, shoulders, and cheeks whitish.—Some of the species of C. are adorned with beards.—The name *Cebidæ* is sometimes given to the American monkeys collectively, as a family or tribe. See MONKEY.

CECIDOMY'IA (Gr. *kekidion*, a gall-nut; and *myia*, a fly or gnat), a genus of dipterous (two-winged) insects of the family *Tipulariæ*—the gnat and mosquito family; having downy wings, which have three nervures, and are horizontal when at rest; antennæ as long as the body; with bead-like joints, and whirls of hairs at the joints; long legs, and the first joint of the tarsi very short. The species are numerous; nearly thirty are British. All are of small size; but some of them are very important on account of the ravages which their maggots effect in grain-crops. *C. cerealis*, sometimes called the Barley Midge, a brownish-red fly with silvery wings, of which the maggot is vermilion-colored, is often very destructive to crops of barley and spelt in Germany. The little maggots live in families between the stalk and the sheath of the leaf, abstracting the juice of the plant.—The WHEAT-FLY (q. v.) and the HESSIAN FLY (q. v.) belong to this genus.—Some of the species of C. deposit their eggs on the young buds of trees, which the larvæ transform into galls.

CECIL, WILLIAM, LORD BURLEIGH, one of England's greatest statesmen, was born at Bourne, Lincolnshire, September 15, 1520. Educated at the grammar-schools of Grantham and Stamford, he thence passed to St. John's College, Cambridge, where he was remarkable alike for his diligence and aptitude in learning. Entering Gray's Inn at the age of 21, he devoted himself assiduously to the study of law. History, genealogy, and theology also formed part of his studies at this time; and his knowledge of the last recommended him to the notice of Henry VIII., who presented him with the reversion of the *custos brevium*, an office of value in the Common Pleas. An alliance with the daughter of Sir Anthony Cook procured him the friendship of the Protector Somerset, who, in 1547, appointed him Master of Requests; and in the following year his great talents procured for him the office of secretary of state. He shared in the disgrace of Somerset, even to imprisonment for three months; but in less than two years after his release, his pre-eminent abilities secured for him a re-appointment to the state secretaryship by the Duke of Northumberland, his former patron's sworn enemy. During his second secretaryship, C. effected most important and beneficial changes in the commercial policy of the country. With a sagacity far beyond the spirit of his age, he endeavored to throw trade open, and did succeed in abolishing some monopolies; but others proved too strong for him, standing as he did alone, at a time when exclusive privileges were considered the only sureties of a profitable trade. When Queen Mary ascended the throne, C., being a Protestant, resigned his official employment, because he could not conscientiously serve a Roman Catholic court; but as a private gentleman he maintained good relations with the Roman Catholic party, and was one of the few eminent Protestants who escaped in purse and person during that short but infamous reign. His freedom from persecution has given rise to the charge that he was a 'trimmer'—a very unjust accusation, indeed. C. was naturally cautious and politic, and averse to extremes in religion; but though he took no part in bitter sectarian discussions, he never belied his conscience, and to him is mainly owing the rejection of the bill which the Roman Catholics had introduced into parliament, with the view to a wholesale confiscation of the estates of Protestants. Prior to Mary's death, C., foreseeing her end, had entered into correspondence with Elizabeth, who, on her accession to the throne (November 16, 1558), at once recognizing C.'s capacity for government, appointed him secretary of state.

A biography of C. from this time until his death would be a forty years' history of England, for he was alike the originator and director of that policy which, hitherto, has made Elizabeth's reign memorable above that of any other English sovereign; for although Elizabeth occasionally, in her caprice, favored other courtiers, C. was the statesman whose judgment she relied on in all matters of consequence. His policy at home and abroad was at once shrewd and cautious, and also liberal and comprehensive, while he displayed a power of decision, ready and stern, when necessity demanded. As a statesman, C. was above animosities and favoritism; his enemies never suffered, and his friends profited nothing, by his power. Capacity, truth, and honor were what he sought in public men. Had he been less just, history might have been more generous to his memory. The queen created him Baron Burleigh in 1571, and conferred on him the Order of the Garter in the succeeding year, when he was also made lord high treasurer, an office he held until his death, August 15, 1598.

CECIL, ROBERT, EARL OF SALISBURY, son of the above, was born about 1550. On the death of his father, having previously held important state offices, he succeeded to what would now be called the premiership. On the accession of James I., C., who had carried on a private correspondence with that monarch before Elizabeth's death, was confirmed in his office, and received many high honors, culminating in that of Earl of Salisbury. In 1608, he was made lord high treasurer, and the Exchequer was greatly improved in his hands. C. was a man of immense energy and far-reaching sagacity, undoubtedly the best minister the country had in his time; but he was cold, selfish, and unscrupulous as to the means he took to gain his ends, and get rid of his rivals. His connection with the disgrace of Essex and Raleigh laid him open to great and deserved odium, in the latter case especially. Like his father, however, he was free from the meanness and dishonesty of enriching himself out of the public money. He died May 24, 1612.

CECI'LIA, ST., the patroness of music, is said to have suffered martyrdom in 230 A.D. Her heathen parents, as we are told, belonged to a noble Roman family, and betrothed their daughter, who had been converted to Christianity, to a heathen youth named Valerian. This youth and his brother Tiberius became Christian converts, and suffered martyrdom. C., when commanded to sacrifice to idols, firmly refused, and was condemned to death. Her persecutors, it is said, first threw her into a boiling bath, but on the following day they found her unhurt.

The executioner next attempted to cut off her head, but found it impossible. Three days later, she died—rather a lame conclusion to such miraculous interference! As early as the 5th c., there is mention of a church dedicated to her at Rome; and in 821, by order of the Pope Paschal, her bones were deposited there. St. C. is regarded as the inventor of the organ, and in the Roman Catholic Church her festival-day, Nov. 22, is celebrated with splendid music. Chaucer, Dryden, and Pope have celebrated St. C., and the painters Raphael, Domenichino, Dolce, and others have represented her in fine pictures.—Another St. C. was born in Africa, and suffered martyrdom by starvation under Diocletian. The Roman Catholic Church celebrates her festival on the 11th of February.

CECRO'PIA, a genus of trees of the natural order *Artocarpaceæ*. *C. peltata*, a native of the West Indies and of South America,

sometimes called Trumpet-wood and Snake-wood, is remarkable for its hollow stem and branches, exhibiting merely membranous partitions at the nodes. The small branches, these partitions being removed, are made into wind-instruments. The wood is very light, readily takes fire by friction against a harder piece of wood, and is much used by the Indians for procuring fire in this way. The fruit is agreeable, and resembles a raspberry. Both the trunk and branches yield a large quantity of saline matter, which is employed by the French planters in the purification of sugar. The bark is strong and fibrous, and is much used for cordage. It is also astringent, and is applied in diarrhœa and other diseases.

CE'CROPS, the first king of Attica, figures in Greek mythology as an Autochthon (q. v.), half-man and half-dragon. Belonging, as he does, to the prehistoric ages of Greece, his real character can only be guessed at. Tradition declares him to be the founder of marriage, the author of the political division of Attica into twelve states, and the introducer of agriculture, of navigation, and commerce. He is also said to have civilized the religious rites of the people. The name C. is given to various towns in Greece, and the legends in general seem to indicate a Pelasgic origin for the hero. The later accounts, that he came from Sais in Egypt, have no historic basis.

CE'DAR, or CEDAR OF LE'BANON, a tree much celebrated from the most ancient times for its beauty, its magnificence, and its longevity, as well as for the excellence and durability of its timber. It is often mentioned in Scripture; it supplied the woodwork of Solomon's temple; and in the poetry of the Old Testament it is a frequent emblem of prosperity, strength, and stability. It belongs to the natural order *Coniferæ*, and is the *Pinus Cedrus* of the older botanists; but is now ranked in the genus *Abies* (see FIR), in the genus *Larix* (see LARCH), by those who make *Larix* a distinct genus from *Abies*, or is made the type of genus, *Cedrus*, distinguished from *Larix* by evergreen leaves and carpels separating from the axis, and receives the name of *C. Libani*.

Of the celebrated CEDARS OF LEBANON, only a few now remain. They consist of a grove of 400 trees, about three-quarters of a mile in circumference, partly old trees, and partly young ones. Learned

Cedars of Lebanon.

travelers think that most of the trees in the grove may be 200 years old, and several between the ages of 400 and 800 years. There are twelve trees whose age is incalculable—seven standing very near each other; three more a little further on, nearly in a line with them; and two, not observed by any recent traveler except Lord Lindsay, on the northern edge of the grove. The largest of these two is 63 feet in circumference—following the sinuosities of the bark; one of the others measures 49 feet.

These trees are more remarkable for girth than stature, their height hardly exceeding 50 feet. Their age is variously estimated; the rules by which botanists determine the age of trees are not applicable to them, for their stems have ceased to grow in regular concentric rings; they owe their prolonged existence to the superior vitality of a portion of their bark, which has survived the decay of the rest. Russeger is inclined to admit that these trees may possibly number some 2000 years.

The Arabs, of all creeds, have a traditional veneration for these trees; they believe that an evil fate would surely overtake any one who shall dare to lay sacrilegious hands on the *saints*, as they fondly call them. Every year, at the feast of the Transfiguration, the Maronites, Greeks, and Armenians mount to the cedars, and celebrate mass on a homely altar of stone at their feet.

The C. has been planted in parks in many parts of Europe; it was introduced into England in the latter part of the 17th c., and a tree at Sion House, London, is now eight feet in diameter at three feet above the ground. Even in Inverness-shire it succeeds so well, that trees at Beaufort Castle, the seat of Lord Lovat, planted in 1783, are now three or four feet in diameter. On its native mountains, the C. is found at the base of the highest peaks, at an altitude of about 8000 feet above the sea. It seems to delight in a dry open soil, where, however, its roots can have access to abundance of water. Although in foilage and some other particulars the C. considerably resembles the common larch, it differs in form and habit very widely both from the larch and from the pines in general. Its stem bears almost down to the ground irregularly placed branches, of prodigious size and expanse, which divide irregularly into branchlets. The leaves are dark green, 10—15 lines long, pointed, united in clusters of 20—30: on the young shoots they are very numerous, and not in clusters; the small branchlets also are crowded together and pensile. The cones are erect, oval, broadly rounded at both ends, about four inches long, and three inches in diameter; their scales closely crowded, large and broad. The cones take two years to come to maturity, and hang on the tree for years before their scales come off and their seeds are set free. The wood of the trunk is reddish and full of a fragrant resin. The ancients kept their writings in cabinets or boxes of cedar-wood. Extraordinary indestructibility and other virtues were ascribed to it. It is not nearly so much prized at the present day, because it is soft and light, and apt to crack in drying. This inferiority is, however, not improbably owing to the inferior age of the trees from which the timber is now procured. A resineous substance, called *Cedar Resin*, or *Cedria*, flows spontaneously from the trunk of the C., or from incisions; it resembles mastic, and was anciently used along with other resins in the embalming of the dead. It was also used as a medicine. In very ancient times, C. OIL a kind of turpentine, was prepared from the wood, and was spread on books in order to their better preservation.

Cone of Cedar of Lebanon.

At the present day, the oil and the resin are scarcely known. The branches of the C., like those of the larch in warm countries, exude a sweet substance, which is known by the name of C. MANNA.—The DEODAR, or HIMALAYAN C. (*Cedrus Deodara*), a tree held in great veneration by the Hindus, and of which the name is said to be properly *Devadara*, and to signify *god-tree*, is common in the Himalaya mountains, at elevations of 7000—12,000 feet, forming magnificent forests, and attaining a great size, a height sometimes of 150 feet, with a trunk 30 feet or more in circumference, an ample head, and spreading branches. It is described as having cones somewhat larger than those of the C. of Lebanon, the scales of the cones falling off as soon as the seed is ripe, and as differing from the C. of Lebanon also in more pensile branches and longer leaves; but Dr. Hooker expresses a strong opinion that they will prove to be really the same species, as well as the C. of ALGIERS (*C. Atlantica* or *Africana*), which is found in the mountainous regions of the north of Africa. The wood of the deodar is resinous, fragrant, compact, and very durable. It is susceptible of a high polish, and in its polished state has been compared to brown agate. Owing to the abundance of resin, laths of it burn like candles. Its turpentine is very fluid, and although coarse, is much used in India for medical purposes; and tar and pitch are obtained from the trunk. The deodar has now become very common as an ornamental tree in Britain, although few specimens have yet attained a very considerable size. On account of its extreme gracefulness when young, it is often planted in situations to which large trees are unsuitable, and is to be seen in many suburban parterres.—The name C. is often given to other coniferous trees besides the true cedars. Thus, the Siberian Stone Pine, or Cembra Pine, is called the SIBERIAN C. (see PINE), and a species of fir (*Abies religiosa*) is the RED C. of California (see FIR). A species of Cypress (q. v.) is known as WHITE C., and another as the C. of GOA. Several of the trees which bear the name C. are species of Juniper (q. v.), among which are the VIRGINIAN C. or RED C. of North America, and the BERMUDA C.—which yield the cedar-wood used for pencils—the SPANISH C. of the south of Europe, &c. The name C. is even given to trees which have no resemblance to the true cedars, except in the resinous quality of the wood; thus the Cedar-wood of Guiana is produced by *Icica altissima*, a tree of the natural order *Amyridaceæ* (q. v.); the C. of the West Indies (see next article) belongs to the natural order *Cedrelaceæ*; and the name BASTARD C. is given in India to a tree of the natural order *Byttneriaceæ* (q. v.).

CEDAR, BARBADOES (*Cedrela odorata*), a tree of the natural order *Cedrelaceæ* (q. v.), and of the same genus with the toon of India, a native of the West Indies and warm parts of America. It is simply called Cedar in the West Indies. It is often upwards of eighty feet high, with a trunk remarkable for thickness. It has panicles of flowers resembling those of the hyacinth. The fruit, bark, and leaves have the smell of asafœtida, but the wood has

an agreeable fragrance. Being soft and light, it is used for canoes, and for shingles. Havannah cigar-boxes are very generally made of it. In France, it is used in making black-lead pencils.

CEDAR BIRD. See WAXWING.

CEDAR MOUNTAINS, a range of the Cape Colony, parallel with the Atlantic, and nearly half-way between it and the dividing ridge of the country. They form the height of land between the Oliphant on the west, and the Great Thorn, its principal tributary, on the east, varying in altitude from 1600 feet to 5000. They lie about 32° S., and long. 19° E., in the division of Clanwilliam, and supply the village of that name with cedar planks.

CE'DRATE. See CITRON.

CEDRELA'CEÆ, a natural order of exogenous plants, very nearly allied to *Meliaceæ* (q. v.), and chiefly distinguished by the winged seeds, numerous in each cell of the fruit, which is a capsule. The known species are few, all tropical or sub-tropical trees or shrubs, with pinnate leaves, most of them trees valuable for their timber. To this order belong mahogany, satin-wood, toon, Barbadoes cedar, the yellow-wood of New South Wales, &c. The barks of some species are febrifugal. That of *Soymida febrifuga*, the Rohuna or East Indian Mahogany, has been imported into Britain as a medicine.

CEFALU', a town of Sicily, on the north coast, 47 miles east-south-east of Palermo. It is situated at the foot of a rock, and is surrounded by old walls. It has a cathedral, and the ruins of a Saracenic castle occupy a neighboring hill. As a seaport, it has little traffic. The inhabitants, numbering some 14,000, are chiefly engaged in fishing.

CE'GLIE, a town in Southern Italy, province of Lecce, 18 miles north-east of Taranto. Pop. about 12,580. It produces much grain, and has fine pastures.

CEHEGI'N, a town of Spain, in the province of Murcia, 37 miles west-north-west of the city of that name. It has some spacious streets with handsome buildings, and manufactures of paper, cloth, and pottery. Pop. about 10,000.

CEILING (Fr. *ciel ;* Lat. *cælum*, heaven). This term seems to have been suggested by the use of arched coverings for churches, and even for rooms, which prevailed in the middle ages, and was not unknown to the Romans. Whether the term was further suggested by the habit of tinting ceilings of a blue color, and decorating them with stars, or whether that usage arose from the use of the term already introduced, is more doubtful. Arched ceilings among the Romans were known by the name *cameræ* or *camera*, the Greek origin of which seems to furnish an argument in favor of the view that the arch was known to the latter people. The camera was formed by semicircular beams of wood, at small distances from each other, over which was placed a coating of lath and plaster. In later times, the cameræ were frequently lined with plates of glass; whence they were termed *vitreæ*. But the ceilings most commonly in use amongst the Romans were flat, the beams, as in modern times, having been at first visible, and afterwards covered with planks and plaster. Sometimes hollow spaces were left between the planks, which were frequently covered with gold and ivory, or paintings. The oldest flat C. in existence is believed to be that of Peterborough Cathedral. Like that at St. Albans Abbey, it is made of wood, and plastered over like a modern ceiling. Ceilings of churches, in the middle ages, were generally painted and gilded in the most brilliant manner; and many existing ceilings still exhibit the traces of early decoration of this kind. The older ceilings generally follow the line of the timbers of the roof, which, in the Early English and Decorated, are often arranged so as to give the shape of a barrel vault. In ceilings of this description there are seldom many ribs, often only a single one along the top. In the perpendicular style, the C. often consists of a series of flat surfaces or cants, formed on the timbers of the roof. Though sometimes altogether destitute of ornament, they are more frequently enriched with ribs, dividing them into square pannels, with bosses (q. v.) or flowers at the intersections. Wooden ceilings are sometimes formed in imitation of stone-groining, with ribs and bosses, examples of which will be found at York, Winchester, and Lincoln. In the Elizabethan age, ceilings were generally of plaster, but they were ornamented with ribs having bosses or small pendants at the intersections. It is not unusual for the C. immediately over the altar, or the rood-loft, to be richly ornamented, whilst the rest is plain.

CE'LANDINE (*Chelidonium*), a genus of plants of the natural order *Papaveraceæ* (the Poppy family), having a corolla of four petals, and a podlike capsule. The common C. (*C. majus*) is a perennial, with pinnate leaves, lobed leaflets, and yellow flowers in simple umbels, frequent under hedges, in waste places, &c., in Britain and most parts of Europe. It flowers from May to September. The root, stem, and leaves, when fresh, have a disagreeable smell, and are full of a yellow juice, which is very acrid, causing inflammation when applied to the skin. C. is sometimes used in medicine: it is a drastic purgative, and in large doses an active poison; in small doses it is said to act beneficially on the lymphatic system and on theorgans of secretion, and to be useful in scrofulous diseases, disease of the mesenteric glands, &c. The

Common Celandine.

fresh juice, applied externally to warts, corns, &c., removes them by stimulating them beyond what their languid vital powers can bear. Mixed with milk, it is applied to the eye for the cure of opacities of the cornea, but is a remedy that requires great caution in its use.

CELA'NO, LAKE OF. See FUCINO, LAKE OF.

CELASTRA'CEÆ. See SPINDLE-TREE.

CE'LEBÉS, a large island in the Eastern Archipelago, east of Borneo, between 5° 45′ S. lat.—1° 45′ N. lat., and 118°—126° E. long. Area, 37,485 sq. miles. It is irregular in shape, and four peninsulas springing from a common root form the large bays of Gorontalo and Tolo, and the Gulf of Boni. C. is covered with mountains and valleys; a chain running throughout it sends spurs into the peninsulas. Some are active volcanoes, and earthquakes are frequent. The peak of Bonthaim is 9788 feet high. The island has a rich soil and extensive pastures. The vegetable kingdom gives sago, coco-nuts, bread-fruit, coffee, tamarinds, bananas, oranges, pine-apples, maize, rice, tobacco, sugar-cane, indigo, sandal-, sapan-, and ebony-wood. The animals include excellent horses, buffalo, cattle, wild swine, elands, goats, sheep, parrots, lories, birds of paradise, beautiful butterflies, wild bees, &c. The minerals are gold, iron, coal, and salt. The people spin and weave cottons. Pop., of various races, is reckoned at 3,000,000, of whom about 600,000, including 2000 Europeans, are under Dutch rule. The chief town is Macassar, which names the strait between C. and Borneo. In Nov. 1874, a fire destroyed 774 houses of the town.

CE'LERY (*Apium*), a genus of plants of the natural order *Umbelliferæ*, distinguished by a mere rudimentary calyx, roundish entire petals, very short styles, and roundish fruit. The common C. (*A. Gravolens*) is found wild in Britain and most parts of Europe, in ditches, brooks, &c., especially near the sea and in saline soils. Its leaves are dark green and smooth, its petals involute at the tip. The wild plant, also called SMALLAGE, has a stem about two feet high, a tapering slender root, a penetrating offensive odor, a bitterish acrid taste, and almost poisonous qualities. By cultivation, it is so much changed that its taste becomes agreeably sweetish and aromatic, whilst either the leaf-stalks much increase in thickness, or the root swells in a turnip-like manner. These parts, blanched, are much used as a salad, or to impart flavor to soups, &c., and sometimes as a boiled vegetable. They contain sugar, mucilage, starch, and a substance resembling manna-sugar, which acts as a stimulent, particularly on the urino-genital organs, so that a very free and frequent indulgence in the use of C. cannot, in ordinary circumstances, be altogether favorable to health. Two principal varieties of C. are cultivated, that most common in Britain having long thick leaf-stalks, which are more or less tubular, sometimes almost solid, and, after blanching, either white or more or less tinged with red; whilst the other, called TURNIP-ROOTED C., or CELERIAC, is chiefly remarkable for its swollen turnip-like root, and is in most general cultivation on the continent of Europe. The 'red' varieties of C. are esteemed rather more hardy than the 'white.' The blanching of

the leaf-stalks is generally accomplished by drawing up earth to the plants, which are transplanted from the seed-bed into richly manured trenches; and as they grow, the trenches are filled up, and the earth finally raised into ridges, above which little more than the tops of the leaves appear. C. is thus obtained for use throughout the winter. In the northern parts of Britain, the seed is generally sown on a hotbed. C. seed is often used for flavoring, when the leaf-stalks cannot be obtained. Another species of C. (*Apium australe*) grows abundantly in wet places on the shore about Cape Horn, and in Staten Island. It is a large, hardy, and luxuriant plant, and is described as wholesome and very palatable, nearly equal in its wild state to our garden celery. It seems well worthy of the attention of horticulturists.

CE'LESTINE, a mineral bearing the same relation to strontia (q. v.) that heavy spar bears to baryta. It is essentially sulphate of strontia ($StOSO_3$), with occasional admixture of sulphate of baryta, carbonate of lime, oxide of iron, &c., in small proportions. It much resembles heavy spar, but is not quite equal to it in specific gravity; is usually blue, often of a very beautiful indigo-blue; sometimes colorless, more rarely reddish or yellowish. Its crystallization is rhombic, like that of heavy spar. Most beautiful specimens of crystallized C. are found in Sicily. C. derives its name from its color. It is used as a source of strontia.

CE'LESTINES, an order of hermits of St. Damianus, founded by Peter de Morrone about 1264, and confirmed as a monkish order by Urban IV. in 1264 and 1274. They called themselves C. when their founder ascended the papal chair under the name of Celestine V. They are regarded as a branch of the great order of St. Benedict, whose rule they follow; they wear a white garment with black hood and scapulary, and live a purely contemplative life. In the 13th and 14th centuries, the order rapidly spread through France, Italy, and Germany, but subsequently decayed. The French C. were secularized by order of Pope Pius VI. in 1776—1778; so also were the Neapolitan Celestines. In the present day, the order is almost extinct.

CE'LIBACY, from Lat. *cælebs*, unmarried. Notwithstanding the divine commendation of marriage given in the Jewish Scriptures (Gen. i. 28), the opinion had become prevalent, even before the time of Christ, that C. was favorable to an intimate union with God. This notion took its origin in the wide-spread philosophy of a good and an evil principle. The body, consisting of matter, the seat of evil, was looked upon as the prison of the pure soul, which was thought to be defiled by bodily enjoyments. Among the Jewish sect of the Essenes, accordingly, a life of C. was held to be the chief road to sanctity. These ascetic views naturally led, in the first place, to the disapproval of second marriages. While, therefore, in the first Christian churches, every one was left at liberty to marry or not as he thought fit, the objecton to those who married a second time had become so generally spread, that the Apostle Paul saw occasion to counsel such Christian converts as were in widowhood to remain so.

By the 2d c., however, the unmarried life generally had begun to be extolled, and to be held necessary for a life of sancity, although several, at least, of the apostles themselves had been married. Two passages of Scripture (1 Cor. vii. and Rev. xiv. 4) were specially cited as proving that C. was the genuine condition of a Christian; and with the platonizing Fathers of the 2d and 3d centuries, the unmarried of both sexes were held as standing higher than the married. Accordingly, although there was no express law against the marriage of the clergy, many, especially of the bishops, remained unmarried; a second marriage was, in their case, already strictly prohibited.

As the bishops of Rome rose in consideration, and gradually developed a firmer church government, they called on all who belonged to the clerical order to live for the church alone, and not marry. This requirement met with constant resistance; still, it became more and more the custom, in the 4th c., for the higher clergy to refrain from marriage, and from them it went over to the lower orders and the monks. Provincial synods now began expressly to interdict the clergy from marrying. The council of Tours (566) suspended for a year all secular priests and deacons who were found with their wives; and the Emperor Justinian by an edict declared all children born to a clergyman, after ordination, to be illegitimate, and incapable of inheritance. There were still, however, many married priests who resisted the law, and found encouragement in the opposition which the Greek Church made to that of Rome in this matter of celibacy. The council held at Constantinople in 692, declared, in opposition to the Church of Rome, that priests and deacons might live with their wives as the laity do, according to the ancient custom and ordinance of the apostles. The orthodox Greek Church has continued to adhere to this decision. Priests and deacons in that church may marry before ordination, and live in marriage after it; but they are not allowed to marry a second time. However, only a priest living in C. can be chosen as bishop or patriarch.

The Church of Rome continued its endeavors to enforce the law of C.; though, for several centuries, they were attended with only partial success. There still continued to be numbers of priests with wives, although the councils were always issuing new orders against them. Popes Leo IX. (1048—1054) and Nicolas II. (1058–1061) interdicted all priests that had wives or concubines from the exercise of any spiritual function, on pain of excommunication.

Alexander II. (1061—1073) decreed excommunication against all who should attend a mass celebrated by a priest having a wife or concubine. This decision was renewed by Gregory VII. in a council held at Rome in 1074, and a decretal was issued that every layman who should receive the communion from the hands of a married priest should be excommunicated, and that every priest who married or lived in concubinage, should be deposed. The decree met with the most violent opposition in all countries; but Gregory succeeded in carrying it out with the greatest rigor; and though individual instances of married priests were still to be found in the 12th and 13th centuries, the C. of the Roman Catholic clergy was established, and has since continued both in theory and practice.

The violence thus done to human nature did not fail to avenge itself in those rude times. The licentiousness and corruption of the priests and monks became in many cases boundless, and it was in vain that strict individuals, as well as councils, strove against it. The immorality and debasement of the clergy became a reproach and by-word in the mouth of the people, and gave a powerful impulse to the religious movement that began in the 16th c. The leading Reformers declared against the C. of the clergy as unfounded in Scripture, and contrary to the natural ordinance of God, and Luther set the example of marrying. This was not without effect on the Roman Catholic clergy, and the question of the abolition of C. was raised at the council of Trent (1563). But the majority of voices decided that God would not withhold the gift of chastity from those that rightly prayed for it, and the rule of C. was thus finally and forever imposed on the ministers of the Roman Catholic Church. Those who have only received the lower kinds of consecration may marry on resigning their office. For all grades above a subdeacon, a papal dispensation is necessary. A priest that marries incurs excommunication, and is incapable of any spiritual function. If a married man wishes to become a priest, he receives consecration only on condition that he separate from his wife, and that she of her free will consent to the separation and enter a religious order, or take the vow of chastity. The priests of the united Græco-Catholic congregations in Rome have received permission from the popes to continue in marriage, if entered into before consecration, but on condition of always living apart from their wives three days before they celebrate mass.

Notwithstanding these decisions, the contest against clerical C. has again and again been resumed, in recent times, both within and without the Roman Catholic Church. In fact, all attempts at innovation within the bosom of Catholicism, connect themselves with the attack on C., the abolition of which would deeply affect the constitution and position of that church. Between 1817 and 1848, the propriety of putting an end to compulsory C. had been discussed publicly in most European countries, either by clergy, legislatures, or the press. The German Catholics (q. v.) abolished C. In Austria, the state took the side of the pope, who, in a bull of 1847, had added fresh stringency to the rule of C. The permission of marriage to the clergy was one of the principal contentions of the Old Catholics in Germany in 1874, and is maintained by the Separatist Church. Père Hyacinthe in France identified himself with the demand for legitimating clerical marriages. (See BACHELOR).

CELL, CELL-THEORY. In the latter half of the seventeenth century, Malpighi and Leeuwenhoek on the continent, and Hooke and Grew in England, commenced the application of the simple microscope to the examination of the minute structure of plants and animals; but although their labors in this department of biology were continued by Swammerdam and others during the eighteenth century, the foundation of scientific histology was not laid until the appearance, in 1801, of the *Anatomie Générale* of Bichât. In this epoch-making work, the conception of the *tissue theory*, as it may be termed, is first stated, the vital activities of the body being regarded as the sum of the vital activities of its component *tissues*, which are for the first time described. Not only, too, are the tissues defined and described, but they are discussed in detail in their healthy and morbid conditions. In fact, Bichât thus 'founded a system of histology by the aid of the anatomist's knife, of chemical analysis, and of pathological and physiological research, in which investigation without the microscope reached its zenith, but in which the tissue-elements remained in obscurity.'

The invention of achromatic lenses (see LENS, MICROSCOPE), and their combination into the compound microscope, enabled anatomists to inquire into the composition of the tissues themselves

with ever-increasing success. 'Fibres' and 'globules,' 'laminæ,' 'nuclei,' and even 'cells,' were described; the latter with some distinctness among plants; but the first clear idea of their nature and relations was emitted by Johannes Müller in 1835, who pointed out that the cells of the vertebrate notochord resembled those of plants.

The cellular nature of epidermis, and the presence of nuclei therein, were next ascertained, and the like discoveries were made for several other tissues. Robert Brown discovered the nucleus in plant-cells; and, in 1838, Schleiden proved that a nucleated cell is the only original component of a plant embryo, and that the development of all tissues might be referred to such cells. In the following year, Schwann published at Berlin his famous *Microscopic Investigations on the Accordance in the Structure and Growth of Plants and Animals* (transl. Sydenham Soc., 1847), in which the cell-theory was definitely constituted, the accordance asserted in the structure and development of the most different parts of plants and animals alike being their cellular composition and origin.

Schwann defined the cell as consisting of a *membrane*, having more or less fluid *contents*, and a central mass or *nucleus*. Schleiden had supposed the origin of new cells to take place in the interior of pre-existing cells; Schwann, on the contrary, assumed the formation of new cells in an intercellular substance, of which the granules or globules built themselves to form a nucleus, around which subsequent particles became grouped into an enlarging sphere, the structure being completed by the formation of a membrane. Both views, however, were erroneous. Dujardin, in the course of his microscopic studies of the lowest forms of animal life, had already discovered that their bodies were composed of a viscous, granular, contractile, living substance—his 'sarcode,' now better known as 'protoplasm,' a term subsequently proposed by Von Mohl, to denote the essentially similar 'contents' of the vegetable cell, henceforth no mere inert fluid. The nature and constancy of the membrane in plants and animal cells continued to be hotly debated until 1865, when Max Schultze established a new definition of the cell, as essentially a nucleated mass of protoplasm, with or without an investing membrane. Again, in 1824, Prevost and Dumas has observed that the development of the embryo commenced with the division of the ovum into segments; and, in 1840, Reichert suggested that these segmentation masses were really cells. This was demonstrated by Kölliker in 1846, who showed (1) that in embryos, all the tissues are built up of the descendants of the cells which arise by the cleaving of the yolk; (2) that the multiplication of animal and vegetable cells takes place, usually, by a process of transverse division identical with segmentation, and resembling, too, that already observed among the Protoza; (3) that Schwann's free nuclei or incipient cells nowhere occurred. These observations were confirmed by Remak in 1852, and the study of the embryonic development of tissues (histogenesis) was thus organized.

In 1858 appeared another biological classic—the *Cellular Pathologie* of Virchow—worthy to rank after those of Bichât and Schwann, since it applied their discoveries in the department of structure, to the illumination of physiology and pathology—the study of function, normal and abnormal alike. This contained the conception, that 'every animal presents itself as a sum of vital unities'—in other words, that the activities of an organism are the sum of the activities of its component cells. The general aim of the work is to give 'a view of the cellular nature of all vital processes, both physiological and pathological, animal and vegetable, so as to distinctly set forth what even the people have long been dimly conscious of, namely, the unity of life of all organized beings; in opposition to the one-sided humoral and neuristical (solidistic) medical tendencies which have been transmitted from the mythical days of antiquity to our own times, and at the same time to contrast with the equally one-sided interpretations of a grossly mechanical and chemical bias, the more delicate mechanism and chemistry of the cell.' By copious observation, too, the results of Kölliker and Goodsir (condensed in the aphorism 'Omnis cellula e cellula') were confirmed, and extended to pathology; for 'every pathological structure has a physiological prototype, and no form of morbid growth arises which cannot in its elements be traced back to some model which had previously maintained an independent existence in the economy.'

The cell-theory being thus founded, histologists were in a position to devote themselves profitably to the study of the structure and development of cell-aggregates, of vegetable and animal tissues and organs.

Vegetable Histology—*The Cell.*—If a film of epidermis, stripped from a young hyacinth or lily leaf, or a thin section of the growing point of a fern, be placed under the microscope, an admirably clear idea can be obtained of the structure of an embryonic or little differentiated vegetable cell—the protoplasm with its nucleus, its granules and sap-vacuoles, being easily distinguishable, even without the addition of a dye. In some cells, such as the stinging hairs of the nettle, those forming the staminal filaments of *Tradescantia*, or those of certain aquatic plants, such as the common *Anacharis* or *Chara*, the protoplasm may be observed in circulation; a continuous current passing round and round the interior of each cell, with a speed which may be considerably increased or diminished by simply warming or cooling the preparation.

As types of unicellular plants, the student may conveniently examine yeast; the *Protococcus*, which abounds in stagnating pools, roof-gutters, &c.; or its ally, which forms the green film on the stem of trees. In Protococcus the protoplasm owes its green hue

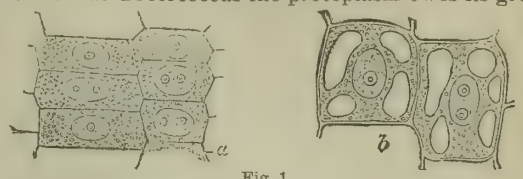


Fig. 1.
A, embryonic cells from growing-point of a root; *B*, older cells becoming vacuolated (after Sachs).

to the presence of diffused Chlorophyll (q. v.), but in higher plants the chlorophyll is contained in numerous small masses of denser protoplasm, the chlorophyll bodies, from which it may be removed by alcohol and other solvents. The starch which is formed within chlorophyll grains during sunlight (see Leaf) may easily be distinguished. Other cell contents—oil globules, protein crystals or crystalloids, albuminoid or aleurone grains, &c.—are frequently present. The cell sap consists of water with various substances in solution—inulin, sugar, tannin and coloring matters, and salts, of which calcium oxalate most frequently crystallizes out. But in many tissues, not only the protoplasm, but the whole cell contents may wholly disappear, leaving only the cellulose wall, filled with air.

Cell-wall.—The cell-wall is secreted by the protoplasm, but its growth is rarely uniform either in surface or thickness. The mutual pressure of even the most undifferentiated cells of any solid tissue compels them to assume a polyhedral shape, and this is often much more modified—the commonest and extreme change being that of enormous elongation, to form the fibres of which hard bast (see Wood) and the greater portion of wood are composed. Variations in thickening are also very frequent, leading to the pres-

Fig. 2.—Life-history of Unicellular Plant (*Protococcus*):
1, encysted; 2. quitting its wall; 3, ciliated: 4. quiescent; 5 and 6, dividing.

ence of knots or ridges, of pits of many forms and even perforations, which are described in most works on botany with a fulness of detail considerably out of proportion to their importance. Thick cell-walls usually exhibit a stratified appearance like that of starch grains, due to the alternation of more or less watery layers. These were at first considered by histologists to indicate the origin of the cell-wall by deposition of successive laminæ one within another; but this view was controverted by Nägeli, whose theory of intussusception (i. e., of interposition of new 'micellæ,' as he terms the crystalline particles, surrounded by water, of which he assumes all organized structures to consist), with subsequent differentiation of the laminæ, became generally adopted.

The recent very thorough researches of Schimper and Strasburger upon starch grains and cell-walls respectively, have induced them, however, to return to what is substantially the earlier view.

The cell-wall at first consists of pure Cellulose (q. v.), in which, however, modifications usually soon occur. Sometimes only a small quantity of mineral salts, the ash of wood, becomes deposited, but more frequently the wall becomes either woody, corky, or gluey. The former change is due to deposition of the substance known as *lignin* or *xylogen*, to which the hardness, elasticity, permanence, and other characteristic physiological and economic properties of wood are due. In cork, which forms the outer layer of the bark under the epidermis of stems and branches, and can conveniently be studied in a transverse section of a potato or of any twig, the *suberin*, with which a considerable quantity of silica, &c., is often associated, makes the cell-wall exceedingly impervious to water and gases; hence its use to the plant depends mainly upon the same properties which make it useful to man. Suberified cell-walls are usually very thin, whence their compressibility. The cork layer also serves as a defence against mechanical injuries, and is a good non-conductor. The thin film or cuticula which overlies the cells of epidermis is also suberified. The gluey or colloid change is due to a modification of the cell-wall,

which renders it capable of absorbing great quantities of water, and of swelling up to perhaps a hundred times its former volume, and may even go so far as the production of soluble gum. In cherries, &c., this seems a merely pathological process, but normally takes place in the epidermis of certain seeds, thereby gumming them down to the soil whenever they alight upon a damp spot suitable for germination. None of these changes need affect the whole cell-wall, but only certain layers of it; thus the woody change may take place only in the inner or middle laminæ of the cell-walls. The gelatinous change occurs most frequently in the middle, while suberin may be deposited on the outer surface of a cell-wall only.

Modes of Union between Cells.—Of adjacent cells, the walls are usually continuous, but frequently leave intercellular spaces at their angles. The protoplasm of one cell thus seems completely separated from that of others, and though in many cases of thickened cell-walls, deep pits are present, and correspond to each other on opposite sides, yet a thin septum in the position of the original cell-wall can always be made out, which separates the cell-contents, without preventing osmosis (see OSMOSE).

In the cambium cells of Rhododendron, in the irritable cushion at the base of the leaf-stalk of the sensitive plant, &c., a direct continuity of the protoplasm from cell to cell, through fine pores in their walls, has recently been described by careful observers, and is supported not only by such analogies as that of the structure of Volvox (q. v.), and some Protozoa, but also by the fact of the undoubted continuity of the protoplasm in the bast vessels (sieve-tubes).

Vessels.—In addition to cellular, we find also *vascular* tissue, elongated tubes arranged in bundles, in phanerogams, and all cryptogams higher than mosses. In a longitudinal section of the tip of a fern or other stem—say the rhizome of the bracken (*Pteris*)—the cells along certain lines, continuous with the woody portion of the bundle, are to be seen arranging themselves in rows; their protoplasm and their partition walls become absorbed and disappear, and a *cell-fusion*, or vessel, is the result. The walls of vessels become thickened in various ways, and are then termed dotted, scalariform, spiral, annular, &c. In the other portion of the bundle, the bast, certain cells also unite to form vessels, but their protoplasm persists, and becomes continuous from vessel to vessel, through a multitude of minute perforations in their oblique partitions, whence their common name of sieve-tubes.

Tissues.—De Bary considers the permanent tissues of plants under seven heads: (1) *Cell-tissue*, epidermis, cork, parenchyma, &c.; (2) *Sclerenchyma*, hard, thickened cells and fibres; (3) *Gland-cells;* (4) *Tracheal-tissue*, wood-vessels and similarly marked modified cells; (5) *Sieve-tubes;* (6) *Laticiferous tubes;* (7) *Intercellular spaces.*

The enormous variety of cellular and vascular structures to be observed in plants is yet susceptible of another simple classification, according to their position and development. Just as the whole plant is reducible to an axis bearing lateral appendages, so its constituent cell-structures are to be considered as modifications of one or other of three tissues—the epidermic, the fundamental, and the fibro-vascular. The epidermis, besides forming a continuous external layer, may give rise to hairs, stomata, spore-cases, &c.; the fundamental, besides forming ordinary parenchyma, may be hardened into sclerenchyma, softened into collenchyma, or the like; while the fibro-vascular bundles, when present, are of considerable complexity.

They consist of bast and wood (phloem and xylem), which may be variously arranged, but each usually contains cells, fibres (prosenchyma), and vessels. Thus in tabular form, the tissues are:

I. Epidermic (hairs, spore-cases, &c.).
II. Fundamental (parenchyma, sclerenchyma).
III. Fibro-vascular
- 1. Bast
  - 1. Cells.
  - 2. Cells elongated (fibres).
  - 3. Cells united in rows (vessels), sieve-tubes.
- 2. Wood
  - 1. Cells.
  - 2. Cells elongated (fibres).
  - 3. Cells united in rows (vessels), dotted, spiral, annular, scalariform, &c.

It is also necessary to recognize the distinction between the formed or permanent tissues and the formative, undifferentiated *meristem* tissues, to which the former owe their origin. Primary meristem can be observed by cutting sections of the growing point of the stems and roots; its cells are rich in protoplasm, contain few vacuoles, are thin-walled, without intercellular spaces, and are all capable of division. In most algæ, in mosses, ferns, and horse-tails, a fortunate longitudinal section will reveal the apical cell by the division of which in certain regular planes the whole meristem has arisen; and such a section of the apex of a vascular cryptogram also shows the meristem in process of differentiation into the adult tissue. Three layers are formed: the *dermatogen*, or primitive epidermis; the *periblem*, from which the cortical tissues arise; and the *plerome*, which develops into the axial tissues and fibro-vascular bundles. In the higher plants, too, the embryo is at first composed wholly of primary meristem, and this usually separates into the same three zones. In gymnosperms and dicotyledons, the 'cambium layer' of dividing cells which lies between the wood and bast portion of the fibro-vascular bundle, and to which their circumferential growth is due, as well as the more external similar layer of 'cork cambium,' are termed secondary meristem. (See WOOD, LEAF, &c.; also Carpenter, *On the Microscope;* Sachs' *Text-book of Botany*, &c.)

ANIMAL HISTOLOGY.—Just as the resting *Protococcus* (fig. 2), the encysted *Amœba* (fig. 3), may be taken as the type of the vegetable cell, so the free and naked *Amœba* (which is closely similar to the white corpuscles of the blood) or *Protococcus* (fig. 2, Nos. 3' and 4') may be regarded as a typical animal cell, both in its structure and functions.

Fig. 3.—Life-history of Amœba:
1, encysted; 2, escaping; 3, free; 4, dividing; 5, free half, with vacuole *v*, nucleus *n*, and food particles *f*; 6, encysting anew.

Structurallly, it is of extreme simplicity (fig. 4); it is Schultz's nucleated mass of protoplasm, with at most a slight differentiation into an outer clear layer, and an inner more granular and fluid substance, containing food particles and sap-vacuoles, one of which may become enlarged and rythmically contractile, for the expulsion of surplus fluid and waste products. Physiologically, however, it is superlatively complex, since its morphologically simple protoplasm exhibits all those vital properties which, in the higher animals, we find almost completely differentiated off to separate tissues. Thus it is contractile, like muscle; it exhibits the irritability and automatism which characterize the nervous tissue; it is receptive and assimilative, like the digestive system; its protoplasm undergoes incessant destructive change, respiratory and other, and the waste products have to be utilized when possible, but in any case got rid of; and thus we have the principle of all respiratory, secretory, and excretory apparatuses. Finally, it is reproductive. In the higher animals (vast colonies of amœbæ which have arisen by repeated transverse division, the ordinary mode of amœboid multiplication, from a parent amœba—the ovum), we find that 'certain groups of the constituent amœbiform units or cells have, in company with a change in structure, been set apart for the manifestation of certain only of the fundamental properties of protoplasm, to the exclusion, or at least to the complete subordination, of the other properties.' These groups are the tissues. One set is specialized for contractile purposes, its 'automatism, metabolism, and reproduction being kept in marked abeyance. Of another tissue, the nervous, the marked features are irritability and automatism, with an almost complete absence of contractility and a great restriction of the other qualities. In a third group, the activity of the protoplasm is largely confined to the chemical changes of secretion,' and we have the glandular epithelium of the alimentary system. Similarly, the pulmonary and the renal epithelium are specialized for respiration and excretion, and so on. A physiological analysis of the body into its fundamental tissues (Bichât's theorem) is stated by Foster as follows:

Fig. 4.

1. The eminently contractile; the muscles.
2. The eminently irritable and automatic; the nervous system.
3. The eminently secretory or excretory; digestive, urinary, and pulmonary, &c., epithelium.
4. The eminently metabolic; fat cells, hepatic cells, lymphatic and ductless glands.
5. The eminently reproductive; ovary, testis.
6. The eminently indifferent or mechanical; cartilage, bone, &c.

These tissues being aggregated and compounded into organs, which have to be nourished and purified by the aid of a circulatory system, and co-ordinated and brought into relation with the outer world by means of a nervous system, the path will be sufficiently evident by which one passes from the study of the amœba to the most recondite problems of physiology. (See Foster's *Physiology*, introduction; and separate articles, DIGESTION, RESPIRATION, &c.)

A more strictly histological classification places the animal tissues under four heads: (1) Epithelium, the least modified from the embryonic state, including the ordinary epidermis, and its modifications in the organs of special sense, the epithelium of the

glandular, secretory, respiratory, and reproductive systems, &c.; (2) Connective tissue, characterized by a great development of intercellular substance, and consequent diminished physiological activity of the cells, and including ordinary connective tissue, bone, cartilage, many pathological products, &c.; (3) Muscular tissue; and (4) Nervous: these two last being the most highly specialized and differentiated, both in structure and function. (See Klein's *Atlas of Histology*, and any manual; also articles MUSCLE, NERVE, BONE, &c.)

Tissues may also be classified according to the primitive layers of undifferentiated cells from which they arise in the embryo, as ectodermic, mesodermic, or endodermic. (See DEVELOPMENT; and Balfour's *Embryology*.)

GENERAL HISTOLOGY.—The general conception of the cell-theory having been clearly formed, and a scrutiny, aiming at exhaustiveness, of the structure of plants and animals having since been in fruitful progress, we are in a position to inquire whether —and if so, what—unity of result has been obtained, over and above the generalizations just outlined of vegetable and animal histology respectively. Such results are numerous and important, and require brief notice in order.

Cell-multiplication.—The fact of the normal origin of the vast majority of animal and plant tissues, by the transverse division of pre-existing cells (themselves arising ultimately by the division of a parent cell—the ovum), must, after the conception of the cell itself as a unit-mass of protoplasm, always remain the fundamental proof of the unity which underlies the variety of organic structure. Yet, important results have accrued from the recent study of the details of the process of division (rendered possible by those improvements of the technical method of fixing and coloring the finest details of structure, upon which advance now so largely depends, the power and definition of the microscope having long been sufficient for ordinary purposes).

The division of the nucleus is seen to be a gradual process of great complexity (see fig. 5). Its details cannot here be entered

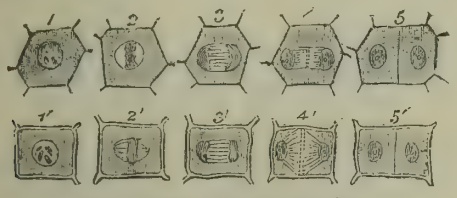


Fig. 5.—Stages of transverse division:
1, 2, 3, 4, 5, in epidermis of a tadpole; 1′, 2′, 3′, 4′, 5′, in epidermis of lily (after Macfarlane).

upon; but the fact of a close correspondence—stage for stage—in the mode of division of plant and animal cells, which will be sufficiently evident on inspection of the figure, is what here concerns us.

The process may be readily observed with ordinary microscopic power in developing pollen taken from a bud—say of *Tradescantia*—in the epidermis of a growing lily leaf, or in the outer skin of the tadpole.

The minor modes of cell-multiplication also demand a share of attention. The process of *free-cell formation*, in which, within a given cell, a number of nuclei appear, around which the protoplasm groups itself into new unit masses (a process which, curiously enough, includes the main points of both Schleiden's and Schwann's hypotheses of cell-formation, outlined above), may be observed alike in the embryo-sac of a panerogam, the spore-cases of many fungi, or occasionally in animal tissues. Since the nuclei have frequently been seen to arise by a segmentation of the original nucleus of the parent cell, this process may be regarded as really only a modification of that of transverse division.

Gemmation, the formation of a new cell by the enlargement of an at first minute vesicle or bud, which is protruded at some portion of the periphery of the parent cell, is most conveniently observable in yeast, but is known to occur in others of lower organisms, both plant and animal. It is not improbable that this, too, is preceded by division of the nucleus.

Rejuvenescence.—In many of the lower algæ, fungi, and even protozoa, the protoplasm of a cell may be seen to contract and round itself, with expulsion of water and apparently complete internal re-arrangement. It then commonly escapes from its wall, and after a period of activity of variable length, encysts itself and settles down anew. (See figs. 2, 3, and 6.)

Conjugation.—In adjacent parallel filaments of the common fresh-water alga *Spirogyra*, the constituent cells may frequently be observed to throw out processes, which unite and bridge the intervening space. Through the tubular connecting bridge, the protoplasm of one cell flows into the cavity of the other, and completely unites with it. The united mass becomes rounded off, forms a new cell-wall, and after a period of quiescence, undergoes repeated transverse division, so forming a new filament. The like process of conjugation can be observed not only among many algæ and fungi, but among the protozoa—most easily among the infusorian inhabitants of a drop of stagnant water. The fertilization of the higher animals and plants, in which ovum is fertilized by spermatozoon, or egg-cell by antherozoid, is simply a differentiation of the process of conjugation, the two apparently similar masses of protoplasm having become externally distinguishable by constancy of form and origin. (See DEVELOPMENT.)

Besides the change from the encysted to the naked and motile state, which is the main feature of rejuvenescence, other analogous cell-transformations commonly occur. A monad before encystment loses its long vibratile cilium and its definite form, to melt down into a creeping amœboid mass; and this change from the ciliated to the amœboid state is of great importance among the protozoa (fig. 6). The ciliated Zoospore (q. v.) of seed-weed settles down in the same way; and in such highly organized animals as worms and echinoderms, we find the ciliated cells lining the body cavity falling off, to melt into amœboid corpuscles.

The converse change from the amœboid to the ciliated state is also observable, and it would seem not improbable that the three phases which the lower cellular organisms exhibit more or less

Fig. 6.—Protomyxa:
1, encysted; 2, dividing; 3, spores escaping—as ciliated bodies, passing into 4, amœboid state; 5, plasmodiam.

completely—the encysted, the amœboid, and the motile—were the fundamental forms of the cells; those cell-aggregates which we term the higher plants and animals being made up of more or less differentiated encysted, amœboid, and ciliated cells, variously arranged.

A process which is sometimes regarded as of multiple conjugation, is the formation of a *plasmodium*; an indefinite number of amœboid cells flowing together into a single mass. At first described in Myxomycete fungi, it was next found to occur in Protomyxa, one of the lowest rhizopods (fig. 6) (in both cases preceding encystments and free-cell formation), and it has recently been shown that the amœboid cells of the corpusculate fluids of all invertebrate animals similarly unite when drawn (fig. 7); thus, this also is seen to be a fundamental property of the amœboid cell.

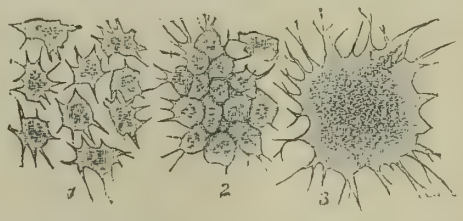


Fig. 7.—Amœboid Corpuscles of Invertebrate, uniting when drawn.

Numerous other observations in cell physiology are accumulating. The phenomenon of circulation above mentioned as visible in the protoplasm of many vegetable cells, has been also observed in at least one case in the animal kingdom, where also movements of the nuclei have sometimes been observed. So, too, though the various forms of contractile tissue presented by the animal world do not, of course, find parallels in the plant, the fluid of the contractile vacuole of the rhizopod is as much cell sap as that of the vegetable cell.

Returning to questions of cell structure, some recent students of the process of cell division have also concluded that the so-called granules of the protoplasm of animal cells are really the optical expressions of the thickened intersections of a delicate network of denser filaments—the *stroma*—between the meshes of which lies the more fluid protoplasm; and there is little doubt that a similar structure exists in the vegetable cell, although there the frequently enormous development of sap-vacuoles presses the protoplasm into threads, as in *Spirogyra*, which cannot then be fairly compared to the stroma. There is considerable reason to believe that the fibrils of at anyrate a plain muscular fibre represent the stroma, in which contractility would thus be mainly localized. But the granules and stroma of vegetable and animal cells alike are possibly mere temporary differentiations, like the 'aggregation of the protoplasm' discovered in plant-cells by Darwin.

An intra-nuclear network of fibrils is frequently described, though whether this be or be not continuous with the stroma through the nuclear membrane is disputed. Within the nucleus, a smaller central body, the nucleolus, can be discerned, and within

this very frequently yet another, the endo-nucleolus; and the process of division has been described as originating in the innermost of these, and passing successively outwards to the protoplasm.

A large number of the lower plants and animals, were supposed to be non-nucleated, but more careful study has led to the discovery of nuclei in all, save only a few of the lowest rhizopods and the bacteria. Multinucleate cells are of very frequent occurrence, especially among plants. Although the appearance of nuclei, *de novo*, in new cells formed by gemmation has been described, the balance of evidence is vastly in favor of the invariable origin of nuclei from pre-existing nuclei. We have seen, too, that the wall of the plant-cell corresponds structurally and chemically with the cyst of the protozoon, and thus, though new evidence is incessantly forthcoming, hardly any further evidence can be desired to justify the fundamental idea of the cell-theory and of Schwann's immortal work, *The Accordance in the Structure and Growth of Plants and Animals*.

See Strassburger's *Zellbildung u. Zelltheilung;* also articles on Anatomy, Histology, and Morphology of *Encyclopædia Britannica*, 9th ed.

CE'LLÉ, or ZELL, a town of Prussia, on the Aller, 23 miles N.E. of Hanover, in the midst of a sandy plain. Pop. (1880) 18,800. The chief manufactures are linen, hosiery, tobacco, wafers, soap, &c.

CELLI'NI, BENVENU'TO, a celebrated Italian gold-worker, sculptor, founder, and medailleur, remarkable not only for his skill as an artist, but also for his checkered life, was born at Florence in the year 1500, and first displayed skill as a chaser and gold-worker. His autobiography is a remarkably curious and interesting work, presenting us with a complete picture of the author's life and character; his activity, his extraordinary weaknesses, the impetuosity of his passions, the perilous circumstances in which his quarrelsome disposition placed him (for C. thought nothing of committing manslaughter in a moment of rage), and the ludicrous vanity and credulity which are never absent from him. The book is also of great value in a historico-social point of view, but does not impress us favorably in regard either to the personal or social morals of the time.

At an early period, having been banished from Florence in consequence of an 'affray,' C. went to Rome, where he was employed by many distinguished patrons of art, but afterwards was allowed to return to Florence. Another 'affray' compelled him to flee to Rome a second time, where he secured the favor of Clement VII. C., by his own account, was as great in arms as in art; he declares that it was himself who killed the Constable Bourbon and the Prince of Orange at the siege of Rome. His reckless conduct for some years compelled his constant shifting between Rome and Florence, Mantua, and Naples. In 1537 he went to the court of France, where he was very honorably received. Illness, however, induced him to return yet once more to Rome, where he had the misfortune to be imprisoned on a charge of plundering the treasures in the castle of St. Angelo during the siege of Rome. At length he was liberated, through the intercession of the Cardinal of Ferrara, for whom he executed, out of gratitude, a fine cup, and various other works. He now accompanied his deliverer to France, and entered the service of Francis I.; but having incurred the displeasure of the ruling favorite, Madame d'Estampes, he returned to Florence—not, however, until, as usual, he had settled some matters with his 'sword'—where, under the patronage of Cosmo d'Medici, he executed several fine works in metal and marble—among them, the celebrated bronze group of 'Perseus with the Head of Medusa.' In his 58th year, he began to write his autobiography, and died in 1570 or 1572. In 1876, a number of C.'s original papers were found. See the magnificent monograph on C. by Eugene Plon (1882).

CELLULAR PLANTS. It was formerly attempted by De Candolle and others, to unite all the lowest plants destitute of vascular tissue (see *Vegetable Histology* in CELL above), under the general title of *Cellulares*, as opposed to the *Vasculares*, including all the higher plants. Although this classification is long disused, the term 'cellular plants' is often employed to distinguish the Fungi, Algæ, Lichens, Characeæ, Liverworts, and Mosses (q. v.), from the higher or vascular cryptogams—ferns, horsetails, lycopodiaceæ, and selaginellæ, and isoetæ. (See Sachs', Prantl's, or other recent *Manual of Botany*.)

CELLULAR TISSUE. See *Vegetable Histology* in CELL above.

CELLULOID, a hard, perfectly homogeneous, compact substance, closely resembling ivory, is produced by the action of strong nitric acid upon cellulose. Cotton, wool, linen, paper, or other substance largely consisting of cellulose, is immersed in nitric acid; and the result is a mixture of two nitro celluloses. This product, of which collodion is a solution in alcohol, may be dissolved under pressure at moderately high temperatures in camphor, when C. is obtained. C. becomes plastic at 125°. If coloring matter be mixed with the C. during manufacture, artificial coral, amber, malachite, &c., result. C. is an excellent material for making backs of brushes, handles of knives or umbrellas, combs, and the like.

CELLULO'SE is the substance secreted by the living protoplasm of a vegetable cell to form its investing membrane or cell-wall. See *Vegetable Histology* in article CELL above, for account of mode of formation of ligneous, corky and colloid change, mode of arrangement and union in cell-walls, &c. Pure C. consists of carbon, hydrogen, and oxygen, in the proportion $C_6H_{10}O_5$. Though it is not yet exactly known how it is formed by the living cells, there is no doubt that grape-sugar, starch, and inulin (which are all of similar chemical constitution), as well as fats, may all serve as the raw material, and like them, it is frequently stored in seeds, tubers, &c., as reserve materials, to be afterwards digested by an appropriate ferment, and applied to the nutrition of the plant-cells when these commence active growth. It is easily recognized by the blue color it assumes when treated successively with dilute iodine solution, and strong sulphuric acid. The cysts of amœbæ and other protozoa appear to be composed of cellulose, and the external tunic of Ascidians is of identical, or at least isomeric composition. (See Sachs' or Prantl's *Botany*.)

CELSUS, an Epicurean philosopher, but tinged with Platonism, lived in the 2d c. after Christ, and wrote, after 150 A.D., under the title *Logos Alethes* (the True Word), the first considerable polemic against Christianity. The book itself has perished; but considerable fragments have been preserved as quotations given by Origen in his answer, *Contra Celsum*, in eight books. In the fragments—which are very interesting, as showing the views of a heathen philosopher in regard to Christianity—C., with wit and acuteness, but without depth or earnestness of thought, prefers against the new religion charges of unphilosophicalness and blind credulity; and especially endeavors to convict Christians of self-contradiction in their spiritual doctrine contrasted with their anthropomorphic representations of Deity; in their religious arrogance contrasted with their confession of sinfulness; and in their views of the necessity of redemption.

He also reproaches Christians with their party divisions and ever-varying opinion. With regard to his own positive doctrines, he speaks of evil as necessary and eternal, as an essential property of the material world (*hyle*); sin as something that can never be entirely removed, and least of all, through a vicarious sacrifice. He charges Christians with having wilfully altered their sacred writings.

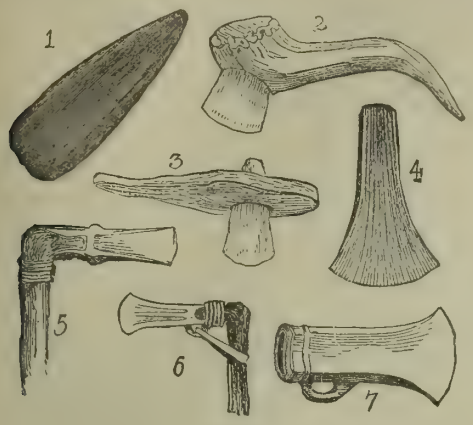
CELSUS, AULUS CORNELIUS, a Latin physician and writer, who flourished probably in the reign of Augustus. He was called the Roman Hippocrates, because he generally followed the great 'Father of Medicine,' and introduced the Hippocratic system among the Romans. C. wrote not only on medicine, but also on rhetoric, history, philosophy, the art of war, and agriculture. His style is succinct and clear, but full of Græcisms. The only great work of his which survives, is the *De Medicinâ*, which is divided into eight books. The portions relating to surgery are exceedingly interesting and valuable, because C. has there given an account of the opinions and observations of the Alexandrian school of medicine. The first edition of the *De Medicinâ* appeared at Florence in 1478. C.'s works have been translated into several modern languages. A translation into English was made by Dr. Grieve, London, 1756. Among the best editions are those of Krause (Leip. 1766), Dr. Milligan's 2d edition (Edin. 1831), and one at Cologne, 1835.

CELT (Lat. *celtis* (?), a chisel), the name by which certain weapons or implements of the early inhabitants of Western Europe are known among archæologists. Celts are either of *stone* or of *bronze*.

Stone celts vary in length from about 1 inch to 22 inches; but the most common size is from 6 to 8 inches in length, and from 2 to 3½ inches in breadth. They are made of almost every kind of stone, and show considerable diversity of shape, almost all, however, having more or less resemblance to the muscle-shell. Fig. 1 in the accompanying wood-cut shows a stone C. of the better kind. The ruder celts are generally of slate, shale, schist, or grit; the finer, of flint, porphyry, greenstone, syenite, or agate. Many of the finer celts are beautifully shaped and highly polished. A remarkable example of this class, the property of Sir Coutts Lindsay, found near St. Andrews, in Scotland, is described by Sir David Brewster in the *Philosophical Journal* for 1823. Recently, a class of celts found in the later geological strata have excited much interest as well among archæologists as among geologists. They are obviously of the same type with the more common celts, but of ruder construction, as if fashioned by a more barbarous people.

The stone C. was fastened into a handle of horn, bone, or wood, as shown in the accompanying wood-cut. Fig. 2 represents a C. of serpentine, with a handle of deer-horn, found in one of the Swiss lakes in July 1859. Fig. 3 represents a stone C. with a wooden handle, found in the county of Tyrone, in Ireland.

Bronze celts vary in length from about 1 inch to 8 or 10 inches, the most common length being about 6 inches. They are sometimes ornamented with rudely incised lines or circles, and have occasionally been found wrapped up in linen, or enclosed in bronze cases or sheaths. They show much greater diversity of shape than the stone celt. As many as four classes have been distinguished by archæologists—1*st*, The simple wedge-shaped C., most nearly resembling the common form of the stone C., as in the accompany-



Celts.

ing wood-cut fig. 4. 2*d*, The wedge-shaped C., with sides more or less overlapping, and a stop ridge or elevation between the blade and the part which received the handle, as in fig. 5. 3*d*, The wedge-shaped C., with sides greatly overlapping, with or without the stop-ridge, but with a loop or ear upon, and parallel to, its lower surface, as in fig. 6. 4*th*, the socketed C., or the C. with a hollow to receive the handle, and generally with a loop or ear upon its lower surface, as in fig. 7.

Both stone and bronze celts were probably used for several purposes, serving for chisels, adzes, and axes, as well as for weapons of war, like the stone hatchets of the South Sea Islanders. A bushel of bronze celts has more than once been discovered at one spot.

CELTIBE'RI, a powerful people of ancient Spain, supposed to have sprung from a blending of the Iberians or Spanish aborigines with Celtic invaders from Gaul. The C. inhabited a large inland district of the Peninsula, corresponding to the south-west half of Aragon, nearly the whole of Cuença and Soria, and a great part of Burgos, but the name Celtiberia had often a wider signification, including the country as far south as the sources of the Guadalquivir. The C. were divided into four tribes, and were unquestionably one of the bravest and noblest peoples in the Peninsula. Their cavalry and infantry were equally excellent. For many years, they withstood the efforts of the Romans to subdue them, and it was not till after the campaigns of Sertorius that they began to adopt the Roman language, dress, and manners.

CELTIC NATIONS, one of the groups of the great Aryan (q. v.) family. It used to be held that the Celts were the first inhabitants of Britain. Now it is held by many that there always was, and still is, in Britain a large element of pre-Celtic and non-Aryan blood, variously called Ivernian, Silurian, or Euskarian. Rhys (in *Celtic Britain*, 1882) holds that the Northern Picts were wholly Ivernian; and he departs also from current views by holding that Wales and Cornwall was originally occupied by Goidelic Celts, but were subsequently overrun by Cymri, whose tongue Welsh and Cornish adopted.

Languages.—In addition to the English, and retreating before it, there are at present four languages spoken in the British Isles—the Irish, the Highland Scotch (or Gaelic), the Manx, in the Isle of Man—all three nearly related to one another, and constituting the northern (Erse, Gadhelic) branch of the Celtic languages; whilst the fourth language, the Welsh, constitutes, together with the Cornish of Cornwall (extinct since 1778) and the Bas Breton of Brittany, the southern (Briton, Cymric, Cambric) branch. The remains of the language of the Gauls or Celts, the ancient inhabitants of France, closely resemble the British and Gadhelic idioms; hence the name Celtic languages has been applied to the whole of them. The Celtic idioms belong to the Indo-German (Aryan) family, as their numerals show. Compare

	Old Irish.	Old Welsh.	Sanscrit.
1.	óin	un	êka
2.	dá	dou	dvâu
3.	trí	tri	trayas
4.	cethir (c = k)	pedwar	chatvâras
5.	cóic	pimp	panchan
6.	se	chwech	shash
7.	secht(n)	seith	saptan
8.	oct(n)	wyth	ashtan
9.	noi(n)	nau	navan
10.	deich	dec	daçan
20.	fichet	ugeint	vinçati
100.	cét	cant	çata

The Gaulish was nearer to the Cymric branch, its numerals 4 and 5 having been *petor*, *pempe*. There are a few Gaulish inscriptions which show a declension with full inflections; in old Irish, five cases still exist, but the terminations are very much mutilated; in Welsh, they have disappeared. Thus, the Gaulish name *Segomaros* is declined: gen. *-ri*, dat. *-ru*, acc. *-ron:* the old Irish, *fer*, a man, has the gen. *fir*, dat. *fiur*, acc. *fer*, voc. *fir;* whilst the corresponding Welsh *gwr* is inflexible. Hence it follows that the pseudo-simplicity of the Welsh is the result of grammatical decay, common in all Aryan languages, and does not at all warrant Latham's theory, that the Celts branched off from the primitive Indo-German nation before the development of case inflections.

History.—Of the separation of the Celts from the other Aryans or Indo-Germans, and their early migrations to Western Europe, no record has come down, the stories about Milesian colonies in Ireland, and migrations from Troy into Wales, being simply monkish fictions. At the dawn of history, we find the *Gauls* (Galli, Celtæ, *Galatai*) occupying France (Gallia), which was divided into *Aquitania*, between the Pyrenees and Garonne; *Gallia Celtica* Proper, between Garonne and Seine; and *Belgica*, from the Seine to the Rhine. The land about the *Rhone* being more early conquered by the Romans than the rest, was set apart by them under the name of *Gallia Narbonensis*, or *Gallia Lugduaensis* (from the towns Nabro and Lugdunum, Narbonne and Lyon). The whole of the four was called *Gaul beyond the Alps* (Gallia Transalpina). A great many tribes of Gauls had settled in Lombardy, where they founded *Mediolanum* (Milan), and which therefore took the name *Gallia Cisalpina* (Gaul this side the Alps). Other Gauls had penetrated into Spain, where they became mixed with the native Iberians, and thus gave rise to the *Celtiberians* about the river Iberus (Ebro). Numerous hosts migrated across the Rhine, occupied Southern Germany and Bohemia, and, following the course of the Danube, some invaded Thrace and Greece (278 B.C.); but being repelled, the main body of them settled in Asia Minor, in the province called after them *Galatia*. The Romans found the Gauls at first very formidable enemies; Rome itself was burned by them (389 B.C.), but gradually the Romans conquered first Gallia Cisalpina (222), then Gallia Narbonensis (112), and lastly, Cæsar subjected all France (52 B.C.), after which the Gauls soon became Romanized.

The Gauls of Asia Minor, for a long time the terror of all the neighborhood, were defeated by the Romans (187), and their land finally made a province of the empire (25 B.C.).—The *Britons* (*Britanni;* Welsh, *Brython*) were little known before Cæsar's two unsuccessful expeditions into Britannia; the country was conquered by the Roman general Agricola (78—84 A.D.), who secured the new province against the inroads of the Caledonians of Scotland by a fortification across the Scotch Lowlands, between the Forth and the Clyde, afterwards removed by the Emperor Hadrian further southward, to between Solway Firth and the mouth of the Tyne. The Britons were so much influenced by Roman civilization—they were also early converted to Christianity—that the heathen Angles and Saxons, who conquered them in the 5th and 6th centuries, called them *Welsh;* a name which, with the other Teutons, applies to all nations speaking languages of Latin descent. A few of the Britons maintained their independence in Cornwall, Cumberland, and in the mountains of *Wales*. On the last, the name Welsh was ultimately fixed by the English; they themselves, however, called their nation *Cymro*, pl. *Cymry* (a compound of *cyn*, with, in common, and *bro*, land = having a common country, countrymen, in contradistinction to the foreign invader), a name which has nothing to do with Cimbri and Cimmerii. The Welsh remained independent under different petty princes till 1282, when Edward I. conquered them. A part of the Britons went over in the 4th c. to France, where they took possession of *Brittany*, which maintained a doubtful independence under dukes of its own till about 1500.—Whether the *Caledonians*, the oldest inhabitants of Scotland, were Celts of the Cymric or Erse branch, is unknown. After the 3d c., their name disappears, and we hear, instead, of the Scoti and Picti. As to the latter, the same doubt prevails; but the *Scoti* were emigrants from Ireland, both *Scotus* and *Gadhelus* being common national names of the old Irish. From *Gadhel*, the modern *Gael*, *Gaelic* is derived, which has nothing to do with the name of the Galli.—*Ireland* (*Hibernia*, whence the modern *Eirinn* is derived) enters into the light of history with its conversion to Christianity by St. Patrick (460). The four centuries following on this event are the brightest period in its history. Ireland was then the seat of piety and learning, and sent forth numerous missionaries, by whom many monasteries,

centers of civilization, were founded—as *Iona*, in Scotland, by Columba (563); *St. Gall*, by Gallus (615); *Würzburg*, by Kilian (687). In the 7th c., we find Irish bishops at Ratisbon; and *Virgilius* (Feargal), (died 784), Bishop of Salzburg, played no small part in the ecclesiastical history of Germany. But Ireland remained politically divided among many princes, and so became an easy prey of those 'black heathens' the Scandinavians, whose invasions began 795, and who founded Norse kingdoms at Dublin, Waterford, Limerick, &c.

In the fierce battles between the two nations, the prosperity of Ireland rapidly declined, and the English conquest (1171) only completed the ruin.—The Isle of *Man*, inhabited by a branch of the Irish, after having been subject to Welsh, Scotch, Norse princes in turn, acknowledged England's sovereignty in 1344.

Religion and Mythology.—A few notices in the classics and the Latin inscriptions of Gaul are our rather meagre sources of information on the Celtic paganism. As the three chief gods, or three of the chief gods, Lucan mentions *Teutates*, *Hesus*, and *Taranis*, all of them worshiped with human sacrifices. *Taranis* reappears as *Jupiter Taranucnus* on an inscription; and from this identification with Jupiter, as well as from the fact that in Welsh *taran* means thunder, we may infer that he was the god of the thunderstorm. Other gods frequently occurring on inscriptions are *Apollo*, *Grannus*, *Apollo Belenus*, *Mars Camulus*, *Minerva Belisama*, &c., all of them, however, empty names to us. A remarkable feature in Gaulish religion was the worship of certain *Mother Goddesses* (called on the inscriptions Junones, Matronæ, Deæ Matres, Campestres, Nymphæ). They are frequently connected with special localities, as in the inscriptions dedicated to Matronis Lanehiabus, M. Hamavehis, M. Rumanehabus, and on the one in Gaulish: *Matrebo Namaucicabo*, 'to the Mothers of Nimes.' To this class apparently belongs the *Dea Nehalennia*, once represented on a relief with a basket of fruit, and a dog for companion. Mela, the geographer, speaks of an island in the Atlantic, near Gaul, where there was an oracle superintended by nine maidens, who could cause storms, take the form of any animal, could cure what otherwise was incurable, and predicted the future. These goddesses, at once motherly and maidenly, residing in field and wood (campestres, nymphæ), givers of plenty and prophets of the future, are the heathen prototypes of the *fées* (fairies, as distinguished from 'elfs') of the middle ages. The 'little folk' were known to the Gauls under the name of *Dusii*. They believed in the existence of individual tutelary genii, as a stone of Lausanne shows, being erected by three Gauls *Sulfis* SUIS (hence our sylph?). The belief in the transmigration of souls was common amongst the Gauls, or at least their priests the *Druids*, so called from their performing sacred rites in oak-woods (Welsh, *derw*, an oak; *derwydd*, a Druid). These Druids were also the depositaries of knowledge and tradition, and constituted, in Gaul at least, a powerful hierarchy, with a supreme pontiff. Druids are found both in Ireland and in Wales, and the fées abound in Welsh tradition; but it is very doubtful whether the superhuman beings appearing in the Welsh poems of the 12th and 13th centuries—such as *Hu Gadarn*, the reputed founder of Bardic institutions (see beneath)—are genuine relics of the British religion.

The belief in transmigration lasted very long, as the medieval Welsh tale of *Taliesin* speaks distinctly of Taliesin's successive existences. Though not properly mythological, we may mention here the romantic stories of the Britons about King *Arthur* and his knights. He is first mentioned by Nennius in the 9th c.; but his fable was further developed in the next centuries both in Wales and Brittany, then embodied in Geoffrey of Monmouth's *Historia Britonum*, which served as the groundwork of the French *Roman de Brut* of Wace. Through these works, and partly, also, through the direct influence of the oral traditions of Brittany, it passed into French literature, and thence spread over all Europe.

Literature.—The Gauls learned writing from the Greeks; later, they employed the Roman alphabet, as do the Welsh and Irish, the now used Irish character being nothing but the common Anglo-Saxon form of the Latin alphabet. Besides, however, the Irish claim an old character of their own, the Ogham, in which the letters are represented by a number of vertical strokes put in a right angle to a horizontal line, or else by horizontal strokes to a vertical line. Some of the Ogham inscriptions are said to be older than Christianity. Even more doubtful is the antiquity of a Welsh so-called Bardic alphabet, in which there seem to be no inscriptions extant, and which is, at anyrate, an alteration of the Roman character. A feature common to all Celts is the existence of a kind of literary order, the *Bards* (q. v.), poets and guardians of tradition—in Gaul, nearly related to or part of the priesthood; in Wales and Ireland, in immediate connection with the kings.—A *Gaulish* literature there certainly was, as Cæsar informs us that, in the schools of the Druids, the young men used to learn by heart a great number of verses on theological and historical subjects. But these poems were never written down. It is highly probable that rhyme, first used by St. Ambrosius (397) in his hymns, is of Gaulish origin, this being the common form even of the oldest Irish and Welsh poems.—The *Irish* literature began with the conversion, but our existing manuscripts are not older than the 9th or 8th century. Interlinear versions of biblical and other theological, or of grammatical writings are about the oldest manuscripts, many of which, in consequence of the missionary zeal of the nation, are to be found at St. Gall, Milan, and other continental places. Then there are ecclesiastic *hymns*, one of the oldest ascribed to Patrick. A renowned author of poems, in the 10th century, was Eochad O'Flin.

Secular poetry of ancient times there has come down to us none, but we have testimonies as old as the 12th c., of the existence of such, ascribed in a general way to the old pagan hero Oisin, son of MacCumhal. The existing specimens, mostly warlike—except some dialogues between Oisin and St. Patrick—are recent. Those Gaels that went over to Scotland, took, of course, similar traditions with them. With a partial knowledge of these, Macpherson composed (1765) the work which he declared (rather loosely) to be an English translation of the songs of the old Scotch poet Ossian, son of Fingal (the true Oisin was an Irishman). The would-be Gaelic original of Macpherson's work, edited in 1807, is either a compilation or a retranslation. Of Irish prose, the annals are the most important part: first, those of Tighernach (1088), then the *Annales Inisfalienses*, *A. Ultonienses;* lastly, the *Annals of the Four Masters*, being a compilation made (1634) from older sources chiefly by four Franciscans, beginning with 242 after the Deluge, and ending with 1616 A.D.—The oldest remains of *Welsh* literature are the songs, so far as they are genuine, of the bards of the 6th c.—*Llwarch Hen*, *Aneurin*, *Taliesin*—having chiefly the life and deeds of contemporary princes for their subject, but few in number. In the 10th c., we have the collection of laws by Howel Dda. The historians Gildas and Nennius, of the 9th c., wrote in Latin.

The great age of *Welsh* literature is the 12th and succeeding centuries, when the energies of the nation were roused in the struggle with England. In this contest, the bards played a conspicuous part as agitators. After a long interval, we hear again of a great bard, Meylyr (1100); many follow, amongst whom Kynddelw (1200) deserves special mention, both as a poet (we have 49 pieces of his) and a patriot. Welsh poetry consists in—1. Political lyrics, war-songs, songs in praise of chieftains, elegies on the same. 2. Religious hymns. 3. Pseudonymous poems, ascribed to Merddin (Merlin), the mythical enchanter, and Taliesin, the old bard, having generally the form of prophesies on the struggle between the Saxons and Welsh, and the ultimate triumph of the latter. Thus, in the *Avalennau* (or Apple-trees), attributed to Merlin, the Welsh nation is enigmatically represented under the image of 'seven score and seven sweet apple-trees,' whose fruits, princes (viz., the English) wish in vain to despoil. 4. The Triads, short memorial (?) verses in which *three* remarkable events, subjects, or persons are respectively mentioned (hence the name), embracing history, theology, jurisprudence. 5. Dialogues of dramatic character. There were—apparently now lost—also miracle plays actually represented.

The only remarkable remnant of *Cornish literature* comes under this head, being three ecclesiastical plays of the 14th c.—the *Creation*, the *Passion*, and the *Ressurrection*.—In Welsh prose, we have first the chronicles. Geoffrey's chronicle, though Latin, is thoroughly national; then there is that of Caradoc, who begins where Geoffrey leaves off; and the *Liber Landavensis*, a history of the bishops of Llandaff down to 1132. Further, we have the *Mabinogion* (Children's Tales), romantic stories. The most interesting of these refer to Arthur and his champions; the lady of the fountain, Peredur, Geraint (now revived by Tennyson), Arthur's boar-hunt. Amongst the non-Arthurian tales, special mention is deserved by the *Mabinogi of Taliesin*, interspersed with verses, relating the adventures, transformations into animal shape, and transmigrations of that bard. There are besides some scientific writings, a treatise on medicine, another on geometry, and one on Welsh prosody by Edeyrn (1260). This last, a grammatical essay in and on a vernacular tongue, is paralleled in the middle ages only by Icelandic literature, to which, upon the whole, the Welsh, although not quite so high, bears a marked resemblance.

Concluding Remarks.—Altogether the Celts are a very important branch of our Indo-German family. The incessant warfares of the Gauls bespeak at least activity of mind and body; the Irish missions have done a great deal for European civilization; whilst the traditions of the Britons have deeply influenced medieval literature. The one great defect of the Celts is incapacity for political organization. Their very enthusiam, lively feeling, and vivid imagination, have ever prevented them from taking coolly and deliberately those measures which lead to national unity; hence it is that they gave way before the more practical Roman and Teuton. But while they lost their independence, and oftentimes their language in the contest with the foreigner, whose strong hand moulded them into national unity, yet they reacted on him in their turn. They are fast disappearing by merging into the English; but if the quiet resolution, the sturdy common sense, the talent for public life, state organization, and political dominion,

that characterize the modern British nation, are altogether Teutonic—on the other hand, their genuine refinement of manner and feeling, and their high poetical susceptibilities, are to no small extent due to the admixture of Celtic blood.

CELTIS. See NETTLE-TREE.

CE'MBRA NUT AND CEMBRA PINE. See PINE.

CEMENTA'TION OF STEEL is the process followed in the production of *Blistered Steel* (q. v.), or *steel of cementation.*

CEME'NTS. A cement is a substauce used to make the surfaces of solid bodies adhere to one another; it is applied in a liquid or viscous state, and hardens after the surfaces are brought together. When fused metals or alloys are used in this manner, they are called solders. There is a great variety of C. derived from animal, vegetable, and mineral substances. The animal C. are chiefly composed of gelatine and albumen as their bases. Joiners' glue is an example. See GLUE. The binding materials of vegetable C. are gums, resins, and wax. The mineral C. are chiefly of lime and its compounds. In many C., animal, vegetable, and mineral substances are combined. The simplest of the mineral C. is plaster of Paris, which is used for uniting slabs of marble, alabaster, and many similar purposes. It is mixed with water to the consistence of thick cream, and then applied. This hardens rapidly, but is not very strong. Its hardening depends upon the true chemical combination of the water with anhydrous sulphate of lime, of which plaster of Paris is composed, and the formation thereby of a solid hydrate. The plaster of Paris may be mixed with thin glue, with diluted white of egg, or a solution of size or gum, instead of water, and is strengthened thereby.

Keene's marble cement is prepared by steeping plaster of Paris in a concentrated solution of alum, then recalcining and powdering. This powder is mixed with water in the same manner as plaster of Paris. It is used as a stucco for internal decorations, takes a high polish, and when colored, forms beautiful imitations of mosaic, marbles, scagliola, &c.

A mixture of paper-pulp, size, and plaster of Paris in equal proportions, forms a useful cement, and is also used as a sort of papier-mâché for casting into architectural ornaments, &c.

Common mortar is one of the most important of the lime cements. It is composed of slacked lime, or a mixture of this with sand; its hardening depends upon the slow formation of carbonate of lime by the absorption of carbonic acid from the atmosphere, and a partial combination with the silica of the sand. Cow-hair is sometimes mixed with it, to bind it when laid in masses. In order to obtain a fine smooth paste, which is required for good mortar, the lime should be slacked rapidly by adding about three parts of water to one of lime; if the quantity of water is too small, a coarser or semi-crystalline hydrate of lime is produced by the slacking. For the mode of applying mortar, see BRICKWORK.

Ordinary mortar, when exposed to the continuous action of water, softens and disintegrates, and some of the lime dissolves away. Lime which contains 20 or 30 per cent. of clay, or finely divided silica, produces a mortar which is not liable to this softening, but possesses the property of hardening under water; such lime is called *hydraulic*, and the motar made from it, hydraulic cement or mortar.

Puzzolana, a porous lava found at Puzzuoli, near Naples, has long been celebrated for its property of forming a hydraulic cement, when mixed with ordinary lime. It is mainly composed of silicates of alumina, lime, and soda. Portland cement, so named from its resemblance to Portland stone when dry, is made from clay found in the valley of the Medway, which is intimately mixed with the neighboring chalk, and then burned. Roman cement is similar to the Portland, but of a darker color; it contains a larger proportion of clay, and solidifies more rapidly. These C. should be mixed with a sufficient quantity of water, to form a moderately thick paste; the surface to which they are applied should be well wetted, and the cement kept slightly moist until it hardens. The solidification of hydraulic cements depends upon the combination of the lime with the silica and alumina forming, first a dydrated compound, and finally a true silicate. They expand slightly in solidifying.

The following receipts include some of the most useful and reliable C. applicable to the purposes specified: For water-tight joints, such as slate cisterns, aquaria, &c., and for uniting broken pieces of stone, and filling up metallic joints—take equal parts of red and white lead, and work them into a stiff paste with boiled linseed oil. When used for metal joints, it should be made rather thin, and both pieces of metal, as well as the washer, well smeared with it. The cement hardens slowly, but becomes ultimately of almost flinty hardness. We have before us an aquarium, holding fifteen gallons of water, made of plate glass, cemented at the angles to mahogony columns with this composition. It has stood without leaking for above three years, in spite of much rough handling and moving about; and the cement is now so hard, that it is difficult to scratch it with a knife.

Cement composed of ox-blood thickened with finely powdered quicklime, is used by coppersmiths, for securing the edges of rivets of copper boilers, and for steam-joints. Another cement for steam-joints is made with borings or turnings of cast-iron mixed with a little sal ammoniac and flower of sulphur. It should be stirred up with a small quantity of water, just sufficient to moisten it, then rammed into the joint, which should be bolted up as tightly as possible: 5 lbs. of iron borings to 2 oz. of sal ammoniac, and one oz. of sulphur, are the proportions recommended. A cement of this kind may be made of 4 lbs. iron borings, 2 lbs. pipe-clay, and 1 lb. of powdered earthenware fragments made into a paste with salt and water; or two parts litharge in fine powder, 1 part very fine sand, and 1 of quicklime that has slaked spontaneously in a damp place.

These should be mixed, and kept from the air, and made into a paste with boiled linseed oil when about to be used. This is a valuable cement for steam joints, for mending cracks in boilers, ovens, &c. Beale's Patent Fireproof Cement, for similar purposes, is composed of chalk, 12 parts; lime and salt, each 4 parts; Barnsey sand, 2 parts; iron filings or dust, 1 part; and blue or red clay, 1 part. These are ground and calcined together.

Electrical Cement—so called from its use in uniting the cylinders of electrical machines to their axes, and for a variety of similar purposes—is composed of 5 lbs. rosin, 1 lb. each of bees-wax and red ochre, and 4 oz. of plaster of Paris. This is Singer's formula. A cheaper cement of this kind may be made from 14 parts rosin, 2 red ochre, and 1 plaster of Paris. These should be melted together till the frothing ceases, and the composition runs smoothly. This is applicable to a variety of purposes, where a cheap and tolerably adhesive cement is requred. It will serve as bottle-wax for sealing the tops of corks; but this is usually prepared from 4 parts rosin with 1 of tallow or suet, and red ochre or other coloring matter added.

For mending earthenware and china, &c., a variety of C. are recommended. For ornamental glass or china, which is not subjected to heat or rough usage, Canada balsam that has evaporated until rather hard, is a very useful cement; from its transparency, it makes an almost invisible joint. The surfaces should be slightly warmed, and the balsam brushed over them, after which they should be kept pressed together for a short time. Thick copal or mastic varnish may be used in the same manner. Gum shell-lac, dissolved in spirits of wine in sufficient quantity to form a treacly liquid, forms a stronger cement than the above, but its color is objectionable for some purposes. The shell-lac may be dissolved in naphtha, but is not equal to that in spirits of wine. The *liquid glue* sold in the shops is usually prepared in this manner; another kind is made of a mixture of the solutions of shellac and India rubber. The cement sold in sticks at fairs and in the streets of London by loquacious itinerants, is shell-lac or gum mastic fused and moulded into a convenient form, and is one of the most useful C. when properly applied, by heating the surfaces to be joined just sufficiently to fuse the shell-lac, and then smearing them thinly with it, and pressing them together. If shell-lac is heated much above its fusing-point, it becomes carbonized and rotten, and therefore great care must be used in fusing any composition of which it is an ingredient.

The *marine glue*, a mixture of shell-lac and India rubber, is a remarkable cement, and when applied, as the last, with the precautions just alluded to, is so strong, that glass or china cemented with it, and then dashed on the ground, or otherwise broken again, will give way in any part rather than that cemented. This cement may be purchased ready made. For the mode of preparing it, see GLUE.

Universal Cement, used for the above and many other purposes, is prepared as follows: Curdle skim-milk with rennet or vinegar, press out the whey, and dry the curd at a very gentle heat, but as quickly as possible. When it has become quite dry, grind it in a coffee or pepper mill, and next triturate it in a mortar until reduced to a very fine powder. Mix this powder with $\frac{1}{10}$th of its weight of new dry quicklime, also in very fine powder, and to every ounce of the mixture add 5 or 6 grains of powdered camphor; triturate the whole well together, and keep it in small wide-mouthed phials well corked. When required, make it into a paste with a little water, and apply it immediately.

Cheese Cement is similar in composition and uses. Take two parts of grated cheese and one of quick-lime in fine powder; beat these together with white of egg to form a paste, and use immediately.

The following is the reputed formula for preparing the *Armenian or Diamond Cement*, used by the Armenian jewelers for attaching diamonds, &c., without any metallic setting: 'Dissolve 5 or 6 bits of gummastic, each the size of a large pea, in as much rectified spirit of wine as will suffice to render it liquid; and in another vessel dissolve as much isinglass, previously a little softened in water—though none of the water must be used—in French brandy, or good rum, as will make a 2-ounce phial of very strong glue, adding two very small bits of gum galbanum or ammonia-

cum, which must be rubber or ground till they are dissolved. Then mix the whole with a sufficient heat. Keep the glue in a phial closely stopped, and when it is to be used, set the phial in boiling water.' This cement has a great reputation, but our experience does not confirm it. We have tried the above, and several other receipts, with very little success. We doubt whether the true method of preparing it is known in this country, and suspect that it still remains one of the oriental trade-secrets. White of egg, thickened with finely powdered quicklime, forms a useful cement, especially if the cemented article is warmed for a short time in a slow oven.

Cutlers' Cement, used for fixing knives and forks in handles, is made of equal weights of rosin and brick-dust melted together; or, for a superior quality, 4 parts of rosin 1 of bees-wax, and 1 of brick-dust.

Mahogany Cement, used for stopping cracks and holes in mahogany, may be prepared by melting 4 parts of bees-wax with 1 of Indian red, and as much yellow ochre as is found requisite to to give the color. If shell-lac be substituted for the bees-wax, and less red is used much harder cement is made.

For *French Cement*, *Rice Glue*, and other light C. for joining paper articles and artificial flowers, see GLUE and PASTE.

CE'METERY, from the Greek, may mean any grave-yard, or other place of deposit for the dead; but it has lately acquired a special meaning, applicable to those extensive ornamental burial-grounds which have recently come into use in this and other European countries, as the practice of burying within and around churches was gradually abandoned (see BURIAL). The fine burial grounds of the Turks, extending over large tracts adorned by cedars and other trees, may have suggested the plan to Europeans. It was first exemplified on a great scale in Paris, in which, as the largest walled town in Europe, the disposal of the dead was long a matter of extreme anxiety and difficulty. There are few considerable towns in Britain near which there is not at least one C., and the legislation mentioned under the head of BURIAL, has renderered their establishment, to a certain extent, a legal necessity. There was at first a natural feeling of regret at the prospect of deserting places of deposit for the dead so hallowed by ancient use and recent associations as the church and the churchyard. In many instances, however, the places thus professedly hallowed were in reality surrounded by degrading and disgusting circumstances. On the other hand, the new places of interment began to develope humanizing and elevating influences, in beautiful trees and flowers, natural scenery and works of monumental art. The new cemeteries are in many instances cheerful open places of recreaction, and in them the place of rest for the dead has rather tended to improve than to undermine the health of the living. One of the oldest established and most celebrated of the European cemeteries, is that of Père la Chaise (q. v.), near Paris, the arrangements of which have been generally followed in the cemeteries of London and other English cities; with, however, this distinct difference, that the English cemeteries are divided into two portions—one consecrated for the burials of the members of the Established Church, over whose remains the funeral service is read, and one unconsecrated for the burials of dissenters. In the Scottish such distinctions are not required, though the Episcopal Church has some consecrated burying-places. In the United States, as at Philadelphia and New York, there are cemeteries equal in point of arrangement to any in Europe.

CENCI, BEATRICE, called 'the beautiful parricide,' was the daughter of Francesco Cenci, a wealthy Roman nobleman. According to Muratori (*Annales*, lib. x.), Francesco was twice married, Beatrice being his daughter by the first wife. After his second marriage, he treated the children of his first wife in a revolting manner, and was even accused of hiring bandits to murder two of his sons on their return from Spain. The beauty of Beatrice inspired him with the horrible and incestuous desire to possess her person; with mingled lust and hate, he persecuted her from day to day, until circumstances enabled him to consummate his brutality. The unfortunate girl besought the help of her relatives, and of Pope Clement VII. (Aldobrandini), but did not receive it; whereupon, in company with her step-mother, and her brother, Giacomo, she planned and executed the murder of her unnatural parent. The crime was discovered, and both she and Giacomo were put to the torture; Giacomo confessed, but Beatrice persisted in the declaration that she was innocent. All, however, were condemned, and put to death, August 1599, in spite of efforts made in their behalf. Such is Muratori's narrative. Others allege that Beatrice was the innocent victim of an infernal plot. The results of Bertolotti's investigations (*Francesco Cenci e la sua Famiglia*, 1877), based on original documents and contemporary notices, go far to deprive the story of the Cenci tragedy of the romantic elements on which Shelley's powerful tragedy mainly turns. Francesco, it would appear, was profligate, but no monster; Beatrice at the time she murdered her father, was not sixteen but twenty-one years of age, was far from beautiful, and probably had already a tarnished moral reputation. And Bertolotti is further convinced that the sweet and mournful countenance which forms one of the treasures of the Barberini Palace in Rome, is not only not the portrait of Beatrice, but was not even painted by Guido, to whom it has long been unhesitatingly attributed.

CENEDA, now officially called VITTORIO, a city of Northern Italy, province of Treviso, 36 miles north of Venice. Pop. 10,530. It is an episcopal see, has a very handsome modern cathedral and a fine monolithic fountain. Under the republic of Venice, it was rich, and famed for its manufactures of woollen cloth, silk, and paper. C. is very ancient, dating from the time of the Romans, but now it is a decayed city.

CENIS, MONT, or MONTE CENISIO, a mountain-pass of the Alps, between Savoy and Piedmont, forming part of the watershed between the valleys of the Doire and the Arc. The culminating point of the pass reaches an elevation of 6775 feet above the sea. Schist, limestone, and gypsum, in alternate beds, compose the strata of the mountain, the vegetation of which is rich in the rarer kinds of Alpine plants. Over the pass, a road was constructed (1803—1810) by the Chevalier Fabbroni, under Napoleon's orders, at an expense of £300,000. This is the safest and most frequented road across the Alps. Near the pass, a railway tunnel, 7½ miles long, was finished in 1870. For details see TUNNEL.

CE'NOBITES. See MONACHISM.

CENO'MYCE. See REINDEER MOSS.

CE'NOTAPH (Gr. *kenotafion*, from *kenos*, empty, and *tafos*, a tomb), a monument which does not contain the remains of the deceased. They were originally erected for those whose bones could not be found, e. g., for those who had perished at sea. Latterly, the name was applied to tombs built by a man during his lifetime, for himself and the members of his family.

CEN'SER (Fr. *encensoir*, from Lat. *incendo*, to burn), a vase, or other sacred vessel, used for burning perfumes. See INCENSE. Censers were much used in the Hebrew service of the temple, but their form is not accurately ascertained, and it is probable that they varied in this respect, according to the occasions on which they were used. The C., called also a *thurible* (Lat. *thuribulum*, from *thus*, frankincense), is used in the Roman Catholic Church at mass, vespers, and other offices. It is suspended by chains, which are held in the hand, and is tossed in the air, so as to throw the smoke of the incense in all directions. It varies very much in form, from a simple vase, or chafing-dish, covered by a perforated dome, to the ornamented structure represented in the wood-cut.

Thurible.

CE'NSORS, the name of two Roman officers of state. The office was established by Servius Tullius, the fifth king of Rome. After the expulsion of the kings, it was held by the consuls, special magistrates not being appointed till 443 B.C. It continued to be filled by patricians till 351 B.C., when C. Marcius Rutilus, a plebeian, was elected. Twelve years later, it was enacted that one of the C. (there were always two) must be a plebeian. In 131 B.C., both C. for the first time were plebeians. The C. were elected in the *comitia centuriata*, presided over by a consul.

The term of office at first lasted five years, but was shortly afterwards limited to eighteen months. The censorship was regarded as the highest dignity in the state, except the dictatorship. It was a sacred and irresponsible magistracy, whose powers were vast and undefined, and whose decisions were received with solemn reverence. The duties of the C. were threefold. 1. The taking of the census, or register of the citizens and of their property. 2. The *regimen morum* (regulation of morals). 3. The administration of the finances of the state. The taking of the census (Lat. *censeo*, to value, to take an account of) was originally their sole function (hence their name), and was held in the Campus Martius, in a building called *Villa Publica*. The *regimen morum* was the most dreaded and absolute of their powers. It grew naturally out of the exercise of the previous duty, which compelled them to exclude unworthy persons from the lists of citizens. Gradually, the superintendence of the C. extended from the public to the private life of citizens. They could inflict disgrace (*ignominia*) on any one whose conduct did not square with their notions of rectitude or duty. For instance, if a man neglected the cultivation of his fields, or carried on a disreputable trade, or refused to marry, or treated his family either too kindly or too harshly, or was extravagant, or guilty of bribery, cowardice, &c., he might be degraded, according to his rank, or otherwise punished. *The administration of the finances of the state* included the regulation of the *tributum*, or property-tax; of the *rectigalia*, such as the tithes paid for the public lands, salt-works, mines, customs, &c., which were usually

leased out to speculators for five years; the preparation of the state budget, &c.—See Rovers, *De Censorum apud Romanus Auctoritate et Existimatione* (Utrecht, 1825).

CE'NSORSHIP OF THE PRESS, the term generally applied to the arrangements for regulating what may be printed, in countries where the press is not free. The simplest form of C. is when a public officer—the censor, or licenser, as he is sometimes called—reads over the MS. to be printed, and after striking out any objectionable passages, certifies that the work may be printed. Thence it is common in old books to see the word *imprimatur*—let it be printed, followed by one or more signatures.

Though it has its name from an analogy with the functions of the Roman censor, the C. did not come into operation until the invention of printing. It was common to all European countries, Great Britain included. The C. was established by act of parliament in 1662, 13 Char. II., c. 33: 'An act for preventing the frequent abuses in printing seditious, treasonable and unlicensed books and pamphlets, and for regulating of printing and printing-presses.' This was a temporary act, renewed from time to time; and its renewal was refused in 1693, owing to a quarrel between the House of Commons and the licenser. Since that time there has been, generally speaking, no restriction in this country on what any man may publish; and he is merely responsible to the law, if in his publication he should commit any public or private wrong. See LIBEL, LAW OF; see also PRESS FREEDOM OF THE; BOOK-TRADE; and COPYRIGHT.

CE'NSUS, means, in this country, the periodical counting of the people. It is a Latin word applied by the Romans to one of the functions of their censors (q. v.). They had to enumerate the people, but only for immediate purposes of taxation, so that no accounts of the results of such enumerations has been preserved. The idea of ascertaining the numbers of the people, and the proportions in which they are divided according to sex, age, profession, rank, and the like, as statistical information, is of late origin. The first C. of Britain was taken in the first year of the present century—1801. From that time it has been taken at each period of ten years. An attempt, but a rather unsuccessful one, was made to take the statistics of Ireland in 1811. Ten years after, the attempt was repeated, but the accuracy of the bare enumeration it furnished was doubtful. That of 1831, which was an improvement, was corrected three years after, in order that it might form the basis of a new system of education. The four subsequent enumerations have been very trustworthy, and have furnished besides valuable statistics regarding the agricultural condition of the country. The system of registration under a registrar-general, established in England in 1836, has given considerable assistance by supplying a staff for carrying out the enumeration, and also by affording the means of checking the C. A similar registration system was extended to Scotland in 1854, of which the C. of 1861, 1871, and 1881 have had the advantage. A C. must be taken for the whole empire simultaneously, otherwise it cannot be accurate. The practice is for the enumerating officer in each petty district to leave a schedule at each house, which he receives filled up, aiding, when necessary, in the filling up. The C. of 1851 was taken for the night of the 31st March.

This C. supplied important, but not altogether satisfactory information, as to the educational and ecclesiastical condition of the country; neither item is now included in the C. The C. of 1861 was taken for the night of Sunday, 7th April; that of 1871 for Sunday, 2d April; that of 1881 for Sunday, 4th April, a schedule being left in each house on the Saturday, and called for on Monday. The schedule of 1881 contained compartments for 'particulars of the name, sex, age, rank, profession or occupation, condition, relation to head of family, and birthplace of every living person' who passed the night of Sunday in the house; and whether any was blind, deaf, dumb, imbecile, or lunatic. Most civilized nations take a C. at regular intervals—France, every five years, (1876, 1881, &c.); Belgium, every ten years (1866, 1876, &c.); Austria, every ten years (31st Dec. 1880, &c.); the United States, the same (1870, 1880, &c.); in Germany, every five years (1st Dec. 1870, 1875, 1880, &c.). The first C. for India was taken between 1867 and 1872, the second in 1881.

CENT, and CENTI'ME (Lat. *centum*, a hundred), names of coins. The Dutch cent is a copper coin = $\frac{1}{100}$th of the guilder, which is equal to 1*s.* 8*d.* sterling. In the United States of America, the cent is a copper coin = $\frac{1}{100}$th part of the dollar, or nearly one halfpenny English. The Centime is the 100th of the French franc (q. v.), and is of the value of $\frac{1}{10}$ of an English penny.

CENTAU'RÉA, a genus of plants of the natural order *Compositæ*, sub-order *Cynaraceæ*, containing many species of annual and perennial herbaceous plants, chiefly natives of the temperate and cold regions of the eastern hemisphere. Six or seven species are natives of Britain, some of them common weeds, whilst some species appear among the frequent ornaments of flower-gardens.—The BLUE-BOTTLE, or CORN BLUE-BOTTLE (*C. cyanus*), is common in cornfields in Britain and other parts of Europe, and has now become frequent also in similar situations in America, and indeed over the greater part of the world. It is an annual, growing to the height of about two feet, and producing its flowers in July and August. The florets of the disk are small and purple; those of the ray are few, comparatively large, and of a bright blue. Its flowers have long been much used in wreaths and garlands. It is common in gardens, with flowers variously modified by cultivation. Water distilled from the flowers of the blue-bottle was at one time in high repute as a remedy for weak eyes. The juice of the florets of the disk, with a little alum, dyes a beautiful and permanent blue.—The large Blue-bottle (*C. montana*), a native of Central Europe, is still more frequently cultivated in flower-gardens. Its flowers are considerably larger, and it is a perennial.—SWEET SULTAN (*C. moschata*), a native of the Levant, with fragrant flowers is also common in flower-gardens. It is an annual or biennial.—Several species, having the involucre spiny, bear the name of STAR-THISTLE.

Blue-bottle (*Centaurea cyanus*).

The common STAR-THISTLE (*C. calcitrapa*) is a native of the southern parts of Britain and of Europe.—The Common or Black KNAPWEED, called in Scotland *Horse Knot* (*C. nigra*), is abundant in the meadows and pastures of most parts of Britain, and is a troublesome perennial weed, difficult of extirpation. *C. Jacea*, also called KNAPWEED, more rare in Britain, is very common in some parts of Europe, and its bitter astringent root, and indeed the whole plant, were formerly used in medicine. It affords a beautiful bright yellow dye, almost as good as Saw-wort.—The name C. has its origin in an ancient legend concerning the cure of a centaur by one of the species.

CE'NTAURS ('bull-killers'), a wild race of men who inhabited, in early times, the forests and mountains of Thessaly, and whose chief occupation was bull-hunting. Homer, the first who mentions them, describes them merely as savage, gigantic, and covered with hair. They do not appear as monsters, half-man and half-horse, until the age of Pindar. The C. are celebrated in Greek mythology on account of their war with the *Lapithæ* (q. v.), and their contest with Hercules. The fact lying at the bottom of Pindar's myth may refer to the impression which the old bull-hunters of Thessaly, who spent almost their whole life, it is said, on horseback, first made on some of the neighboring tribes—viz., that the man and the horse were one creature, which, at least, we know was the opinion entertained by the Mexicans of the Spanish cavalry. On account of their resemblance to the Satyrs, the C. were at a later period introduced into the artistic representations of the Bacchic worship.

Centaur.—From the Elgin Marbles.

CENTAU'RUS, the *Centaur*, one of the constellations in the southern hemisphere, represented on the celestial globe by a form half-man and half-horse. The stars in this constellation are, according to Ptolemy's catalogue, 37 in number; according to the Britannic catalogue, 35. It contains the stars α Centauri and β Centauri, both of the first magnitude.

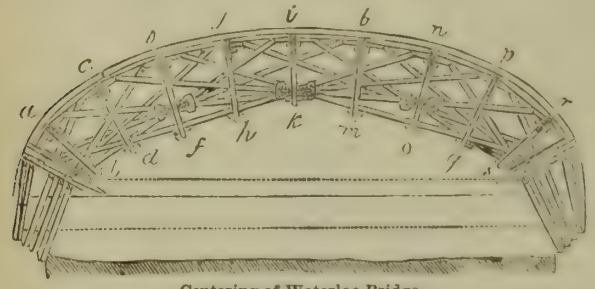
CE'NTAURY (*Erythræa*), a genus of plants of the natural order *Gentianeæ*, having a funnel-shaped regular 5-partite corolla. The species are pretty little annuals, natives chiefly of the temperate parts of Europe and Asia, with pink or rose colored flowers. They possess the tonic and other medicinal virtues of gentian, and although not frequently administered by physicians, are an important domestic medicine; and the tops are collected when the plant is in flower, by the country people both in England and on the continent of Europe, to be employed in cases of dyspepsia, in in-

termittent fevers, and as a vermifuge. They contain a substance called *Centaurine*, the hydrochlorate of which is said to be an excellent febrifuge.—The Common C. (*E. Centaurium*) is the species most frequent in Britain; a plant of eight inches to a foot in height, with flowers collected in loose heads, growing in dry pastures. Two or three other species are found on sandy sea-shores. Nearly allied to these is the AMERICAN C. (*Sabbatia angularis*), an annual plant with an erect quadrangular stem, extensively distributed throughout the United States and Canada, and much used in the domestic practice of America, as a prophylactic against autumnal fevers, in strong infusions and large and repeated doses. The name C. owes its origin to the same legend with the name *Centaurea*, although appropriated to plants so different.

CENTE'NES. See TENREC.

CE'NTERING, the framework upon which an arch or vault of stone, brick, or iron is supported during its construction. The simplest form of C. is that used by masons and bricklayers for the arches of common windows and doors. This is merely a deal-board of the required shape, upon the curved edge of which the bricks or stones of the arch are supported until they are keyed in. In building bridges or other structures where arches of great span are to be constructed, the C. is usually made of framed timbers, or timbers and iron combined. The arrangement of the timbers should be such, that the strain upon each shall be mainly a thrust in the direction of its length, for if the strain were transverse, a comparatively slight force would snap it, and if a longitudinal pull, the whole structure would be no stronger than the joints holding the pieces of timber together. In arches of great span, such as that of Waterloo Bridge, London, a longitudinal pulling strain is almost inevitable in some parts, as a beam of great length would bend to some extent under a thrusting strain. In such cases great skill and care are demanded in the designing and construction of the joints. As an arch is built from the piers towards the keystone, the weight upon the haunches during construction tends to push the crown upwards, and therefore the problem of designing a framed C. involves the resistance of this tendency, as well as the supporting of the weight of the materials.

The annexed figure of the C. of Waterloo Bridge, designed by Rennie, presents a fine example of the fulfilment of these requirements. It will be easily seen that a weight upon *np* and *ce* will be resisted by direct thrust upon the beams passing obliquely down-



Centering of Waterloo Bridge.

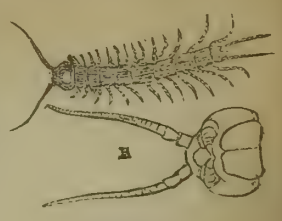
wards from these parts; one of each pair of these oblique beams thrusts outwards, and is directly supported by the abutments; the other thrusts inwards towards *k*, the yielding of which is prevented by the longitudinal pull of the lower and longer oblique beams *kq*, *kr*, *kl*, *ka*, &c. In this, and other modern structures, cast-iron shoes have been successfully used for the tying joints subject to the longitudal pulling strain. The flexible C., so called from its yielding at the joints, and varying its form with the load put upon it, is now abandoned. It was chiefly used by French engineers. That of Perronet for the bridge of Neuilly is a celebrated example.

Occasionally, when a very great span is required, and the navigation will permit, piers are built, or piles are driven, to support the C., and the design is much simplified thereby.

Cupolas like the Pantheon and St. Peter's at Rome, St. Paul's in London, or the flat domes of the Turkish mosques, require very effective centerings.

CE'NTIGRADE. See THERMOMETER.

CE'NTIPEDE (*Scolopendra*), a genus of *Myriapoda* (q. v.), having a long slender depressed body, protected by coriaceous plates, 21 pair of legs, distinct eyes, four on each side, and antennæ with 17 joints. The name is, however, popularly extended to species of nearly allied genera. Centipedes run nimbly, feed on insects, and pursue them into their lurking-places. They have not only a pair of horny jaws, like those of insects, but also another pair of organs closely connected with the mouth, and which are regarded as transformed legs, dilated and united at the base, terminated by a strong hook, and pierced beneath the extremity for the emission of a venomous fluid, which makes their bite quickly fatal to insects, and in the case of the larger species, very painful and even dangerous to the larger animals and to man. The common C. of tropical America (*S. morsitans*) is often nine inches or a foot in length. A species found in the south of Europe (*S. cingulata*) is nearly as large, but its bite does not seem to be equally venomous It may seem strange that creatures of such aspect as centipedes should ever have been thought of as human food, but Humboldt, in his Personal Narrative, tells us that he has seen Indian children of the tribe of the Chuymas draw large centipedes out of the earth and eat them.—The most common British C. is not a true *Scolopendra*, as that genus is now restricted, but is very nearly allied to it. It is known to naturalists as *Lithobius forficatus*. It is very plentiful under stones, &c., in summer.



Centipede:
B. head, magnified.

Another allied genus, *Geophilus*, of more numerous joints and slender form, contains some species which are occasionally phosphorescent, one of which, *G. longicornis*, yellow, with rust colored head, is very abundant at the roots of turnips, &c. It is supposed, however, to be rather useful than injurious, preying on the destructive larvæ of insects.

CENTLIVRE, SUSANNA, an English dramatic authoress, was the daughter of a Lincolnshire gentleman, named Freeman, born (most probably) in Ireland, about 1670. Her early history is obscure; but such were her wit and beauty, that on her arrival in London, though a destitute orphan, and only 16 years of age, she won the heart of the nephew of Sir Stephen Fox, who, however, died shortly after their marriage. Her second husband, an officer named Carrol, lost his life in a duel. Left in extreme poverty, his widow endeavored to support herself by writing for the stage, and after producing a tragedy called *The Perjured Husband* (performed first in 1700), made her appearance on the stage. She afterwards married (1706) Joseph Centlivre, principal cook to Queen Anne, with whom she lived happily until the time of her death, December 1, 1723. Her plays—*The Busybody* (of which the leading character 'Marplot,' is highly amusing), *A Bold Stroke for a Wife* (1717), and *The Wonder* (1714)—though not distinguished by purity of style or truthfulness of portraiture, are lively in their plots, and have kept their place on the stage.

CE'NTO (from Gr. *kentron*, patchwork), a name applied to literary trivialities in the form of poems manufactured by putting together distinct verses or passages of one author, or of several authors, so as to make a new meaning. After the decay of genuine poetry among the Greeks, this worthless verse-manufacture came into vogue, as is proved by the *Homero-centones*, a patchwork of lines taken from Homer (edited by Teucher at Leipsic, 1793); but it was much more common among the Romans in the later times of the empire, when Virgil was frequently abused in this fashion, as in the *C. Nuptialis* of Ausonius (who gives rules for the composition of the C.), and especially in the *C. Virgilianus*, constructed in the 4th c. by Proba Falconia, wife of the Proconsul Adelfius, and giving, in Virgil's misplaced words, an epitome of sacred history! The C. was a favorite recreation in the middle ages. In the 12th c., a monk named Metellus contrived to make a C. of spiritual hymns out of Horace and Virgil.—See *Littérature du Centon*, by M. Delepiere (1875).

CENTO, a town of Central Italy, 16 miles north-west of Bologna, is pleasantly situated on a fertile plane near the Reno. It is celebrated as the birthplace of the famous painter Guercino, whose house, adorned with paintings, is still preserved; and in the church of C. are many of his works. Pop. about 5000.

CENTRAL FORCES are those which cause a moving body to tend towards some point or center, called the center of force or motion. The doctrine of C. F. has for its starting-point the first law of motion—viz., that a body not acted on by any external force will remain at rest, or move uniformly in a straight line. It follows from this law, that if a body in motion either changes its velocity or direction, some external force is acting upon it. The doctrine of C. F. considers the paths which bodies will describe round centers of force, and the varying velocity with which they will pass along in these paths. It investigates the law of the force round which a body describes a known curve, and solves the inverse problem, and many others, the general statement of which could convey no clear idea to the unmathematical reader. As gravity is a force which acts on all bodies from the earth's center, it affords the simplest general illustration of the action of a central force. If a stone be slung from a string, gravity deflects it

from the linear path which it would otherwise pursue, and makes it describe a curved line which we know would, in vacuo, be a parabola. Again, the moon is held in her orbit round the earth by the action of gravity, which is constantly preventing her from going off in the line of the tangent to her path at any instant, which she would do, according to the first law of motion, if not deflected therefrom by any external force. To that property of matter by which it maintains its state of rest or motion, unless acted upon by other matter, has been given the name *inertia*.

We will now explain how, through the action of a central force, a body is made to describe a curved path. Suppose it to have moved for a finite time, and conceive the time divided into very small equal parts; and instead of the central force acting constantly, conceive a series of sudden impulses to be given to the body in the direction of the center, at the end of each of the equal intervals, and then observe what, on these suppositions, will happen. Let S (see fig. 1) be the center, and let the original motion

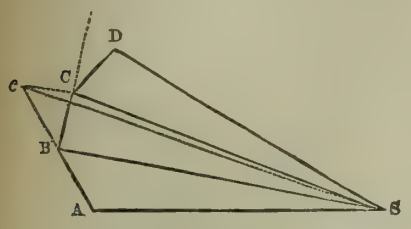


Fig. 1.

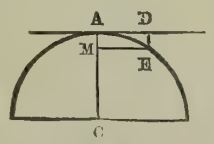


Fig. 2.

be from A, on the line AB, which does not pass through S. In the first interval, the body will move with a uniform velocity, say from A to B. In the second, if acted on by no force, it would move on in AB produced to *c*, B*c* being = AB. But when it arrives at B, it receives the first sudden impulse towards S. By the composition of velocities (q. v.), it will move now with a new but still uniform velocity in BC instead of B*c*, BC being the diagonal of the parallelogram of which the sides represent its impressed and original velocity. Having reached C at the end of the second interval, it receives the second impulse towards S. It will now move in CD instead of in BC produced. If, then, we suppose the periods of time to be indefinitely diminished in length, and increased in number, the broken line ABCD will become ultimately a continuous curve and the series of impulses a continuous force. This completes the explanation.

Going back, however, on our suppositions, we may here establish Newton's leading law of central forces. That the body must always move in the same plane, results from the absence of any force to remove it from the plane in which at any time it may be moving. The triangles ASB and BSC are clearly in the same plane, as the latter is on that in which lie the lines B*c* and BS. Also, since the triangles ASB, BS*c* are equal, being on equal bases, AB, B*c*, and triangle BSC = triangle BS*c*, as they are between the same parallels, *c*C and BS, it follows (by Euclid I. 37) that ASB = BSC. So BSC = CSD; and so on. In other words, the areas, described in equal times by the line (called the radius vector) joining the center of force and the body, are equal. As this is true in the limit, we arrive, by the composition of the small equal areas, at the law: That the areas described by the lines drawn from the moving body to the fixed center of force, are all in one plane, and proportional to the times of describing them. Very few of the laws of C. F. are capable of being proved like the preceding, without drawing largely on Newton's lemmas, with which we shall not suppose the reader to be acquainted.

Centrifugal and Centripetal Force.—We have shown that a body continually drawn to a center, if it has an original motion in a line that does not pass through the center, will describe a curve. At each point in the curve, it tends, through its inertia, to recede from the curve, and proceed in the tangent to it at that point. It always *tends* to move in a straight line in the direction in which it may at any time be moving, and that line, by the definitions of a tangent and of a curvature, is the tangent to the curve at the point. At the point A (see fig. 2), it will endeavor to proceed in AD: if nothing hindered it, it would actually proceed in that line, so as, in the time in which it describes the arc of the curve AE, to reach the point D, and thus recede the length DE from the curve; but being continually drawn out of its direction into a curve by a force to a center, it falls below the point D by the distance DE. The force which draws it through this distance is called the centripetal force, and that which would make it recede in the same time through the distance DE from the curve is called the centrifugal force. It may be remarked that the centrifugal force is not, like the centripetal, an impressed or external force acting on the body. It is simply the assertion of the body's inertia under the circumstances produced by the centripetal force.

Many familiar illustrations will occur to the reader of the action of what is called the centrifugal force. A ball fastened to the end of a string, and whirled round, will, if the motion is made sufficiently rapid, at last break the string, and fly off. A glass of water may be whirled so rapidly that, even when the mouth is presented downward, the water will still be retained in it, by the centrifugal force pressing it up against the bottom of the glass. The centrifugal action will be found to increase with the velocity. In all cases of a body moving in a circle, the force, it can be proved, varies as the square of the velocity of the body at the moment, and in the inverse ratio of the radius. As in this case the velocity varies as the radius inversely, it follows that the force is as the inverse cube of the radius. As in the case of circular motion the body always is at the same distance from the center, it follows that the centrifugal and centripetal forces are equal to all points of the circular orbit. The general law for all orbits is, that the centrifugal force varies as the inverse cube of the distance from the center. As the attractive force of gravitation varies as the inverse square of the distance, it may hence be shown that the centrifugal force gives perfect security, notwithstanding the constant attraction of the sun, that the planets, so far as that attraction is concerned, will never fall into the sun.

The doctrine of C. F. owes more to Kepler and Sir Isaac Newton, of whose philosophy it makes a considerable branch, than to all the rest of the philosophers, though almost all the leading mathematicians have contributed to it. The doctrine of centrifugal forces was first mentioned by Huygens, at the end of his *Horologium Oscillatorium*, published in 1673; but Newton was the first who fully handled the doctrine, at least so far as regards the conic sections.

CENTRALIZA'TION, a term which has lately come into general use for expressing a tendency to administer, by the sovereign or the central government, matters which have been previously under local management. We cannot properly use the term towards an established despotism, for there everything is already directed from the center. The legitimate application is to a state of change from local to central management—a change in the opposite direction would, on the same principle, be called localization. Of this latter change, however, it can scarcely be said that we have any recent example, unless it may be found in the system of self-government lately communicated to some of the British colonies. Ever since the existing European states began to grow out of the chaos of the fall of the Roman empire, there has been a continued progress in centralization. That empire itself was, however, the greatest instance of C. which the world has yet seen. In it the numerous municipalities and other local organizations originally existing in Italy, and communicated to the colonies, were entirely centralized.

The empire, such as it had been in the days of Constantine, was the type after which the European monarchs, such of them especially as became more powerful than their neighbors, were ever striving; and a few of them, such as Charlemagne, and, long afterwards, Charles V., seemed to have almost restored it. In this country, we trace C. from the time when there were about a dozen kings in Britain, and perhaps as many in Ireland, till the united kingdom came under the rule of one monarch. A subsidiary C. at the same time made silent progress, absorbing the feudal power of the aristocracy and the municipal privileges of the corporations. In other countries—as, for instance, in France, notwithstanding her desperate struggles for freedom, this process of C. has tended to a pure irresponsible despotism. With so sad a result before their eyes, a distrust of C. has not unnaturally been felt by some inhabitants of Great Britain. But the British constitution possesses a grand remedy, which turns the process to good use instead of mischief. While administrative authority has been centralizing in the crown, the controlling power of parliament has been increasing at a more rapid ratio, so that the vesting of a function in the crown or central government, means the putting it under the control of parliament, and especially of the peoples' representatives in the House of Commons. There is nothing done in any of the offices under the government for which a secretary of state, or some other member of the ministry, may not at any time be called to account in parliament. The efficiency of this control was in a manner proved by one or two instances in which offices with central powers were created, without being connected with any of the great state departments. There were, for instance, the English Poor-law Board, and the Board of Health. Both created much discontent and outcry about C., and it was found necessary to transfer their functions to the great government departments, the heads of which are immediately responsible to parliament. It is not the policy of this country in any case to abolish local management, but rather to aid and direct it from the central authority. The constituents of local bodies are often disinclined to watch or control them, and the business falls into the hands of incapable or designing men, or is otherwise mismanaged.

A very little central help—especially from a quarter where the proceedings of other bodies of the same kind are known—remedies such defects. One of the methods in which the government has

of late been in use to exercise its central power, has been by the appointment of inspectors, who make reports which are laid before parliament. This is, in reality, nothing more than a method of concentrating public opinion on the proceedings inspected and reported on, and as such it is very efficacious.

CE'NTER OF GRA'VITY is that point in a body or system of bodies rigidly connected, upon which the body or system acted upon only by the force of gravity, will balance itself in all positions. Though the action of gravity enters this definition, many of the properties of the point are independent of that force, and might be enunciated and proved without conceiving it to exist. By some, accordingly, the point has been called the *center of magnitude*, and by others, the *center of parallel forces*. Such a point exists in every body and system, and only one such point. Every body may be supposd to be made up of a multitude of minute particles connected by cohesion, and so far as its balance under gravity is concerned, each of these may be supposed to be removed, and its place occuppied by a force proportioned to its weight. Instead of the body, on these suppositions, we should then have a system of parallel forces, the lines from the various particles to the earth's center being regarded as parallel. But a system of parallel forces (see PARALLEL FORCES) has a single resultant acting through a fixed point, whose position is independent of the position in space of the points of application of the component forces, provided their relative positions in the system continue unchanged. This point is the C. of G.; and if it be supported, it is clear that the body will balance itself upon it in all positions. The same reasoning obviously applies to any system of bodies rigidly connected. It is usual to demonstrate this and the general rule for finding the C. of G. by proving it first in the case of two heavy particles forming a body or system, and then extending the proof to the case of any number of particles. Let

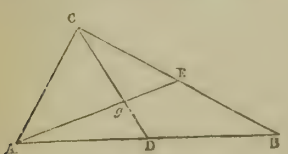


Fig. 1

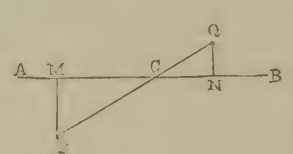


Fig. 2

P and Q (see fig. 1) be two heavy particles. Join P and Q, and divide the line PQ in C, so that weight of P : weight of Q : : CQ : CP. Then C will be the C. of G. of P and Q. Draw ACB horizontal, and PM, QN vertical, meeting AB in M and N. Then if P and Q represent the weights of P and Q, we have P : Q : : CQ : CP. But CQ : CP : : CN : CM by similar triangles. Therefore P : Q : : CN : CM, and P.CM = Q.CN. P and Q, therefore, are balanced about C See BALANCE and LEVER. This is true in all positions of P and Q, for no assumption was made as to their positions. C, therefore, is their center of gravity.

Also, we may conceive P and Q to be removed (see PARALLEL FORCES), and in their stead a particle at C equal to them taken together in weight. If, now, the system contained three, it is clear how we should proceed to find its center of gravity; having found the C. of G. of two, we should consider the system as formed of two—viz., the equivalent of the first two at their C. of G., and the third, when the case would fall under that already treated; and so on, extending the rule to a system containing any number of particles. Apart from this rule, however, it is possible, in the case of most regular homogeneous bodies, to fix upon their centers of gravity from general considerations. The C. of G. of a straight line, for instance, must clearly be in its middle point. So the C. of G. of a uniform homogeneous cylinder must be in the middle point of its axis. It must be in the axis, for the cylinder clearly is equally balanced about its axis. It must also be somewhere in its middle circular section, for it will balance itself on a knife-edge under that section. It must, therefore, be in the point where that section cuts the axis, or in the middle of the axis. The C. of G. of a uniform material plane triangle may be found from similar considerations. The triangle ABC (see fig. 2) may be supposed to be made up of uniform material lines parallel to its base AB; each of these will balance upon its middle point. The whole triangle, therefore, will balance upon the line CD, which bisects the base AB and all lines parallel to it. In the same way, the triangle will balance upon the line AE, bisecting BC. But if a figure balances itself upon a line, its C. of G. must lie in that line. The C. of G. of the triangle is therefore in CD, and also in CB. It must therefore be at g where these lines intersect, g being the only point they have in common. Now, by geometry, we know that g divides CD, so that $Cg = \frac{2}{3}$ CD. Hence the rule for finding the C. of G. of a triangle: Draw a line from the vertex, bisecting the base, and measure off Cg, two-thirds of the line. g is the center of gravity. By a similar method, the C. of G. of a great number of figures may be determined.

The above method applies only where the figure of the body is regular, and its mass homogeneous. But many bodies, besides being irregular, are formed by the agglomeration of particles of different specific gravities. Of these, the C. of G. can be found only by experiment, though not always satisfactorily. Let the body be suspended by a string, and allowed to find its position of equilibrium. The equilibrium being due to the tension of the string counterbalancing gravity, it follows that the tension is in the same line with that on which gravity acts on the body. But the tension acts on the line of the string, which therefore passes through the center of gravity. Mark its direction through the body. Suspending it then by another point, we should ascertain a second line in which lies the center of gravity. The C. of G., then, must be where these lines intersect.—For the effect on the stability of bodies of the position of the C. of G., see STABILITY.

CE'NTER OF GYRA'TION is the point at which, if the whole mass of a body rotating round an axis or point of suspension were collected, a given force applied would produce the same angular velocity as it would if applied at the same point to the body itself. The C. of G. bears a strong analogy to the center of oscillation. The cases differ only in this, that in the latter the operating forces are supposed to act at every point of the moving body, while in the former there is only one force acting upon one point. The C. of G. is found by the following rule: Divide the moment of inertia of the rotating mass by the mass of the body, and extract the square root of the quotient. The result is the distance of the point from the axis of rotation. The moment of inertia, it may be stated, is the sum of the products of the weight of each point of the mass by the square of the perpendicular distance of that point from the axis.

CE'NTER OF MA'GNITUDE or FI'GURE (see CENTER OF GRAVITY). C. of M. is the point on which plane figures and curved surfaces would balance themselves, supposing their areas to have weight. Thus, the center of a circle is its center of magnitude. Otherwise, C. of M. or F. is a point so situated that all straight lines passing through it, and terminated by the circumference or superficies of the figure or surface are bisected in it.

CE'NTER OF OSCILLA'TION. Referring to the article PENDULUM, the reader will see that the time of a pendulum's vibration increases with its length, being always proportioned to the square root of its length. This is strictly true only of the simple pendulum, in which the pendulous body is supposed to have no determinate magnitude, and to be connected with the point of suspension by an inflexible wire without weight. If, however, the vibrating body have a determinate magnitude, then the time of vibration will vary, not with the square root of its length, but with the square root of the distance from the axis of suspension of a point in the body called its center of oscillation.

If each part of the vibrating body were separately connected with the axis of suspension by a fine thread, and entirely disconnected from the rest of the body, it would form an independent simple pendulum, and oscillate as such—the time of each vibration being as the square root of the length of its thread. It follows that those particles of the body which are nearest to the axis of suspension would, as simple pendulums, vibrate more rapidly than those more remote. Being connected, however, as parts of the solid body, they vibrate all in the same time. But this connection does not affect their *tendencies* to vibrate as simple pendulums, and the motion of the body which they compose is a compromise of these tendencies of its particles. Those nearest the axis are retarded by the more remote, while the more remote are urged on by the nearer. Among these particles there is always one to be found in which the accelerating and retarding effects of the rest are mutually neutralized, and which vibrates in the same time as it would if it were unconnected with the other parts of the body, and simply connected by a fine thread to the axis of suspension. The point in the body occupied by this particle is its center of oscillation. By this C. of O. the calculations respecting the vibration of a solid body are rendered as simple as those of a molecule of inconsiderable magnitude. All the properties which belong to a simple pendulum may be transferred to a vibrating body of any magnitude and figure, by considering it as equivalent to a single particle of matter vibrating at its center of oscillation.

The determination of the position of the C. of O. of a body usually requires the aid of the calculus. It is always further from the axis of suspension than the center of gravity is, and always in the line joining the center of gravity and the point of suspension, when the body is suspended from a point. The rule for finding it in such a case is: If S be the point of suspension, and O the C. of O., $SO = \frac{\Sigma(mI^2)}{M.Sg}$; or it is the quotient obtaind by dividing the moment of inertia of the body by the product of its mass into the distance of its center of gravity from the point of suspension.

CE'NTER OF PERCU'SSION. The C. of P. of a body or a system of bodies revolving about a point or axis, is that point in it, which striking an immovable object, the whole mass shall not incline to either side, but rest, as it were, in equilibrio, without acting on the center or axis of suspension. If the body be moving freely, then the C. of P. is that point in it at which its whole impetus is supposed to be concentrated. In this case, if the body struck with its C. of P. an immovable obstacle, and if it were perfectly rigid and inelastic, it would come to perfect repose; whereas, if it struck the obstacle with any other point, a rotatory motion would be produced in it.

When the body is moving freely, and there is no rotatory motion, the C. of P. coincides with the center of gravity. If the body be moving round a point or axis of suspension, the C. of P. coincides with the center of oscillation. The more complicated case of a body rotating round an axis within it, would require, for its explanation, analytical formulæ which cannot conveniently be translated into ordinary language. There are many positions which the axis may have in which there will be no C. of P.—i. e., there will be no direction in which an impulse could be applied without producing a shock upon the axis. One case of this sort is that of the axis being a principal axis through the center of gravity.

CE'NTER OF PRE'SSURE. The C. of P. of any surface immersed in a fluid is the point in which the resultant of the pressures of the fluid on the several points meets the surface. When the bottom of a vessel containing fluid, or when a plane immersed in fluid, is horizontal, the pressure on every point of it is the same, being that due to the weight of the column of fluid standing above the bottom or plane. In either case, the pressures at the different points obviously form a system of equal parallel forces, whose center will be the center of gravity of the bottom or plane, their resultant passing through this point being the sum of all their forces. But when the plane is inclined at any angle to the surface of the fluid, the pressure is not the same at all points, but is obviously greater at the lower than at the upper points, for the lower have to support taller columns of the fluid. The resultant of these forces, then, will not pass through the center of gravity of the surface, but through a point below it. This point is the C. of P., and evidently will lie below the center of gravity for all fluids in which the pressure increases with the depth. If the surface pressed upon form part of the containing vessel, and be supposed movable, it will be kept at rest by a pressure equal to the sum of the fluid pressures applied at the C. of P., and acting in the opposite direction. In the case of a vessel with a parallelogram for one side, the C. of P. is at the distance of one-third of the height from the bottom. In the case of a triangular vessel whose base is at the bottom, it is one-fourth of the height only.

CENTRI'FUGAL AND CENTRI'PETAL are terms used in Botany to designate two differerent kinds of inflorescence, or modes of flowering of plants. When the flower-bud which terminates the floral axis, and is central in the inflorescence, is the first to expand—in which case the others are developed in succession from the center outwards—the inflorescence is said to be *centrifugal*. When the outermost flowers expand first, the inflorescence is *centripetal*, as is the case in catkins, spikes, and racemes, in which the flowers nearest the base are the first to expand, and those nearest the apex the last. These modes of inflorescence are very characteristic of different plants, of genera, and of orders.

CENTRIFUGAL FORCE. See CENTRAL FORCES.

CENTRIPETAL FORCE. See CENTRAL FORCES.

CEPHAE'LIS. See IPECACUANHA.

CEPHALA'SPIS, a genus of fossil Ganoid fishes, of which six species have been described, two belonging to the Upper Silurian, and four to the Devonian measures. The head was protected by a large ganoid plate, sculptured externally with circular radiating markings. Agassiz gave the name C. (buckler-headed) from this extraordinary covering, which has very much the appearance of, and was formerly supposed to be, the cephalic shield of an *Asaphus*. The body was covered with rhomboidal enamelled scales, and furnished with dorsal and pectoral fins: it terminated in a large heterocercal tail. In a graphic description of this fossil in his *Old Red Sandstone*, Miller thus sketches the general appearance of the animal: 'Has the reader ever seen a saddler's cutting-knife—a tool with a crescent-shaped blade, and the handle fixed transversely in the center of its concave side? In general outline, the C. resembles this tool; the crescent-shaped blade representing the head, the transverse handle the body.' The endo-skeleton was cartilaginous, retaining the notochord through life. The flexible body, assisted by the large tail and the fins, would give the C. the power of moving rapidly through the water. Being a predaceous fish, it must have been a formidable enemy to its associates in the Palæozoic seas, for besides its power of rapid motion, the sharp margin of its shield probably did the work of a vigorously hurled javelin, as in the sword-fish. This genus was originally named *Asterolepis* (star-scale), from the circular markings on its cephalic shield.

CÈPHALO'NIA, or CEFALONIA, the largest of the seven Ionian Islands (q. v.), is situated at the entrance of the Gulf of Lepanto or Corinth, in lat. 38° 3′—38° 30′ N., and long. 20° 21′—20° 49′ E. It is irregular in shape. Its greatest length is about 30 miles, and its total area 348 square milés. Its surface is mountainous, the soil for the most part thin, and water very scarce. The inhabitants, however, are industrious and enterprising, and have planted vineyards wherever the grape will grow, and currents and olive-oil are also produced for export. The climate is warm and agreeable. The population in 1870 amounted to 77,382. The numbers who are brought up to the medical profession are remarkable; it is said that there is hardly a town in the Levant which has not a practitioner from Cephalonia. The inhabitants are also much more disposed to engage in foreign trade than those of Corfu or Zante, and own more vessels. In 1874 the exports amounted to £189,309, and the imports to £240,410. The island is subject to frequent, but slight earthquakes. There was formerly a small English garrison at Cephalonia. Steamers ply between it and Malta, Patras, and Triest. The language spoken is a Greek dialect. The chief towns are Argostoli (q. v.), and Lixuri.

C. is called by Homer Same or Samos, and during the heroic ages was subject to Ulysses, whose residence was in the neighboring isle of Ithaca (q. v.). Later, C. appears under the name of Cephallenia. It successively fell into the hands of the Athenians, Romans, Byzantines, and Venetians, from the last of whom it was several times wrested by the Turks. On the ruin of the Venetian Republic in 1797, it was seized by the French, who were in their turn dislodged by the Russians. In 1809, it came into the posseesion of England. It was ceded to Greece in 1864.

CEPHALO'PODA (Gr. head-footed), a class of mollusks, the highest in organization of that division of the animal kingdom. To this class belong the Nautili, Spirulæ, Argonauts, Poulpes, Squids, or Calamaries, Cuttle-fish, &c., of the present time, and the ammonites, Belemnites, &c., of former geological periods. The C. are all marine, and only a few of them are capable of leaving the water, and moving about in search of food on the shore.

The C. receive their name from having organs of prehension and locomotion attached to the head, an arrangement towards which a gradual approach may be traced in the highest gasteropod (q. v.) mollusks. These organs have been variously designated *arms*, *feet*, and *tentacula*. They 'have no true homology' with the limbs of vertebrate animals, but are only analogous to them in respect of the purposes which they serve.—The body of the C. is a bag, formed of the *mantle* (see MOLLUSCA), open only at the end to which the head is attached.

In some, this bag is almost spherical, and locomotion is accomplished only by the appendages of the head; in others, the body is elongated, and furnished with two fin-like expansions, which

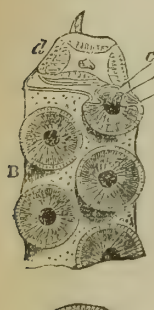
Cuttle-fish (*Sepis officinalis*): swimming and at rest.
From specimens at the Crystal Palace Aquarium in 1876.

are the principal instruments of locomotion. In locomotion by the fins, a cephalopod swims like a fish, with the head first, and often very rapidly; in locomotion by the arms, it drags itself along, laying hold of any object within reach by means of suckers, with which the arms are furnished. Some C. are capable also of moving backwards through the water by alternate contractions and expansions of a muscular web which unites the basis of the arms; some appear to depend for a similar power of swimming backwards upon the forcible ejection of water from the 'funnel' below the eyes.

The head of a cephalopod is roundish, generally furnished with

two large and prominent eyes, very similar in structure to those of vertebrate animals. There are also ears, but they consist merely of little cavities, one on each side of the brain, in each of which is suspended a membranous sac containing a small stone. The organs of smell are not very certainly known, but it appears that the C. possess this sense, as well as that of taste, of which the character of the tongue is much more indicative than in many vertebrate animals.—The brain forms a ring around the gullet. The whole nervous system is more complex than in the lower mollusks.—The mouth opens in the midst of the circle of arms. It is furnished with a strong horny beak of two mandibles, moving vertically, not unlike the bill of a parrot, but the upper mandible is the shorter of the two.—The digestive apparatus is very complicated.

The gullet swells out into a crop, and there is a gizzard as muscular as that of a bird. The intestine, after a few convolutions, terminates in the cavity which contains the gills, at the base of the funnel by which the water is ejected after having supplied air for respiration. This cavity is situated within the mantle or bag, and separated from the other viscera by a membranous partition. Into it the water is freely admitted by means of a slit or valvular opening, being drawn in by muscular action, and again expelled with considerable force through the funnel, which opens at the neck, and with its current all secretions, eggs, and excrements are carried forth. There are only two gills in the greater number of existing C., the only exceptions being the two or three known species of *Nautilus*, which have four gills; and two-gilled C.—the order *Dibranchiata*—are in many respects of higher organization than the four-gilled—the order *Tetrabranchiata*—which, although containing so few recent, contains a vast number of fossil species. Each gill consists of many membranous plates, fixed to two sides of a stalk.—The heart in the *Tetrabranchiata* consists of a single ventricle only; but besides this *systemic* heart, the *Dibranchiata* have two *branchial* or *respiratory* hearts, contractile reservoirs, one for each gill, by which the blood is forced into these organs.



Cephalopoda, suckers of:

A, a single sucker, side view; B, a portion of one of the tentacula, with several suckers, front view; *a*, cartilaginous circlet; *b*, central cavity; *c*, piston; *d*, section of the tentacle.

The 'arms' or 'feet' are very numerous in the *Tetrabranchiata*, not provided with suckers, but hollow, and with long retractile tentacula; in the *Dibranchiata* they are only eight or ten in number, furnished with suckers (*acetabula*); two of them, when they are ten in number, being much longer than the rest, and differing from them in form. The suckers are very admirably constructed—an adhesive disk of muscular membrane, often having a cartilaginous circlet, capable of most exact application to any object, with an aperture in the center leading into a cavity, the bottom of which can be retracted like a piston so as to form a vacuum, and render the adhesion of the sucker close and firm, whilst on the muscular action being interrupted or reversed, it immediately lets go its hold. The Poulpe has each of its eight flexible arms crowded with 120 pair of such suckers, and as an animal of this kind exists on some tropical shores, with arms about two feet long, it is not wonderful that it is reckoned dangerous. Still more formidable, however, are the Hook-squids of the South Seas, the two long arms of which have suckers furnished in the center with a hook to enter into the flesh of any creature of which they may lay hold, and so more effectually to secure their prey.

The sexes are distinct in all the cephalopoda. The eggs have a horny covering, and after their extrusion from the parent, become agglutinated into masses of various forms. The young, from the first, very much resemble the mature animals except in size.

All the *Dibranchiata* are provided with a peculiar organ of defence, called an 'ink-bag,' which is wanting in the *Tetrabranchiata*. This ink-bag is filled with a peculiar secretion, capable of being expelled at will to darken the water, and facilitate the escape of the cephalopod.

The Tetabranchiate C. have a chambered shell. See NAUTILUS. The Dibranchiate C. have no external shell—the shell of the female Argonaut (q. v.) being scarcely an exception—but they have an internal shell (cuttle-fish bone, &c.), sometimes merely rudimentary, included between two folds of the mantle, and apparently intended to give support to the soft body of the animal

The C. are very voracious, feeding on fish, mollusks, crustaceans, &c. Even a powerful crab is not safe from the attacks of a Dibranchiate cephalapod little bigger than itself; the arms, so abundantly provided with suckers, seize it, and trammel every movement, whilst the parrot-like beak is strong enough to break the hard shell. Cuttle-fish and squids are often very troublesome to fishermen, following shoals of fish, and devouring great numbers of them after they are entangled in the net.

Fossil C. exist in all the strata which form the earth's crust. The order *Tetrabranchiata* is almost exclusively a fossil order, being represented by not more than four recent species. With the exception of two genera, *Nautilus* and *Aturia*, this order is confined to primary and secondary rocks. The two groups into which it is divided are also characteristic of geological epochs. The *Nautilidæ*, with simple or gently undulating septa, and siphuncle central or in the inner margin, belong, with the exception of the two genera just referred to, to the Palæozoic rocks. Including a small group, which, while it has the siphon on the external margin, has yet simple septa, the *Nautilidæ* are represented by 145 Silurian, 158 Devonian, and 91 Carboniferous species. The *Ammonitidæ* have the siphuncle always on the outer margin of the shell, and the septa with corrugated or lobed margins. This group, with the exception of *Goniatites*, a Palæozoic genus, is peculiar to, and co-extensive with, the secondary strata. Of the 930 species that have been described, more than the half belong to the genus *Ammonites* (q. v.).

The order *Dibranchiata* is found first in the Lias, and extends through the more recent strata, receiving its full development in our present seas. Scarcely 90 fossil species have been described, while more than double that number are known as recent animals. See AMMONITES, ARGONAUT, BELEMNITES, CALAMARY, CERATITES, CUTTLE-FISH, GONIATITES, HOOK-SQUID, NAUTILUS, OCTOPODA, ORTHOCERAS, POULPE, &c.

CEPHALO'PTERA (Gr. head-wing), a genus of cartilaginous fishes of the ray family, the type of a sub-family, *Cephalopteridæ*. The pectoral fins are very much elongated, so as to give great breadth to the fish. The tail is slender and without fin, but armed near its origin with a great spine. The head is terminated in front by a straight line, and on each side of it there projects a membrane (*precephalic fin*) rolled upon itself, and resembling in shape a pointed horn. The name HORNED RAY has therefore sometimes been given to these creatures, of which only one species, *C. Giorna*, has ever been found on the British coasts. It is not uncommon in the Mediterranean, and there acquires a great size: one is mentioned as having been taken off Messina, which weighed 1250 lbs.—more than half a ton. But this is small in comparison with the size of some of the *Cephalopteridæ* which occur in tropical seas: one taken at Barbadoes required seven yoke of oxen to draw it. They are very dangerous to swimmers and bathers.

CE'PHEUS, a constellation of the northern hemisphere, containing, according to the Britannic catalogue, 35 stars. Its principal star is Alderamin, of the third magnitude.

CEPO'LA. See BANDFISH.

CERA'M, an island in the Moluccas Archipelago, lies N.E. of Amboyna, between 2° 44′ 30″—3° 30′ 30″ S. lat., and 129° 30′—130° 23′ E. long., and is divided into Great and Little Ceram by the Isthmus of Taráno. Area, 7140 sq. miles. Pop. 195,000. Malays inhabit the coasts; Papuans the interior. A mountain chain runs through C., reaching in Násа Keli 9250 feet. The soil is very fertile. The vegetable products include timber-trees, rice, sago, maize, sugar-cane, bananas, and edible roots. The Malays fish. Exports are Ceram clothing, textiles, iron, copper-wire, earthenware, birds of Paradise, trepang, sago, dried fish, edible nests, &c. C. belongs to the Netherlands.

CERA'MBYX, a Linnæan genus of coleopterous insects, included among those which, on account of the length of their antennæ, are usually known as LONG-HORNED BEETLES, and now generally regarded as the type of a tribe or family. To this tribe belongs the Musk Beetle of England (*Callichroma moschata*), remarkable for its strong and agreeable odor, which, however, is rather that of roses than of musk. Some foreign species have the odor of musk in great perfection. *C. heros*, one of the largest European beetles, extremely rare in Britain, deposits its eggs in a hole which it excavates for that purpose in the wood of the oak; and the grub feeds upon the wood, excavating long passages through it.

CERAMIA'CEÆ, a sub-order of *Algæ* (q. v.), also called FLORIDEÆ, and consisting of sea-weeds of a rose or purplish color, with fronds formed of cells arranged in rows, sometimes in a single row; the *sporocarps* containing cells or *spores*, often in fours (*tetraspores*), with a transparent *perispore*, and enclosed in receptacles of very various form and structure. They are most abundant in the seas of the northern temperate zone. Many of them are very delicate and beautiful. A considerable number furnish agreeable articles of food of a gelatinous nature, as DULSE (q. v.), CARRAGEEN (q. v.), or IRISH MOSS, and certain species of PLOCARIA (q. v.), which are much used on the sea-coasts of the East Indies. The edible swallows' nests of the East are supposed to be formed of a sea-weed of this sub-order, a species of *Gelidium*.

CERA'MIC (Gr. *keramos*, potter's clay, from *kaio*, to burn, and *era*, earth), a term used to designate the department of plastic art

which comprises all objects made of clay, such as vases, cups, bassi-rilievi, cornices, and the like.

CERA'STES, or HORNED VIPER, a genus of serpents of the family *Viperidæ*, distinguished by a broad depressed heart-shaped head, the scales of which are similar to those of the back, and particularly remarkable for the development of one of the scales of each eyelid into a spine or horn, often of considerable length. The tail is very distinct from the body. This genus is exclusively

Horned Viper (*Cerastes vulgaris.*)

African, and very venomous. The best known species *C. vulgaris*, the Horned Viper of the north of Africa, was called *C.* by the ancients, the name being derived from the Greek *keras*, a horn. It was correctly described by the traveler Bruce, but his description was for some time regarded with incredulity. Other species of the same genus are *C. nasicornis* of the western coast of Africa, and *C. caudalis* of the Cape of Good Hope.

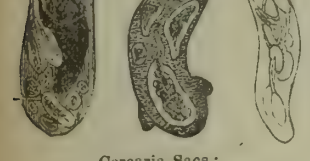
CE'RATE (Lat. *cera*, wax), a compound of wax with other oily and medicinal substances in such proportions as to have the consistence of an Ointment (q. v.). Simple C. is made by melting together equal parts of white wax and olive-oil; they are to be heated together, and carefully stirred into a uniform substance while cooling.

CE'RATITES, a genus of Ammonitidæ, peculiar to, and characteristic of, the Trias. They are distinguished from the other members of the family by having the lobes of the sutures serrated, while the intervening curves, directed towards the aperture, are simple. Twenty-six species have been described.

CERATODUS. See LEPIDOSIREN.

CE'RBERUS (Gr. *Kerberos*), in Greek mythology, the many-headed dog—the offspring of Typhon and Echidna—who guarded the portal of the infernal regions. Later writers describe C. as only three-headed, with the tail and mane composed of serpents, though the poets sometimes encumber him with a hundred heads. —A northern constellation, near the hand of Hercules, was named Cerberus, by Hevelius.

CERCA'RIA, a name formerly given to a supposed genus of *Entozoa*, at first, from their minute size, mistaken for *Infusoria*, but now known to be the young of *Trematode Worms*. In the form to which the name C. was given, these creatures consist of an oval body with a thread-like tail; and swim about with great activity in water, but exhibit a strong instinctive propensity to penerate into the soft bodies of insect larvæ, which they do by means of a spine-like weapon projecting from their head. The tail, as no longer needed, is now left behind, the closing of the wound through which the C. enters apparently nipping it off. Within the body which it enters, the C. loses also its spine, becomes encysted, and awaits its passive migration into an animal of higher kind, there to become a trematode worm. When it does not succeed in finding, in due time, a larva into which to enter, the C. gathers itself up into a ball; emits a mucous secretion, which soon hardens; and incessantly turning round within this mucous mass, becomes invested with a sort of shell, in which form it is not unlikely to be swallowed by some vertebrate animal. The C. is not the immediate offspring of a parent like itself. It is generated in a curious little animated sac (see figure, taken from Von Siebold's work on Tape and Cystic Worms), which is to be found buried among the organs of fresh-water mollusks, and within which this development of young takes place by gemmation. See GENERATIONS, ALTERNATION OF.



Cercaria Sacs:

1. A sac two lines long; *a*, oral cavity; *b*, alimentary canal; *c*, a cercaria developed within the sac; *d*, sporulæ not yet developed into cercariæ. 2. The sac of a different species remarkable for its abdominal processes. 3. Another species, more simple in form and structure.

CERCELÉE, or RECERCELÉE, in Heraldry, is a cross-circling, or curling at the ends, like a ram's horn.

CE'RCIS. See JUDAS' TREE.

CERCOCE'BUS (Gr. tail-ape), a genus of monkeys, natives of Asia and Africa, included by some naturalists in the large genus *Cercopithecus*. These monkeys have large cheek-pouches, large callosities, and long tails. The species commonly called MANGABEYS, or WHITE EYELID MONKEYS, are commonly referred to this genus, besides the CALLITHRIX, or GREEN MONKEY, and the MALBROUK, or DOG-TAILED BABOON.

CERCOPITHE'CUS (Gr. tail-ape), a genus of monkeys, containing a large number of species, natives of Asia and Africa, but chiefly of Africa. They are called *Guenons* by French naturalists, but they have no common English name more distinctive than Monkey. They have cheek-pouches and callosities, and a long but not prehensile tail. A MONA, or VARIED MONKEY (*C. Mona*)—an African species—in the Parisian menagerie, was remarkable not only for the cunning and adroitness with which it searched and rifled the pockets of visitors, but also for the readiness with which it applied a key to the opening of a lock, untied knots, undid the rings of a chain, and performed other similar feats.

CERDO'CYON (Gr. cunning-dog), a genus of *Canidæ*, apparently intermediate between true dogs and foxes, natives of South America. They are sometimes called Aguara Foxes. Their aspect is thoroughly vulpine, as are also their manners. Some of them add to the dispositions of ordinary foxes a singular propensity to steal and secrete brilliant or gaudy objects. A Brazilian species has been known to carry pocket-handkerchiefs into the woods. Some are natives of the coldest parts of South America, and have a rich fur.

CERE. See BILL.

CERE'A, a town of North Italy, about 19 miles south-south-east of Verona. It is a straggling place, with the remains of an old castle. Pop. 5930. The Austrians defeated the French here in 1798.

CEREA'LIA, or CE'REAL GRASSES, so named from Ceres (q. v.), are the plants which produce grain or corn; in other words, all the species of grass (*Gramineæ*) cultivated for the sake of their seed as an article of food. They are also called CORN-PLANTS or BREAD-PLANTS. They do not belong to any particular tribes of the great order of grasses, but differ from each other botanically, perhaps as much as any plants within the limits of that order. The seeds of the grasses in general being indeed farinaceous and wholesome, the employment of particular species as bread-plants seem to have been determined chiefly by the superior size of the seed, or by the facility of procuring it in sufficient quantity, and of freeing it from its unedible envelopes.

Some of the grains, as wheat and barley, are produced in ears or close-set spikes; some, as a few of those called millet, in spike-like panicles; others, as oats and rice, in very loose panicles. The form and size of the grains vary not a little, some being roundish, and some elongated; maize is the largest; many of the millets are very small. The plants themselves vary in size almost as much as their seeds, the millets being the smallest, and maize the largest of ordinary corn-plants.—Buckwheat and Spurry are sometimes ranked with the C., but incorrectly, if the term is regarded as having any botanical limits, for they are not grasses; but their seeds are used in the same way. The Quinoa of South America, and, the Kiery (*Amaranthus*) of India, with other plants of different orders, might be added to the list on the same account; even the Lotus of the Nile, the *Victoria regia*, and other species of water-lilies might thus be reckoned as cereal plants. The most extensively cultivated grains are Wheat (*Triticum*), Barley (*Hordeum*), Rye (*Secale*), Oats (*Avena*), Rice (*Oryza*), Maize or Indian Corn (*Zea*), different kinds of Millet (*Setaria*, *Panicum*, *Paspalum*, *Pennisetum*, and *Penicillaria*), and Durra or Guinea Corn (*Sorghum* or *Andropogon*). These have all been cultivated from time immemorial, and there is great uncertainity as to the number of species to which the many existing varieties belong; their original forms and native countries cannot confidently be determined. Barley, oats, and rye are the grains of the coldest regions, the cultivation of the two former extending even within the arctic circle. Wheat is next to these, and in the warmer regions of the temperate zone its cultivation is associated with that of maize and rice, which are extensively cultivated within the tropics. The millets belong to warm climates, and durra is tropical or sub-tropical. Rice is the food of a greater number of the human race than any other kind of grain. Maize has the greatest range of temperature.—Besides these, other grasses are cultivated to some extent, in different parts of the world, for the grain they yield; a species of *Eleusine* (Mand) in India, and another (Tocusso) n Abyssinia; a species of *Poa* (Teff) in Abyssinia, and a species of *Coix* (Job's Tears) in India. Canary Grass (*Phalaris*) may also be named. Canadian Rice (*Zizania*) is used as a grain, but is scarcely cultivated, and the same remark applies to the Manna Grass (*Glyceria*) of the north of Europe, to some species of Bamboo (*Bambusa*), and to the Sea Lyme Grass (*Elymus*), which affords an esteemed article of food, in small quantity, to the inhabitants of Iceland.

Of all the C., wheat is by common consent admitted to be that of which the grain is best fitted for the making of bread, although others are to some extent employed for this purpose. But some, as rice and maize, are scarcely suited for it, and other methods are chiefly employed of preparing them for food. All the grains are also used to produce some kind of fermented liquor or beer, and spirituous liquors are obtained from them by distillation.

CEREBE'LLUM. See CEREBRUM.

CE'REBRINE, or CE'REBRIC ACID, is an organic acid of very complex composition, found in the liver, blood, and nerves, but especially the brain of animals.

CE'REBRO-SPI'NAL FLUID. There is an interval, termed the *Sub-arachnoid Space*, lying between the two innermost of the membranes of the brain and spinal cord—viz., the arachnoid and the pia mater. This space, which is narrow on the surface of the cerebral hemispheres, but is comparatively wide at the base of the brain between the two middle lobes of the cerebrum, and posteriorly, between the hemispheres of the cerebellum and the medulla oblongata, is occupied by the C. F., which fills up the interval between the arachnoid and pia mater, and keeps the opposed surfaces of the former membrane (which is a closed serous sac) in contact. The C. F is a clear, limpid, slightly albuminous fluid, having a saltish taste, and a faintly alkaline reaction, and not containing more than 1·5 per cent. of solid matters. It varies in quantity from two to ten ounces, and is said to be most abundant in aged persons. Its chief use is to afford mechanical protection to the nervous centers, and to prevent the effects of external shocks or concussions.

CE'REBRUM, CEREBE'LLUM. Cerebrum (Lat. the brain) is sometimes applied to the whole contents of the cranium or skull; but more usually it denotes the upper portion, while the under and posterior portion is called the CEREBELLUM, or little brain. In this article we shall briefly notice the chief results which have as yet been obtained regarding the uses of the various parts of the mass, referring to the article BRAIN for the necessary anatomical details.

The *crura cerebri* appear as the principal conductors of impressions to and from the cerebrum. When one is divided, the animal moves round and round, from the injured towards the sound side, as if from a partial paralysis of the latter side. The effect may be referred to the interruption of the voluntary impulses from the C., for although the cerebellum seems to have the office of combining the muscles, whose co-operation is necessary for each action, the effort of the will must proceed from the cerebrum.

The *corpora quadrigemini* are, as stated in the article BRAIN, 'analogues of the optic ganglia of the lower animals.' Their removal wholly destroys the power of seeing, and diseases by which they are seriously affected are usually accompanied with blindness. Diseases or destruction of one *corpus quad*, produces blindness of the opposite eye. Probably their connection with vision is not their only function.

The *optic thalama* probably participate slightly in the visual function of the corpora quadrigemina; but we have no definite evidence on this point. They are intimately connected with the power of movement. Destruction of one of them causes rotation of the animal, similarly to division of one of the crura cerebri. Longet has shown, that after removing all the cerebral hemispheres and the *corpora striata*, the animal can still stand and walk, but that on removing one of the optic thalami, it falls down paralyzed on the opposite side, or commences rotatory motion.

The function of the *corpora striata* is very uncertain; they have probably some connection with sensation and volition, the precise nature of which is at present unknown.

The parts hitherto considered—including the cerebellum—appear to comprise the apparatus (1.) For the direction and government of all the unfelt and involuntary movements of the parts which they supply; (2.) For the perception of sensations; and (3.) For the direction of such instinctive and habitual movements as do not require the exercise of any reasoning or intellectual act. They cannot be regarded as organs of the higher faculties of the mind.

The functions of the *cerebral hemispheres* are, in the words of Dr. Kirkes (*Handbook of Physiology*), those of organs by which the mind, 1*st*, perceives those clear and more impressive sensations which it can retain and judge according to; 2*d*, performs those acts of will, each of which requires a deliberate, however quick, determination; 3*d*, retains impression of sensible things, and reproduces them in subjective sensations and ideas; 4*th*, manifests itself in its higher and peculiarly human emotions and feelings, and in its faculties of judgment, understanding, memory, reflection, induction, and imagination, and others of the like class.

'The evidences that the cerebral hemispheres are, in the sense and degree indicated above, the organs of the mind, are chiefly these: 1. That any severe injury of them, such as a general concussion, or sudden pressure by apoplexy, may instantly deprive a man of all power of manifesting externally any mental faculty; 2. That in the same general proportion as the higher mental faculties are developed in the vertebrate animals, and in man at different ages, the more is the size of the cerebral hemispheres developed in comparison with the rest of the cerebro-spinal system; 3. That no other part of the nervous system bears a corresponding proportion to the development of the mental faculties; 4. That congenital and other morbid defects of the cerebral hemispheres are, in general, accompanied with corresponding deficiency in the range or power of the intellectual faculties and the higher instincts.' See MIND, THE HUMAN.

Cerebellum.—The functions of this organ have been made the subject of much discussion and investigation. It is itself insensible to irritation, and has been cut away in various animals (by Longet and other French physiologists), without eliciting signs of pain; moreover its removal or disorganization by disease is generally unaccompanied with loss or disorder of sensibility, animals from whom it has been removed being apparently able to smell, see, hear, and feel, as perfectly as before. Flourens seems by his vivisections to have arrived at the correct view regarding the functions of this organ, and his results have been fully confirmed by Longet and others. He extirpated the C. in birds by successive layers. Feebleness and want of harmony of the movements resulted from the removal of the superficial layers; when he reached the middle layers, the animals became restless; their movements were violent and irregular; but they were not convulsed, and their sight and hearing were perfect. By the time that the organ was entirely removed, the animals had completely lost the power of flying, walking, standing, and preserving their equilibrium. When a pigeon in this state was laid upon its back, it could not recover its former position; but fluttered its wings, and saw and tried to avoid a threatened blow. Hence volition, sensation, and memory were not lost, but merely the faculty of combining the actions of the muscles. From a large series of experiments of this kind, subsequently made on all classes of animals, Flourens infers that the C. belongs neither to the sensitive nor to the intellectual apparatus; and that it is not the source of voluntary movements, although it belongs to the motor apparatus; but that it is the organ for the co-ordination of the voluntary movements, or for the excitement of the combined and harmonious action of the muscles.

This view is confirmed by the phenomena observed in certain cases of disease, and to a certain extent by comparative anatomy, for to each of the four classes of vertebrata—if we reckon amphibians and reptiles as a single class—the species whose natural movements require the most rapid and exact combinations of muscular actions are those in which the C. is most developed in proportion to the spinal cord; and if we compare different species of the same class, we usually find the development of the C. to correspond very closely with the perfection and variety of the muscular movements. For example, in the frog the movements are exceedingly simple in character, consisting of little else than flexion and extension of the posterior limbs; and the C. of this animal is extremely small compared with the rest of the brain, being merely thin narrow band of nervous matter. In the common sea-turtles, the movements of the body are of a more varied character; and the motions of the head and neck are more extensive; and here we have a much more highly developed cerebellum. In the alligator, again, a reptile whose motions closely resemble those of quadrupeds, the C. is still more fully developed.

The influence of each half of the C. is directed to the muscles of the opposite side of the body, and for the right ordering of the movements, the actions of its two halves must be mutually balanced and adjusted; for if the nervous structures uniting one of the halves of the C. with the medulla oblongata and spinal cord be divided, strangely disordered movements occur, the animal falling down on the side opposite to that which has been injured, and continually rotating round the long axis of its body, sometimes for several days, at the rate of fifty or sixty times in a minute. Similar movements have been observed in men in whom one of the cura of the C. has been diseased.

Phrenologists are of opinion, in accordance with the view originally propounded by Gall, that the C. is the seat of the sexual impulse and instincts; but this view has been long abandoned by almost all physiologists, for the reason that it has not been found to be sufficiently supported by anatomical and experimental facts, many of which are indeed directly opposed to it.

Our limited space compels us to leave altogether untouched many most interesting topics in Cerebral Physiology, as, for instance, the duality of the brain, the plurality of the cerebral organs, &c. The reader who wishes for further information, is referred to Kirkes's *Physiology* (from which we have freely quoted), Carpenter's *Human Physiology* Noble *On the Brain*, Holland's *Chapters on Mental Physiology*, and Brodie's *Psychological Inquiries*.

CE'REMONY (Fr. *cérémonie;* Lat. *cærimonia*, a sacred rite). Almost any act, when performed in a regular, orderly, and formal manner, and when viewed, not with reference to its object, but

the mode of its performance, becomes a C.; and the more entirely the attention of the performers is withdrawn from the object of the act, and fixed upon the manner of its performance, the more *ceremonious* does it become. The purely formal character of C. is thus illustrated by Hooker: 'The name ceremony,' he says, 'we do not use in so large a meaning as to bring sacraments within the compass and reach thereof, although things belonging to the outward form and seemly administration of them are contained in that name.' The remark is applicable to the most trivial ceremonies of social life and of state pageantry, as well as to the most sacred rites of religion, for a C. which is its own object would scarcely be entitled to be regarded even as a ceremony. The most empty display has always the ulterior object of imposing on somebody.

Ceremonies may be divided into four classes: 1. Religious ceremonies; 2. Social ceremonies; 3. State ceremonies; 4. International ceremonies.

Religious and state ceremonies will be treated of respectively under their various denominations; see, for the first, RITES, LITURGY, MASS, PROCESSIONS, &c.; and for the second, CORONATION; COURT; COURT, PRESENTATION AT; PARLIAMENT; &c. Social C. will in a great measure fall under the heads, ETIQUETTE, PRECEDENCY, COURTESY, FORMS OF ADDRESS, &c.; and international C. under DIPLOMACY, CONSUL, AMBASSADOR, &c.

CEREO'PSIS (Gr. wax-face), a genus of birds of the family *Anatidæ*, to which the New Holland goose (*C. Novæ Hollandiæ*) belongs. This bird has been known since the southern shores of that country were first visited by navigators. There, and on the adjacent islands, it is found in great abundance; and the earlier navigators easily supplied themselves with fresh provisions by knocking them down with sticks, so little were they acquainted with the danger to be apprehended from man. The cere is remarkably large, whence the name.

CE'RÉS, among the Greeks named *Demeter*, daughter of *Chronos* (Saturn), by *Rhea* (Ops), sister of Jupiter, Neptune, Juno, &c. She had the misfortune, along with her other brothers and sister, to be devoured by her father, who, however, vomited her forth again after taking the emetic which Metis gave him. By her brother Jupiter she became the mother of Persephone or Proserpina (q. v.). The chief myth relating to C. tells how her daughter Proserpina was stolen by Pluto, and how the mother wandered far in quest of the maiden. After traveling in human form nine days, and everywhere distributing her gifts to mankind, she excited the pity of Jupiter, by whom Mercury was despatched to bring back Proserpina from the infernal world, but on the condition that she must spend there a third part (or, as others say, one-half) of every year.

The myth of C. was symbolical of the growth of grain; some consider that this is intimated in the name Demeter, which is thought to be equivalent to *ge meter* 'Mother Earth.' The relations of the worship of C. with agriculture, social order, &c., were expressed in her two great festivals—the *Eleusinia* (q. v.) and *Thesmophoria* (q. v.). C. was especially worshiped in Crete, Delos, Sicily, Asia Minor, Arcadia, Argolis, and Attica. Bulls, cows, pigs, honey-cakes, and fruits were offered to her. Among the Romans, her festivals were styled CEREALIA; and of these, the most interesting was the feast celebrated by the rural population shortly before harvest, when the country people, dressed in white, and crowned with oak-leaves, danced and sang harvest-songs in honor of the goddess. The feast in April lasted several days, and was celebrated by games of the circus. C. was represented, most commonly, in a chariot drawn by dragons, having her head crowned with a garland of corn-ears, and holding a torch, a basket, or a poppy in her hand.

CERES, one of the Planetoids (q. v.), and the first of them that was discovered. It was first seen by Piazzi at Palermo, January 1, 1801. He continued to observe its motion till the 13th of February, when illness obliged him to discontinue his observations, which, however, sufficed to enable astronomers approximately to calculate its orbit. It was nearly a year after before it again became visible, owing to its approach to the sun. C.'s magnitude is less than that of the moon; and it looks like a star between the seventh and eighth magnitudes.

CE'REUS, a genus of plants of the natural order *Cacteæ* (q. v.), containing about 100 known species, among which are some of the most splendid flowers of that order. One of these is *C. speciosissimus*, now one of the most common green-house plants in Britain, and sometimes cultivated even in windows. Its large flowers are of a fine scarlet color, the inner petals with a violet tinge: they spring singly from the younger branches. The fruit, when well ripened, is of a delicious flavor. The plant is a native of Mexico.

CERIGNOLA, a town of Italy, in the province of Foggia, 23 miles south-east of Foggia. It is divided into two parts—the old and new town, in the former of which a portion of the ancient walls still remain—and is celebrated for the decisive victory obtained over the French by the Spaniards in 1503, and which established the supremacy of Spain in Naples. C. has manufactures of linen, and a trade in cotton and fruits. Pop. (1871) 25,131.

CERIGO, one of the smaller of the seven Ionian Islands, was anciently called Cythera; is situated in the Mediterranean, and is separated from the coast of Morea by a narrow strait; lat. 36° 28′ N., long. 23° E. It has an area of 107 square miles, with a population in 1870 of 10,637. With the exception of a few tracts of land, it is a very barren, dry, and mountainous island. In some parts, however, corn, wine, and olive-oil are raised. There are two great caverns in the island—one in the sea-cliff at the termination of the wild glen of Milopotamos; the other, known by the name of the Cavern of St. Sophia, from a small chapel at its mouth dedicated to this saint, is situated at about one and a half hour's ride from Capsali (q. v.), the capital of the island. The former cavern is said to be three miles in length, and so low that it is necessary to creep, in many places, on hands and knees to explore it. The latter—that of St. Sophia—is a very remarkable one, and possesses singular beauty; it abounds in enormous stalactities of various shapes and great beauty. In ancient times, C. was sacred to Venus, being, according to the old mythology, the island that received this goddess when she arose from the sea.

CERI'NTHUS (abusively named MERINTHUS, i. e., a halter), a heretic who lived at the close of the apostolic age, but of whom we have nothing better than uncertain and confused accounts. It is said that he was a Jew by birth, and studied philosophy in Alexandria. From Egypt he passed into Asia Minor, and lived in Ephesus contemporaneously (according to the belief of the church) with the aged apostle John. Tradition tells us that John held the heretic in such detestation, that, on a certain occasion, when he encountered C. in the baths of Ephesus, he immediately left the place, saying to those about him: 'Let us flee home, lest the bath should fall while Cerinthus is within.' It was believed in the ancient church, that the Gospel by St. John was written in opposition to the tenets of C.; and the Roman presbyter Caius (about the close of the 2d c.) supposed that C. had revenged himself by falsely ascribing the authorship of the Apocalypse to St. John—it being in reality his own work! The Fathers contradict one another in their accounts of Cerinthus. Some describe him as a complete Gnostic, in which case he would be the earliest recorded teacher of that sect; others say that he held coarse and sensual millenarian views, making the *millennium* (q. v.), with the licentious fancy of an Arab, consist chiefly in 'nuptial delights;' and that he believed the Jewish ceremonial law to be in part binding upon Christians.

There can be no doubt that C. made use of the Jewish law at least as a symbol for his Gnostic doctrines, and also employed millenarian terms in a symbolical manner; a vary natural thing for him to do, on the hypothesis which Neander and others have suggested—that Gnosticism originated, not among the minds which had received a true Hellenic culture, but among the Judaising sects, whose theosophy was a jumble of the spiritual and the material. C. being the oldest teacher of Judaico-Gnostic principles, there would naturally be a greater incongruity and want of harmony in his language and ideas than characterized Gnosticism at a later period of its development; and subsequent ecclesiastical writers, destitute as all of them were of precise historical knowledge and sound principles of criticism, could hardly avoid misunderstanding a system which is not consistent throughout, but bears evident marks of being formed in a transition epoch.—Paulus, *Historia Cerinthi* (Jena, 1799); Neander, *Kirchengeschichte*, vol. i., part 2.

CE'RITE, or O'CHROITE, is the *Silicate of Cerium*. It is found as a mineral in gneiss, at Westmanland, Redderhyttan, and Bastnäs. It contains in 100 parts—silica, 16; preoxide of cerium, 26·55; oxide of lanthanum, 33·38; carbonic acid, 4·62; alumina, 1·68; preoxide of iron, 3·53; lime, 3·56; oxide of manganese, 0·27; and water, 9·1. It occurs in granular pieces of a clove-brown, cherry-red, or gray color, with a white streak, a splintery fracture, an adamantine lustre, and is translucent at the edges.

CERI'THIUM, a genus and the type of a family, *Cerithiadæ*, of gasteropodous mollusca of the order *Pectinibranchiata* of Cuvier. The shell is spiral, elongated, and many-whirled, with an oval oblique aperture which has a short canal in front. The species of this family are numerous, most of them marine, but many inhabiting estuaries and brackish rather than salt water; some are found in lakes and rivers. A few belong to temperate climates, but most of them are tropical, and in mangrove swamps they particularly abound. The fossil species are very numerous almost all limited to the tertiary formations. See BAGSHOT BEDS.

CE'RIUM is a rare metal found native in Cerite (q. v.), and a few other minerals. It is a white metal, has not been obtained in any quantity, is not therefore employed in any manufacture, and forms two oxides and a numerous class of salts.

CEROPLA'STIC (Lat. *cera*, wax), the art of modelling in wax. See WAX-WORK.

CEROSTRO'TUM, or CESTRO'TUM (Lat.), a species of encaustic painting upon horn or ivory, the lines of the design being burned in with *cestrum* or burning needle, and wax introduced in the furrows thus made.

CERO'XYLON. See WAX PALM.

CERRE'TO, a town of South Italy, in the province of Benevento, situated on a slope of the Apennines, about 22 miles north-east of Capua. It is a well-built town, with a cathedral, and manufactures of coarse cloth. The district produces good wine. Pop. 6469.

CE'RRO GO'RDA, the name of several localities of Spanish America.—1. A plateau in Mexico, the most easterly on the route from Vera Cruz to the capital. Here, on 18th of April 1847, the Americans totally defeated the Mexicans.—2. A city of Peru, the capital of the province of Pasco, in the department of Junin. It is in the vicinity of the richest silver-mines in the republic; and standing at an elevation of 14,100 feet, it has, all the year round, the temperature of an English winter. The estimates of the population range from 7000 to 16,000. C. G. is 140 miles to the north-east of Lima.

CERTA'LDO, a market town of Central Italy, is picturesquely situated on the Elsa, about 18 miles south-west of Florence. It is noteworthy as the residence of Boccaccio, as well as the scene of his death. His house, surmounted with a tower, is still standing, and contains the articles of furniture belonging to the poet's time, and a fresco painting of him by Benvenuto Cellini. Pop. 6562.

CERTHI'ADÆ, a family of birds, generally placed in the great order *Insessores* or *Passerinæ*, and tribe *Tenuirostres*, although some naturalists have ranked them in the order *Scansores*. They mostly live on the trunks and branches of trees, feeding on insects which they find in the crevices of the bark; and many of them aid themselves by their stiff tail-feathers in retaining their position as they search for their food on the perpendicular stem. Their claws are long and sharp; the hind toe is also elongated, so that they can take firm hold of the bark or of a small branch; and many of them can pass round a horizontal branch, clinging to its under-surface with their backs to the ground. The bill of many is slender and curved; others, however, have a comparatively short and straight bill. The tongue is cartilaginous at the extremity, and so fitted to aid in seizing insect prey.

The plumage is usually dull and uniform; but the birds are lively and active in their habits. The species are numerous and widely diffused; they are divided into a number of genera. All of them are small birds. The Creepers (q. v.), forming the genus *Certhia*, are regarded as exhibiting the type of the family. Wrens and Nut-hatches, although referred to it, depart very considerably from this type. Many small tropical and subtropical birds, which live by sucking honey from flowers, formerly referred to this family, are now separated from it.

CERTI'FICATE, a written testimony to the truth of a certain fact or facts. The law of England recognizes certificates for various purposes. 1. Annual C. of attorneys. See ATTORNEY. 2. C. of appointment of the creditors' assignees to a bankrupt's estate and effects. 3. C. of conformity of a bankrupt. 4. C. of counsel, to enable a pauper to litigate *in forma pauperis*. 5. C. of the judges of the superior common-law courts at Westminster, which are of various kinds and for various purposes. 6. C. of registry of a ship which is a copy of what is entered in the register of the ship in the books of the Custom-house. This C. is granted by the collector, comptroller, or principal officer of the Customs at the port of registry, and delivered to the captain as a voucher of the character and privileges of the vessel as a British ship.

CERTIFICA'TION, in the law of Scotland, signifies the judicial assurance given to a party of the course to be followed by the judge in case he disobeys the will of a summons, or other writ or order of the court. Reiterated contumacy on the part of the defender was at one time punished with confiscation of his property (1449, c. 29), but now C. amounts to nothing beyond an intimation that if he fails to appear in the usual manner, the judge will decern, or pronounce judgment against him. The most important C. is in the process of Reduction-improbation (q. v.). In this action, two terms are allowed for the production of the deed called for, and sought to be reduced. Thereafter, an additional ten days are given; but should production not be satisfied on their expiry, decree of C. will be pronounced, and this decree has the effect of declaring the deed to be forged and fabricated. Such a decree, even though pronounced in absence, can hardly be recalled. In simple reduction (see REDUCTION), the C. is only to the effect that the deed shall be void and null, till produced.

CE'RTIFIED COPY. See EVIDENCE.

CERTIORA'RI (Lat. to be certiorated, or more fully and accurately informed of), in English law, is an original writ issuing, in civil cases, out of the Chancery Division of the High Court of Justice, and in criminal from the Queen's Bench Division of the same court. This writ, which runs in the Queen's name, is addressed to judges or officers of an inferior court, commanding them to certify or to return the records of a cause depending before them, in order that the party may obtain more sure and speedy justice, from such justices as shall be assigned to determine the cause. A writ of C. may be granted at the instance either of the prosecutor or defender; but to prevent its being used as an instrument of oppression by the one party against the other, it is provided (5 and 6 Will. IV. c. 33, and 16 and 17 Vict. c. 30) that either party, before applying for it, must obtain the leave of the court, and enter into recognizances.

The writ passes on a *Bill of C.*, which states the proceedings in the inferior court, so far as they have gone; sets forth the alleged ground of incompetency, by suggesting that the cause is beyond the jurisdiction of the court, that the defendant or witnesses live beyond it, or the like reason why substantial justice cannot be done. The writ is now chiefly used in the Queen's Bench Division, and is the usual mode of correcting excesses of Justices of the Peace in miscellaneous matters.

CERTO'SA DI PA'VIA, LA, one of the most celebrated monasteries in the world, is situated in the neighborhood of Pavia, and was founded, 1396, by Giovanni Galeazzo Visconti, first Duke of Milan, to appease his conscience for the murder of his uncle. The church is a splendid structure in the form of a Latin cross, the ground-plan being 249 feet long by 173 feet broad. It has altogether 12 chapels, 7 in the whole length of the church, and 5 in the transept, some of which are decorated with fine frescoes and paintings. The richly sculptured façade, designed by Ambrogio da Fossano, named Borgognone, was commenced in 1473. The building is made up of various styles, but the pointed prevails in the interior, which is decorated with frescoes, paintings, &c., by Dan Crespi, Andrea Solari, Campi, and Ambrogio Fossano, and contains a gorgeous high-altar, the mausoleum of the founder, and several monuments.

CERU'MEN. This term is applied to yellow waxy matter which is secreted by certain glands lying in the external auditory canal, or the passage that leads from the external opening of the ear to the membrane of the tympanum. Its main use, doubtless, is to lubricate this passage. It possesses a peculiarly bitter taste, and some physiologists have believed that in consequence of this property it prevents insects from entering the auditory canal. It is popularly known as ear-wax.

CE'RUSE, or WHITE-LEAD, the basis of white oil-paint, is a *carbonate of lead*. It has several other names—krems, Nottingham white, flake-white, &c. Like all other preparations of lead, C. is liable to be acted upon by exhalations from sewers, or by anything which contains sulphuretted hydrogen, in which case it is changed to a dull and leaden hue. Neither will it bear to be mixed with any pigment containing sulphur, such as vermilion. It is supposed that the white oxide of zinc might be substituted for C. as a white pigment with advantage.

CERVA'NTES SAAVE'DRA, MIGUEL DE, one of the greatest imaginative writers of Spain, was born of an old Galician family, at Alcalá de Henares, Oct. 9, 1547. He studied at Salamanca, and afterwards at Madrid, where he was placed under the care of a learned theologian, Juan Lopez de Hoyos, who was then professor of belles-lettres in the university. But his natural love of poetry led him to spend most of his time in writing elegies, ballads, sonnets, and a pastoral romance entitled *Filena*. When 22 years old C. served for some time as valet-de-chambre to Cardinal Giulio Aquaviva of Rome. In 1570 he served as a volunteer under the command of the papal admiral, Marco Antonio Colonna, and fought gallantly against the Turks. At the battle of Lepanto he was maimed for life by a gunshot wound in the left hand. He afterwards took part in various campaigns. Captured by an Algerine squadron, he was made a slave, but was ransomed in 1580, after a four years' captivity. On his return to Spain, he rejoined his regiment in the army sent by Philip II. to support his claims in Portugal, and distinguished himself in the expedition to the Azores. In 1584, he returned to Spain, and retired into private life, to devote his attention to literature. Soon after his publication of the pastoral romance, *Galatea* (1584), he married, commenced writing for the stage, and produced, in the course of a few years, as many as thirty dramatic pieces, of which the tragedy *Numancia* is the most remarkable.

During the years 1588—1599 he lived in straitened circumstances in Seville. In 1605 he once more appeared as an author, and now in a sphere exactly suited to his genius. In his immortal work,

Don Quixote, C. intended to put an end to that taste for extravagant romances of chivalry which had so long prevailed. The first part of this great satirical work appeared in Madrid, and was received at first coolly, but soon afterwards with loud applause, which, at a later period, was echoed from all parts of educated Europe. *Don Quixote*, though written with a satirical purpose, is throughout pervaded by the true spirit of poetry. With that universality which belongs to the highest genius, C. connected a universal human interest with discriptions of local and temporary characteristics. He did not intend by his *Don Quixote* to burlesque the old Spanish knight-errantry, for, as Mr. Ford remarks (see *Handbook of Spain*, part i., p. 238), 'the thing had expired a century before his birth;' but to put an end to the absurd and affected romances which it was then the fashion to read, and which were believed to be true pictures of chivalry. He had also, it is quite clear, another object in view—viz., to show that the deeper and truer and more guileless a nature is, the more will it become the jest and butt of real life; but he likewise teaches us that the pure heart and the high soul obtain a triumph which misfortunes and blunders cannot tarnish; for the knight, always 'disinterested, generous, elevated, and beneficent,' though 'the sweet bells of his intellect are jangled and out of tune,' maintains throughout a firm hold on our affections and esteem. Charles Lamb has truly said, that readers who see nothing more than a burlesque in *Don Quixote*, have but a shallow appreciation of the work.

Though received with enthusiasm, *Don Quixote* brought no pecuniary reward to the author. He was left in the obscurity and poverty in which he had passed so many years, and vainly endeavored to improve his circumstances. After silence during several years, C. published his twelve *Novels Examplares* (Exemplary Tales), 1613; his *Viage al Parnaso* (Journey to Parnassus), 1614—his next best production to *Don Quixote;* and in the following year he produced eight new dramas, but these were indifferently received. In 1614, a certain Alonso Fernandez de Avellaneda published at Tarragona, in 1614, a so-called continuation of *Don Quixote*, which was made a vehicle of abuse lavished on Cervantes. It appears that C. suffered considerably under these despicable attacks; but he revenged himself in noble style by publishing (1615) the *true* continuation of *Don Quixote*. Near the close of his career, C. found a patron in the Count of Lemos, who relieved his poverty. During the last few years of his life, he resided in Madrid, where he died, April 23, 1616. No stone marks the spot where his remains were interred. His novel, *The Sorrows of Persiles and Sigismunda*, was posthumously published. In 1835, when the house in which the poet had lived in Madrid was rebuilt, a bust of C., by the sculptor Don Antonio Solá, was placed in the front.

Among the several editions of *Don Quixote*, we may mention the splendid one in 4 vols. (Madrid, 1780); that by Pellicer (5 vols., Madrid, 1798); the fourth published by the Madrid Academy, with an admirable life of C. by Navarette (5 vols., Madrid, 1819); Diego Clemencin's edition, with the most complete commentary (6 vols., Madrid, 1833—1839); and a good pocket-edition, published at Leipsic (6 vols., 1800—1807). Of the collected works of C., an edition, not containing the comedies, appeared at Madrid (16 vols., 1803—1805); and another, without the *Journey to Parnassus*, was published in the same city (11 vols. 1829). Don Aug. Garcia de Arrieta published a selection from the works of C. (10 vols., Paris, 1826—1832); and a critical reproduction of the first edition of the collected works was published by Fabra in 1872. England has been fertile in translations of C.'s immortal work. The first was that of Thomas Skelton (1612—1620); others are those of Philips, Motteux, Smollett, Durfey, Jarvis, Wilmot, Clark, and Duffield (1881). Mrs. Oliphant's *Cervantes* (1880) is a very readable sketch of his life.

CERVE'RA, a town of Spain, in the province of Barcelona, 28 miles east of the city of Lerida. It is situated on an eminence, is surrounded by old walls pierced with nine gates, and the west approach is commanded by a castle, which is now in a ruinous condition. The university of Lérida was removed here by Philip V., but it was afterwards transferred to Barcelona. The university building, a massive but unsightly edifice, is still standing. C. has manufactures of linen, woollen, and cotton fabrics. Pop. 5300.

CERVE'TERÉ, or CERVE'TRI (ancient Cære or Agylla), a town of Central Italy, 27 miles west of Rome. Though now a place of some 700 or 800 inhabitants, it was formerly one of the most important cities of Etruria, possessing, it is said, a famous collection of paintings before even Rome was founded. Many Etruscan remains of value have been found here.

CE'RVIA, a town of Central Italy, situated on the Adriatic, 13 miles south-south-east of Ravenna. It is regularly built, has a cathedral and several convents; and from a marsh in the neighborhood about 50,000 tons of salt are annually obtained, the salt-works employing a considerable number of the population, which is about 6000.

CE'RVIDÆ AND CE'RVUS. See DEER.

CERVIN, MONT (Ger. *Matterhorn;* Ital. *Monte Silvio*), a mountain of the Pennine Alps, about 40 miles east-north-east of Mont Blanc, and between the Valais in Switzerland and the Val d'Aosta in Piedmont. Above the glacier line, 11,000 feet high, it rises in a bare obelisk of rock. In spite of many resolute attempts, it was not till 1865 that the summit was reached. Mr. Whymper's party of four made the ascent successfully in that year; but in descending, three of the party and a guide fell over a precipice 4000 feet high. Since then the peak has been repeatedly scaled. The Col of Mont. C., used for horses in summer, is 10,938 feet high.

CERVINA'RA, a town of Italy, in the province of Avellino, 12 miles north-west of Avellino. It has a trade in the produce of the district. Pop. 2300.

CE'SARI, GIUSEPPE (sometimes called GIUSEPPINO, or IL CAVALIERE D'ARPINO) an Italian painter, was born at Rome, 1570, and died there in 1640 (or 1642). He was greatly honored by no less than five popes, and his paintings were always highly popular. His works—in fresco and oil—display lively imagination, gay coloring, and great tact in execution; but are deficient in natural simplicity, correctness of design, symmetry of arrangement, and dignity of style. As he was the most brilliant of the mannerists, he was the chief object of the attacks made by the artistic reformers, Caravaggio, the Caracci, and their followers—who constituted the *naturalisti*—on the conventional or pseudo-idealistic style of painting.

CESARO'TTI, MELCHIORE, an excellent Italian poet, was born at Padua, 15th May, 1730, and died 3d November 1808. He gained a reputation by the vigor and originality of his style, especially in his translation of Macpherson's *Ossian* (2 vols., Padua, 1763.) The versification of this work, like that of C.'s free translation of the *Iliad*, under the title of *La Morte di Ettore*, was admired by Alfieri. C. unquestionably threw fresh life into Italian literature, but few in this country will consider his enthusiasm very rational, when it could induce him to think poor Macpherson a better poet than Homer. C.'s best work was his *Saggio sulla Filosofia delle Lingue* (Padua, 1785), written in opposition to the academical pedantry of La Crusca. His prose style is vigorous, but full of innovations, especially Gallicisms.

CESE'NA, a town of Central Italy, about 12 miles south-east of Forli, on the Emilian Way. It is pleasantly situated on a hill-slope, washed by the Savio. Its principal buildings are the *Palazzo Pubblico*, the Capuchin church, and the library founded by Domenico Malatesta Novello, in 1452, with a rich collection of MSS. There are many monasteries and nunneries, as befits a place that gave birth to two popes—Pius VI. and VII. It has some silk factories, with a trade in wine and silk; and in the vicinity are productive sulphur-mines. Pop. (1872) 35,870.

CESS, probably a corruption for *assess*, from the Ital. *assessare*, to impose a tax. It has long been used in England as synonymous with the more modern noun *assessment*. Camden, in the time of Elizabeth, speaks of every man being 'cessed by the pole, man by man, according to the valuation of their goods and lands.' See LAND-TAX.

CE'SSIO BONO'RUM (Lat. cession or surrender of goods), a process which the law of Scotland has borrowed from that of Rome, and which, like many others, is common to it with most of the continental systems. A C. B. may be defined to be an equitable relief from the severity of the earlier laws of imprisonment for debt, granted to a debtor in consideration of a cession of his goods to his creditors. The jurisdiction in cessios formerly belonged exclusively to the Court of Session, but by 6 and 7 Will. IV. c. 56, it was extended to sheriffs. The principal regulations, with reference to this process, at present in force, are the following: Any debtor in prison, or who has been in prison, or even against whom a warrant of imprisonment has been issued, may apply for a Cessio Bonorum. In his petition, he sets forth his inability to pay his debts, and his willingness to surrender his estates, and prays for interim protection. This petition must be intimated in the *Gazette*. The bankrupt then lodges with the sheriff-clerk a state of his affairs, subscribed by himself, with all the relative books and papers. On a day appointed for the purpose, he is examined before the sheriff on oath; and if his creditors object to the petition, they are heard, and a proof, if necessary, allowed them. Whatever order the sheriff may pronounce is subject to review by the Court of Session, or a Lord Ordinary in vacation. Cessios originating in the Court of Session are sued out in the form of a summons, by which all the creditors are called as defenders to the action. Any one or more of them may appear; and the pursuer will not be allowed the benefit of the process, till he has satisfied the court that his insolvency has arisen from misfortune, and that his disclosure of the state of his affairs is full and honest. The burden of proving objections to his statements, and to the evidence which he may produce, will be laid on the creditors. If the debtor can find caution (q. v.) to attend all diets when called on, the sheriff or the Court of Session may grant him

liberation or protection whilst the process is pending. A decree of C. B. operates as an assignation of the debtor's movable estate in favor of a trustee for behoof of the creditors. These trustees, like those in sequestrations, are now placed under the supervision of the Accountant in Bankruptcy. A C. B. differs from a Sequestration (q. v.) in this, that it confers no power on the bankrupt to insist on his discharge, and affords no protection against the attachment of his subsequent acquisitions by his creditors. The debtor has the privilege of retaining his working tools; but nothing beyond what is necessary for mere aliment will be allowed, even to half-pay officers and clergymen.

CE'STIUS, PYRAMID OF, a Roman monument of the Augustan age, situated close to the Porta San Paolo, partly without and partly within the walls of Aurelian. It is known to every English traveler, being in the immediate vicinity of the cemetery where Protestants dying in Rome are buried. The exterior form is perfectly preserved; but of the paintings which formerly decorated the internal walls, only a few traces remain. Several copies of these paintings have been made, of which we may mention those edited by Falconieri, 1661. The pyramid is 125 feet high, 100 feet in width at the base; the walls 25 feet thick. It is built of brick and tufa, faced with slabs of Carrara marble, now perfectly black with age, and rests on a base of travertine 3 feet high. The interior contains burial-chambers of considerable extent. The inner walls are covered with hard stucco, and the roof is vaulted. Both the walls and the roof were covered with paintings of female figures. The memory of the Caius Cestius for whom this pyramid was built has perished, but it has been supposed that he was the Cestius whom Cicero—in the oration *pro Flacco*—mentions as a rich man of business, who, having no children, left a large sum of money for the erection of a monument to himself. Two fluted columns of white marble, now standing before the pyramid of C., with their bases and two other bases, were discovered in the excavations of 1663, at the foot of the pyramid. In the cemetery, the remains of several celebrated men have their resting-place, among whom are the poets Keats and Shelley, Wyatt the sculptor, and Bell the anatomist.

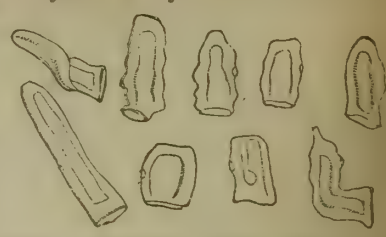
CE'STOID WORMS (Lat. *cestus*, a band or thong), a family of *Entozoa*, or intestinal worms, of the order *Calelmintha* (q. v.), consisting of tape-worms and other creatures which resemble them in structure and habits. The number of different kinds of C. W. is great. Their natural history is important in reference to the health of human beings and of the most valuable of domesticated animals; and although the subject is not in all respects an agreeable one, it presents much that is interesting and wonderful. Recent discoveries have given it an entirely new character.

C. W., in their most perfect state, when alone they possess the form from which their name is derived, are in reality compound animals, like many zoophytes and ascidians. They do not, however, like these, subsist by food entering the system through mouths with which the individuals composing it are furnished; for the joints of a cestoid worm, the individuals composing the system or 'colony,' have no mouth; nor is there any mouth in what is, on various accounts, quite properly regarded as the head, but nutriment is obtained from the surrounding medium by *endosmose* (q. v.); nourishing juices entering everywhere through the skin, as in the spongioles of the roots of plants, into the cellular tissue or *parenchyma* of which the whole body consists.

The head of a cestoid worm is furnished with organs—different in different kinds—by which it affixes itself to the inner surface of the intestine of a vertebrate animal. When first it gets into this situation, the body is very short, and has no joints; but they soon begin to appear as transverse striæ, and gradually increasing in size, become in most of the kinds very distinct, and at last separate from the system in which they were produced, and are carried away out of the intestines of the animal which contained them. This does not take place, however, till they have not only become mature in the development of the sexual organs—the principal organs to be observed in them—but until they are full of what are called eggs, which, indeed, are rather young ones ready for a separate existence, and each enveloped in a sort of protective shell. Each joint of a cestoid worm is androgynous. Whilst the most matured joints are thrown off from the posterior end, new joints are continually formed, as at first, in the part nearest to the head. The number of joints thus formed from a single individual is very great, as will appear when it is considered that tape-worms have been found 20 feet long or upwards, and that these have probably been throwing off joints in large numbers before opportunity has been obtained of measuring them.

As the C. W. have no mouth, so they have no alimentary canal. Some of them, as the true tape-worms, have been supposed to imbibe nourishment by the sucking disks of the head; but these are more probably mere organs of attachment, and the canals which are seen to arise behind them, apparently belong, not to the digestive, but to the vascular system, and are united by transverse vessels or vascular rings in the head and in each of the segments. The only trace of a nervous system hitherto observed is a single ganglion in the head, which in some is seen to send off nerves to the suckers.

The division into segments remains imperfect in some cestoid worms. Those of the genus *Ligula*—chiefly found in birds and fishes—resemble a long flat ribbon, not even notched along the edge, and containing a mere series of hermaphrodite brood-places. When segmentation is perfect, the segments (*proglottides*), on separating from the parent system (*strobila*), possess life and a little power of independent motion, creeping away on moist ground, plants, &c. Their period of separate existence, however, is brief; they burst or decay, and the numerous minute embryos which they contain are ready to commence their career, if in any way transferred into the stomach of an animal of proper kind, which is generally different from that whose intestine their parent inhabited. This may happen by their being swallowed—or even the *proglottis* itself—along with water, grass, &c. Some of the C. W. in this embryo state find their appropriate place in the stomachs of vertebrate, and others in those of invertebrate animals.



Segments (*Proglottides*), of Common Tape-worm: In different States of Expansion and Contraction.

From Von Siebold's work on Tape-worms.

The shell being broken or digested, the young cestoid worm is set free. It is extremely unlike the proglottis by which it was generated. It presents the appearance of a vesicle furnished with a few microscopic hooks. It possesses, however, a power of active migration by means of these hooks, and it is able to perforate the stomach of the animal which contains it. To this its instinct seems immediately to prompt it, and it is so minute that it passes through the stomach without any serious inconvenience to the animal. It now probably gets into the blood, and is lodged in some of the capillaries, from which it makes its way again by perforation, until it finds a suitable place in some of the tissues or of the serous cavities, in the flesh, or in such organs as the liver or the brain; and here relinquishing all active migration, it rapidly increases in size, at the same time developing a head, which is in fact that of a cestoid worm, and generally either encysts itself or is encysted—enclosed in a cyst (q. v.)—according to circumstances, or according to its species. Great numbers of such parasites are sometimes present in a single animal, causing disease and even death. Until recently, they were regarded by naturalists as constituting species and genera quite distinct from the C. W., of which they are really the young; and the name *scolex*, formerly given to one of these supposed genera, has now become a common name for the young of all C. W. in this stage, as *larva* is the common name for the young of insects in their first stage after being hatched from the egg. Those scolices which inhabit vertebrate animals very generally become distended with a watery fluid, and in this state were formerly regarded as Hydatids (q. v.); little else, indeed, appearing without very careful examination, but a small bag filled with fluid, the scolex head being formed within the bag although capable of being everted from it, as the finger of a glove which has been drawn in at the end is turned out. Such is the young of the common tape-worm (*Tænia solium*), formerly known to naturalists as *Cysticercus cellulosæ*, and found in the flesh of the pig and of some other animals, and sometimes of man. It is this scolex, existing in great numbers, which produces in the pig the diseased state commonly known as *measly;* and it is very unsafe even to handle measly pork in a raw state, because a scolex accidentally getting into the mouth, and thence into the stomach, is likely to become a formidable inmate of the intestinal canal.

Cysticercus Cellulosæ (magnified):

a, the head, much magnified.

It does not appear that this particular species has the power of multiplying in its scolex state, or the circumstances in which it exists in the flesh of the pig may be unfavorable to its so doing, and the prodigious numbers sometimes existing in a single animal have probably all entered by the mouth in the way already described, the contents of a single proglottis or joint of a tape-worm being perhaps sufficient to account for them; but some scolices, as that called *Cœnurus cerebralis*, found in the brain of sheep, and the cause of the disease called *staggers*—now known to be the scolex of a *Tænia* of the dog—are proliferous by a sort of pullulation, so that clusters of scolices cover the same parental vesicle. Until, however, the scolex reaches the intestine of an animal suited to it, its propagation is entirely unsexual, and no organs of sex exist; but no sooner is it there, than it begins to develop itself into a cestoid worm, and to produce androgynous joints, fertile of new

embryos, as already described. Thus we have in these creatures an instance, in its relations the most important known of the recently discovered alternations of generations. See GENERATIONS, ALTERNATION OF. The transference of the scolex from its place of growth to that in which it becomes a cestoid worm, usually if not always takes place by the animal which contains it being eaten by that whose intestine is suitable to its perfect development. Each kind of cestoid worm is limited to certain kinds of vertebrate animals, and it has been proved by experiment that if introduced into the stomach of other kinds, the scolices soon die. The only C. W. which infest the human species are *Bothriocephalus* (q. v.) *latus*, and Tape-worms (q. v.). See Von Siebold's interesting work on Tape and Cystic Worms, printed for the Sydenham Society (London, 1857).

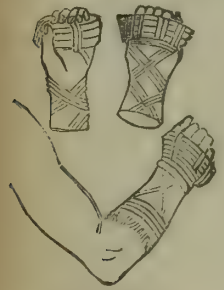
CESTRA'CION, a genus of sharks, regarded as constituting a distinct family, *Cestraciontidæ*, although not more than two species are known as now existing. It is characterized by having two dorsal fins and one anal, the first dorsal situated over the space between the pectorals and ventrals; a spine forming the front of each dorsal; a short wide tail, with its upper lobe strongly notched beneath; the mouth at the fore-end of the snout; spout-holes distinctly visible, rather behind the eyes; eyes destitute of nictitating membrane; small gill-openings; and the front of the mouth armed with sharp angular teeth, whilst the margins and inner surface of the jaws are covered with pavement-like teeth, presenting a general continuity of surface, as in skates, and disposed in rounded oblique scrolls—the former evidently adapted to the seizing of food, the latter to the crushing and bruising of it. The Port-Jackson Shark or 'Nurse' (*C. Philippi*) of the Australian seas, and the Cat Shark of Japan and China (*C. Zebra*), seem to differ chiefly in the patterns of color.

The *Cestraciontidæ* are particularly interesting to geologists; for the oldest fossil sharks belong in great part to this family, of which 'remains are found even in the Palæozoic strata; they become more numerous in the Carboniferous series; they are very numerous in the Lias and Chalk formations; but there they cease almost entirely, the strata of the Tertiary series scarcely containing any of them;' whilst now the species are reduced, as we have seen, to one or two, and other types of shark have become more prevalent.

CE'STRUM, the style or spatula used by the ancients in encaustic painting in wax and ivory. See ENCAUSTIC.

CE'STUI QUE TRUST, a person who possesses the equitable right to deal with property, the legal estate in which is vested in a trustee. There is such a confidence between the cestui que trust and his trustee, that no action at law will lie between them, but they must settle their differences and arrange their disputes in a court of equity. 'The phrase cestui que trust is a barbarous Norman law French phrase, and is so ungainly and ill adapted to the English idiom, that it is surprising that the good sense of the English legal profession has not long banished it, and substituted some phrase in the English idiom, furnishing an analogous meaning.'—Wharton's *Law Lexicon*.

CE'STUS (Gr. *kestos*, embroidered), a girdle worn by Greek and Roman women close under the breasts, and so distinguished from the *zone*, worn round the loins. The C. of Venus was covered with alluring representations, so that Juno borrowed it when she desired to win the love of Jupiter.—CESTUS—or, more correctly, CÆSTUS, from the Lat. *cædere*, to slay—is also the name of the covering for the hands worn by Roman pugilists. It was at first nothing more than a leathern thong or bandage to strengthen the fist; but afterwards it was covered with knots and nails, and loaded with lead and iron, &c., to increase the force of the blow. It was not uncommon for a pugilist armed with the C. to dash out the brains or break the limbs of his antagonist. The Roman pugilist (*cæstuarius*) was often represented in sculpture.



Roman Cestus.

CETA'CEA (Gr. *ketos*, a whale), an order of Mammalia (q. v.) greatly differing in general form and habits from the rest of that class, so as indeed to be popularly reckoned among fishes. The C. have a fish-like form, terminating in a fish-like tail or tail-fin, which, however, is not vertical, as in fishes, but horizontal, and is the great instrument of progression; being moved by very powerful muscles, commonly with an oblique downward and lateral movement, like that by which a boat is propelled in sculling, but sometimes by direct upward and downward strokes, when greater velocity is requisite. There are no hinder limbs, and even the pelvis is represented only by two small rudimentary bones, suspended in the soft parts, so that the body tapers gradually and uninterruptedly towards the tail. The fore-limbs are exclusively, or almost exclusively, adapted for swimming; their bones, however, appearing in the skeleton as those of a hand, placed at the extremity of an arm, of which the bones are much abbreviated and consolidated, with little power of motion except at the shoulder-joint, and are entirely concealed in the soft parts of the animal. The head is connected with the body without any apparent neck, and the vertebræ of the neck are partly ankylosed or soldered together, The skin is naked, having no general covering of hair, although some of the species possess conspicuous whiskers. The C. agree with quadrupeds, notwithstanding the great differences already indicated, in the most important parts of their organization. They are viviparous, and suckle their young, for which they exhibit great affection; they are also warm-blooded, breathe by lungs, and not by gills, and come to the surface of the water for the purpose

Tail-fin of Whale.

Bones of Fore-limb of Whale.

of inhaling air. An approach to their fish-like form is to be seen in Seals (q. v.) and other *Phocidæ* (q. v.); in which, however, the hinder limbs are largely, although peculiarly developed, whilst the fish-like tail-fin is wanting; the skin has a covering of hair; and the head and fore-limbs more resemble those of ordinary quadrupeds.

The C. are usually divided into two sections—the *Herbivorous* and the *Ordinary* C.; but the former constituting the family of *Manatidæ* (q. v.) have recently, by some systematic naturalists, been rejected from this order altogether, and made into a separate order, *Sirenia*. They differ very widely from the ordinary or true C., not only in their adaptation for the use of vegetable instead of animal food, which appears both in their dentition and in their digestive apparatus, but also in their pectoral instead of abdominal teats, and in their want of *blow-holes* and of any provision for retiring to great depths of the ocean, and remaining there for a considerable time, without returning to the surface to breathe.

The ordinary or true C. are divided into the families of *Delphinidæ* (Dolphin, Porpoise, Beluga, Bottlenose, Narwhal, &c.), *Physeteridæ* or *Catodontidæ* (Cachelot, or Spermaceti Whale, &c.), and *Balænidæ* (Greenland Whale, Rorqual, &c.), the distinguishing characters of which are given under separate heads. They all feed on animal food, some of them pursuing and devouring fishes; others, and these the largest, subsisting chiefly on smaller prey, mollusks, small crustaceans, and even zoophites, which they strain out of the water by a peculiar apparatus in their mouths. None of the true C. have molar teeth or grinders like the *Manatidæ;* all the teeth which any of them have are conical; but some of the largest are entirely destitute of teeth. The females of all of them have the teats situated far back on the abdomen. The fore-limbs of the true C. are mere fins, the slight power of grasping with them, which the *Manatidæ* possess, having entirely disappeared. The resemblance to fishes is increased in many of them by the presence of a dorsal fin. There is a wonderful provision to enable them to spend some time under water, before returning again to the surface to breathe—an arterial plexus or prodigious intertwining of branches of arteries, under the pleura and between the ribs, on each side of the spine. This being filled with oxygenated blood, after the animal has spent some time at the surface breathing, the wants of the system are supplied from it, whilst breathing is suspended, so that some whales can remain below even for an hour. The position of the nostrils is remarkable, almost on the very top of the head, so that the animal can breathe as soon as the head comes to the surface of the water; and the nostrils are furnished with a valve of singular but very perfect construction, a sort of conical stopper of fibrous substance, preventing the ingress of water even under the pressure of the greatest depths.

The nostrils appear to be little used for the purpose of smelling the sense of smell being one which these animals either do not possess at all, or in a very imperfect degree; but they are much used, not only for breathing, but also for *spouting*, or the ejection of water from the mouth, for which reason they are generally called *blow-holes*—the water being forced through them by the compression of two large pouches or reservoirs which are situated beneath them. This compression is accomplished by an action similar to that of swallowing; the throat, however, not being open but closed. The height to which the water is thrown into the air is extraordinary, and the spouting of the whale is one of those wonders of the ocean never to be forgotten by those who have seen it.

A peculiarity in the skin of the true C. adapts them for their manner of life. The skin is extremely thick, the inner part of it consists of elastic fibres interlacing each other in every direction, the interstices of which are filled with oil, forming the substance usually called *blubber*. The oil deposited in this unusual situation, not only serves the ordinary purposes of fat, but that also of keeping the body warm, which to a warm-blooded animal, continually surrounded with water, is of great importance; whilst the elasticity of this extraordinary skin affords protection in the great depths to which some of the whales descend, and in which the pressure must sometimes amount to a ton on every square inch.

The number of known species of C. is not great, but their natural history has as yet been imperfectly studied. All of them are large animals, some of them by far the largest that now exist. Almost all of them—both herbivorous and ordinary—are marine, but some of the smaller species ascend large rivers to a great distance from the sea; and one, of the family *Delphinidæ*, belongs exclusively to fresh waters, being found only in the upper tributaries of the Amazon and the elevated lakes of Peru.

Fossil Cetacea have been hitherto discovered only in the Tertiary formation. Their remains represent species not only belonging to each of the recent families of true C., but have supplied materials for forming a new family intermediate between the true whales and the herviborous cetacea. These fossils were originally described as reptiles; but they have been satisfactorily shown to be carnivorous C. by Owen, who, from their remarkable conjugate teeth, has given the typical genus the name of *Zeuglodon* (q. v.), and the family that of *Zeuglodontidæ*. In all, six or seven species have been described belonging to this family, from the Eocene and Miocene beds of Europe and America. The *Delphinidæ* appear first in the Miocene strata, and continue through the newer beds.

The remains of a Narwhal, which cannot be distinguished from the living species, have been found in several places in England. Of *Physeteridæ*, three species have been noticed in Pleiocene and Pleistocene strata, belonging to the recent genus *Physeter*. Fossil *Balænidæ* occur in the Miocene and newer beds. Only four species have been described, if we exclude *Cetotolites* (q. v.), a name given to teeth and ear-bones, belonging to animals of this family, which occur in great numbers in the Suffolk Crag.

CETOTOLITES, a name given by Owen to fossil cetacean teeth and ear-bones, which occur in great abundance in the Red Crag of Suffolk, a member of the Pleiocene period. They are rubbed and water-worn, and have evidently been washed out of some earlier strata, which remain yet unrecognized. The extent of these earlier strata must have been very great, seeing that the remains now extend over a large district in Essex and Suffolk, and attain a thickness, in some places, of not less than 40 feet. Professor Henslow, in 1843, drew the attention of agricultural chemists to this deposit, as a source of materials for manure, and since then superphosphate manures have been manufactured from it to the value of many thousand pounds annually; a striking example of the valuable practical results which frequently flow from a purely scientific discovery.

CETRA'RO, a town of South Italy, in the province of Cosenza, situated on the Mediterranean, 24 miles north-west of Cosenza. It has anchovy fisheries, and a population of 2619.

CETTE, a seaport town of France, in the department of Hérault, is built on a neck of land between the lagoon of Thau and the Mediterranean, in lat. 43° 24′ N., long. 3° 42′ E. The town, which is entered by a causeway raised above the Thau lagoon, and a bridge of 52 arches, is fortified, and the harbor is defended by a citadel and forts. The space enclosed by the piers and breakwater forming the harbor is about 30 acres, and has a depth of from 16 to 19 feet. A broad deep canal, lined with excellent quays, connects the port with the Lake of Thau, and so with the Canal du Midi and the Rhone, thus giving to C. an extensive inland traffic; it has likewise an active foreign commerce. The principal trade is in wine, brandy, salt, dye-stuffs, perfumery, and verdigris. C. has ship-building yards, and fisheries of oysters and anchovies. Pop. (1876), 28,152.

CETTIGNÉ, or CETINJÉ. See MONTENEGRO.

CEUTA, a town belonging to Spain, situated in the kingdom of Fez, on the north coast of Africa, and opposite to Gibraltar, in lat. 35° 54′ N., and long. 5° 16′ W. It is strongly fortified, and defended by a citadel and forts erected on Mount Hacho, the ancient *Abyla*, or South Pillar of Hercules. It is the most important of the four Spanish *presidios*, or convict establishments, on this coast. The harbor is small and not very safe; and the population, which amounts to 8200, is composed of Spaniards, Moors, Negroes, Mulattoes, and Jews, mostly very poor, and employed in trade and fisheries. Many of the Spaniards living here are state-prisoners, and even the garrison is partly manned by convicts.

C., formerly called *Septa* or *Septum*, was taken from the Vandals in 534 by Justinian, who fortified the place anew. In 618, it fell into the hands of the Western Goths; afterwards it was taken by the Moors, who held it until 1415, when it was captured by the Portuguese. It was annexed, with Portugal, to the crown of Spain in 1580, and was the only place on the African coast retained by Spain when Portugal was restored to its independence in 1640.

CEVADI'LLA. See SABADILLA.

CEVENNES (ancient *Cebenna*), the chief mountain-range in the south of France. With its continuations and offsets, it forms the water-shed between the river-systems of the Rhone and the Garonne. Its general direction is from north-east to south-west, commencing at the southern extremity of the Lyonnais mountains, and extending under different local names as far as the Canal du Midi, which divides it from the northern slopes of the Pyrenees. The central mass of the C. lies in the departments Lozère and Ardèche, Mont Lozère reaching an elevation of 4884 feet, and Mont Mézen (the culminating point of the chain) an elevation of 5794 feet. The average height is from 3000 to 4000 feet. Their masses consist chiefly of amphibolic rocks, grauwacke, and limestone, covered with tertiary formations, which in many places are interrupted by volcanic rocks.

The C. has been celebrated as the arena of religious warfare. As early as the 12th c., the several sects known by the names, the 'Poor of Lyon,' the *Albigenses* (q. v.), and the *Waldenses* (q. v.), were known and persecuted in this district. After the revocation of the edict of Nantes by Louis XIV. in 1685, a series of cruel persecutions of the Protestants in the C. began, especially in 1697, after the Peace of Ryswick. 'Dragonnades' (q. v.) were employed to enforce the doctrines of the monks sent as missionaries into the heretical district. All persons suspected of Protestantism met with the most harsh and cruel treatment. Some of the inhabitants emigrated, others fled into the fastnesses of the mountains. Driven to desperation, the persecuted people at length rose to arms, and the murder of the Abbé du Chaila, who was at the head of the dragonnades, gave the signal of a general insurrection in 1702. The insurgent peasants were styled *Camisards*—possibly from *camise*, a smock worn by the peasantry. Headed by bold leaders, the most famous of whom were Cavalier and Roland, they defeated the troops sent against them by Louis again and again, until that king thought the insurrection of sufficient importance to require the presence of the distinguished general, Marshal Villars; but he was recalled before the revolt had been put down, and it was left to the Duke of Berwick to extinguish it in blood; the contest terminating in an entire desolation of the province, and the destruction or banishment of a great portion of the inhabitants.

The embers of religious hatred still remained glimmering through the following century, and, after the restoration of the Bourbons in 1815, burst out into flames in the terrible persecution of the Protestants in Nimes (q. v.) and other places in the south of France. See *Histoire des Troubles des Cevennes*, by Court de Gébelin (1760); Schulz's *Geschichte der Camisarden* (1790); Bray's *Revolt of the Protestants of the C.* (1870).

CEYLANITE. See SPINEL.

CEYLO'N (the *Taprobane* of the Greeks and Romans, and the *Serendib* of the *Arabian Nights*), a valuable island and British colony in the Indian Ocean, to the south-east of the peninsula of Hindustan, from which it is separated by the Gulf of Manaar and Palk's Strait. Recent observations have shown its true place to be between 5° 55′ and 9° 51′ N. lat., and 79° 42′ and 81° 55′ E. long. Extreme length from north to south, from Point Palmyra to Dondera Head, 271½ miles; greatest width, from Colombo to Sangemankande, 137½ miles. Area, including dependent islands, 24,454 square miles.

Physical Features.—In natural scenery, C. can vie with any part of the world; and as it rises from the ocean, clothed with the rich luxuriance of a tropical vegetation, it seems to the voyager like some enchanted island of Eastern story. Its hills, 'draped with forests of perennial green,' tower grandly from height to height, till they are lost in clouds and mist. Near at hand, a sea of sapphire blue dashes against the battlemented rocks that occur at isolated points, and the yellow strands are shaded by groves of noble palms. In shape, C. resembles a pear, but its inhabitants more poetically compare it to one of their elongated pearls. Undulating plains cover about four parts of the island, and the fifth is occupied by the mountain-zone of the central south which has an elevation of from 6000 to 8000 feet above the sea-level. Pedrotallagalla, the highest mountain in the range, attains the height of 8280 feet; the celebrated mountain of Adam's Peak, 7420 feet; and the table-land of Nenera Ellia, 6210 feet.

Geology.—The mountain system is mainly composed of metamorphic rocks, chiefly gneiss, frequently broken up by intruded granite. With the exception of some local beds of dolomitic limestone, the gneiss is everywhere the surface rock, and the soil is composed of its disintegrated materials. No fossils, as was to be

expected, have been noticed in C., if we except the semi-fossil remains of mollusca, crustacea, and corals, belonging to living species, which occur in the rude breccias of the north in the neighborhood of the sea. The northern part of the island is rising, and there also the land is making encroachments on the sea from another agency. The immense masses of corals continually increasing, retain the débris brought from the Indian continent by the currents of the sea, and thus form a flat, ever-increasing madrepore plain.

Of *metals and minerals*, iron, in the form of a carbonate, can be obtained in great quantities, and of such purity as to resemble silver. Tin is found in the alluvium at the base of the mountains, and on the heights the rare metal tellurium has been discovered. Nickel and cobalt are scarce. Anthracite and rich veins of plumbago exist on the southern range of hills. The *gems* of C. have been celebrated from time immemorial, and they are most plentiful in the alluvial plains at the foot of the hills of Saffragam. Sapphires, rubies, the oriental topaz, garnets, amethysts, cinnamon stone, and cat's-eye, are the principal gems and precious stones of the island. The most valuable is the sapphire; and one of these found in the year 1853, was worth more than £4000. The value of the precious stones annually found in the island is estimated at £10,000. The pearl fisheries of C. have long been famous, and since the beginning of the century are conducted directly for behoof of the government. But sometimes fishing operations have to be suspended for a considerable period; thus there was no fishery from 1863, when the value obtained was £46,000, till 1874, when pearls worth £9,500 were secured.

Rivers.—The most important river in C. is the Mahawelli-ganga. It has its source in the vicinity of Adam's Peak, and after draining more than 4000 square miles, it separates into several branches, and enters the ocean near Trincomalee. The south side of the island is watered by ten rivers of considerable size, which flow into the sea between Point de Galle and Manaar. On the east coast the rivers are smaller, but still more numerous, and many others traverse the northern and eastern provinces.

Harbors.—Point de Galle (q. v.) and Trincomalee (q. v.) are the two harbors of Ceylon. The former is small and dangerous, but the latter is unsurpassed as a safe and commodious port. The variation of the tides is very trifling; the rise and fall not generally exceeding 18 to 24 inches, with a third of increase at spring-tides.

In *climate*, C. has a great advantage over the mainland of India, and as an island, enjoys a more equable temperature. The average for the year in Colombo (q. v.) is 80° in ordinary seasons. April is the hottest month; and in May the south-west monsoon commences amid a deluge of rain, and continues the prevailing wind till October, when the north-east monsoon sets in: 80 inches is the average annual fall of rain, though in an exceptional year, 120 inches have been registered.

The beautiful table-land of Neuera Ellia was first visited by Europeans in 1826, and is now used as a sanatorium. Here the thermometer in the shade never rises above 70°, while the average is 62°; the nights are cool and refreshing. The north of the island, including the peninsula of Jaffna, the plains of Neuera Kalawa, and the Wanny, may be reckoned as a third climatic division. Here the annual fall of rain does not exceed 30 inches, and irrigation is largely employed in agriculture.

Flora.—The general botanical features of C., especially of the lowlands, are nearly identical with those of Southern India and the Deccan, although it possesses a few genera of plants not to be found in those regions. Its phænogamic plants are limited to about 3000. The beautiful ixoras, erythrinas, buteas, Jonesias, and other flowering shrubs bloom in the forests. At an elevation of 6500 feet, the acanthaceæ cover large tracts of ground, and the tree-fern reaches the height of 20 feet. On the highest ground, rhododendrons attain to the size of timber-trees. The Coral-tree (*Eurythrina Indica*), the Murutu (*Lagerstræmia Reginæ*), and the *Jonesia asoca* are amongst the most magnificent of the flowering trees. The fig tribe are planted in the vicinity of the temples. In the forests, climbing-plants and epiphytes of prodigious size and striking appearance cover the trees with a mass of parasitical foliage of extraordinary growth. The Palmaceæ are very conspicuous in the vegetation of C., although not more than 10 or 12 species are indigenous: the cocoa-palm—of which it is estimated there are not less than 29 millions of trees—the taliput, the palmyra—which forms extensive forests in the north of the island—and the jaggery palm, are the most noteworthy. Of timber-trees, 416 varieties are known, and amongst these the satin-wood holds the first rank. The flora of the highlands, above 2000 feet, and up to 6000 or 7000, though much resembling that of the Neilgherries, has a marked affinity to the vegetation of the highlands of Malacca and Java, especially the latter.

Fauna.—A knowledge of the fauna of C. has been greatly advanced by the labors of Drs. Templeton and Kelaart and Mr. Edgar Layard. *Quadrumanous* animals are represented by the *Loris gracilis*, and five species of monkeys. Sixteen species of the *Cheiroptera*, or bat tribe, exist in C.; and what is very remarkable, many of these rival the birds in the brilliancy of their colors. The *Pteropus Edwardsii* (the flying-fox of Europeans) measures from 4 to 5 feet from tip to tip of its extended wings. Of the larger *Carnivora*, the bear and leopard; and of the smaller, the palm-cat and the glossy genette (the civet of Europeans) may be mentioned. The dreaded tiger of India, the cheeta, the wolf, and the hyæna, are happily not met with in Ceylon.

Deer, buffaloes, and the humped ox of India are amongst the *Ruminantia;* the little musk-deer (*Moschus meminna*) is less than two feet in length. The *Pachydermata* are represented by the elephant and the wild boar; the former, which is for the most part tuskless, is emphatically lord of the forests of Ceylon. The most remarkable of the *Cetacea* is the dugong. Whales are captured off the coast. 320 species of *Birds* have been ascertained by Drs. Templeton and Kelaart and Mr. Layard. The song of the robin and long-tailed thrush, and the flute-like voice of the oriole, are heard over the whole mountain zone, and far down into the neighboring plains. Eagles, the beautiful peregrine falcon, owls, swallows, kingfishers, sun-birds, bulbuls, crows, parroquets, pigeons, pea-fowl, jungle-fowl, and many others of the feathered tribe might be mentioned did space permit. Myriads of aquatic birds and waders, amongst which the flamingo is conspicuous, cover the lakes and lagoons. The crocodile is the largest reptile in the island; tortoises and lizards are also found. There are a few species of venomous snakes, and of these the ticpolonga and the cobra da capello are the most deadly.

Inhabitants.—The Singhalese, the most numerous of the natives of C., are the descendants of those colonists from the valley of the Ganges who first settled in the island 543 B.C. In their customs, costume, and general appearance, they have remained unchanged since the days of Ptolemy. The dress of the men, who have delicate features and slender limbs, is singularly effeminate, and consists of a *comboy* or waist-cloth, very much resembling a petticoat; their long hair, turned back from the forehead, is confined with combs, and earrings are worn by way of ornament. The women, in addition to the comboy, cover the upper part of the figure with a white muslin jacket, and adorn themselves with necklaces, bangles, rings, and jewelry. The Singhalese are false and cowardly, but manifest a strong affection for their relatives, and a reverence for old age. Polyandry still lingers in the interior of C., and was formerly universal; it is now, however, chiefly confined to the wealthier classes, amongst whom one woman has often three or four husbands. The Kandyans, or Highlanders, are a more sturdy race, and maintained their independence for three centuries after the conquest of the low country by European settlers. The Malabars, or Tamils, have sprung from those early invaders of C., who from time to time swept across from Southern Hindustan, and contended with the Singhalese kings for the sovereignty of the island.

They have formed the chief population of Jaffna for full 2000 years, and constitutionally excel the Singhalese and Kandyans. The Moormen, who are the most energetic and intelligent of the native communities, are met with in every province as enterprising traders. They are a very distinct race from the Singhalese, but have no tradition of their origin. Europeans generally believe them to be of Arab descent, but Tennent is of opinion that 'they may be a remnant of the Persians, by whom the island was frequented in the fourth and fifth centuries.'

The 'burghers' of C. are a people of European descent, who have become naturalized. Those of Portuguese extraction hold the lowest place, and are mostly tradesmen and artisans; but the Dutch burghers frequently fill responsible posts, and are employed in the government offices.

Besides the races already alluded to, there is a remarkable tribe of outcasts—the Veddahs—hardly removed from the wild animals of the forest, and believed to be descended from the Yakkhos, the aboriginal inhabitants of the country. They occupy a district in the eastern part of the island, and have there preserved their ancient customs and manners of living unaltered for more than 2000 years. They appear to be without the instinct of worship, and have no knowledge of a God. The tribe is divided into the *Rock Veddahs* and the *Village Veddahs*. The former hide themselves in the jungle, live by the chase, and sleep in trees and caves. They use fire to cook their meat, and their greatest gastronomic feast are the iguana lizard and roasted monkey. Their language—if the few words they make use of can be called by that name—is a dialect of the Singhalese. The Village Veddahs locate themselves in the vicinity of the European settlements, on the eastern coast, living in rude huts of mud and bark, and are hardly more civilized than their brethren of the jungles. The exertions of government to reclaim this harmless but degraded people have in some degree succeeded, and a promising colony has been formed.

Population.—Sir J. E. Tennent is of opinion that C., when in the height of its prosperity, must have been ten times as densly peopled as at the present day. In the official returns for the year

1870, the area and population of the six provinces of Ceylon are given as follows (total pop. in 1879, 2,558,488):

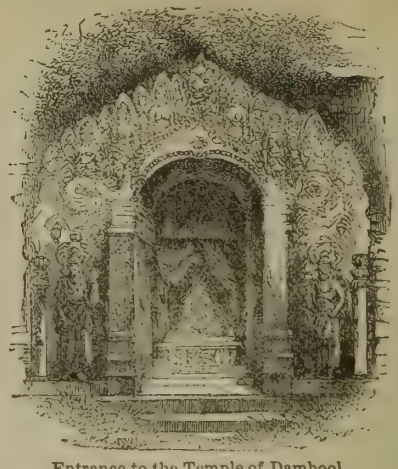
Provinces.	Area in Sq. Miles.	Total Population.	Pop. per Sq. Mile.
Western	3,345	662,658	198·11
North-western	2,805	214,699	76·54
Southern	1,927	353,989	183·69
Eastern	4,545	96,601	21·25
Northern	6,062	426,597	70·36
Central	5,770	371,466	64·37
Total	24,454	2,126,037	86·94
Military	.....	2,847	·11
Total (incl. military)	.....	2,128,884*	87·05

Religion.—The Singhalese are devoted to Buddhism (q. v.), which is the prevailing religion of the island. It does not exist, however, in that state of purity in which it is still found in the Indo-Chinese peninsula. Its sacred books are identical with those of Burmah and Siam, and both record the doctrines of Gautama in the Pali language; the deviations are in matters of practice. The Malabar kings adulterated Buddhism to a considerable extent with Brahmanism, introducing the worship of Hindu deities into the Buddhist temples, and this continues more or less to be the case. More than once have the Buddhists of C. sought to restore the purity of their faith—at one time sending deputies to Siam, at another to Burmah, with this object in view. The Burman or Amarapura sect have long been the reformers of Singhalese Buddhism, and maintain no very friendly relations with the party, who, supported by the priests of Siam, acknowledge the civil power in matters of religion, sanction the worship of Hindu deities and the employment of the priesthood in secular occupations, uphold caste, and restrict the sacred books. Caste was acknowledged by the Singhalese prior to the introduction of Buddhism, which in principle is opposed to it; but so firmly was it rooted, that it still endures, though more as a social than a sacred institution. Gautama Buddha is said to have visited C. three different times to preach his doctrine, and his *Sri-pada*, or sacred footstep, on the summit of Adam's Peak (q. v.), still commands the homage of the faithful. Buddhism was not, however, permanently introduced into C. till 307 B.C., when Mahindo, obtaining the support of the king, established it as the national faith. The influence of the priests gradually increased, and, by the piety of the Singhalese kings, monasteries were richly endowed; for though the Buddhist monk is individually forbidden to possess goods, a community may own property to any extent; and it is a remarkable fact that, at the present day, no less than one-third of the cultivated land of the island is computed to belong to the priesthood, and is exempt from taxation. The priests of C. are divided into two orders—the *Samanaros*, and those who, after a time of probation, receive the higher grade of *Upasampada*. The fraternity are not raised by education above their countrymen, and the respect paid them is directed more to the dress than to the person of the individual. Any member is at liberty to lay aside his ascetic character, and return to a secular life.

The most celebrated Buddhistic relic in C. is the *Dalada*, or sacred tooth of Gautama, at Kandy, which is guarded with jealous care, and preserved in an elegant shrine; but it is well known that the original relic was destroyed by the Portuguese, and the

The Gal-wihara at Pollanarrua.

present substitute is a piece of discolored ivory, bearing no resemblance to a human tooth. In all Buddhist countries, the sacred buildings present, with certain modifications, the same general character (see articles BUDDHISM, BURMAH, &c.); and in C. we find the three classes represented by the dagoba, or relic-shrine (*datu*, a relic, and *gabbhan*, a shrine), the temple proper, and the vihara or monastery. The labor bestowed on these edifices in the early ages of the Singhalese monarchy is truly astonishing. In the north of the island, ruined cities—buried for ages in the depths of the forest, have been discovered, revealing monuments that in dimensions may almost compare with the pyramids of Egypt The most remarkable of these vestiges of an early civilization is



Entrance to the Temple of Dambool.

Pollanarrua, the ancient capital of C.; and here is the celebrated *Gal-wihara*, a rock-hewn temple, supposed to be 'the only example in Ceylon of an attempt to fashion an architectural design out of the rock, after the manner of the cave-temples of Ajunta and Ellora.' The reclining figure of Gautama on the right (see cut, which, with the other illustrations, are reduced from Sir J. E. Tennent's *Ceylon*), is 45 feet in length; the upright one measures 23 feet; and the sitting image on the left is 16 feet from the altar to the top of the head. The cave-temple of Dambool was built

The Ambustella Dagoba, Mihintala.

100 B.C., and is the most celebrated in the island. The bell-shaped tapering dagobas of C., as relic-shrines, answer to the pagodas of Burmah—which they very much resemble—and the topes of Afghanistan. The ruins of the Jaytawanarama dagoba still reach the height of 249 feet; its diameter is 360 feet; and from base to pinnacle it is covered with trees of the lagest size.

This enormous structure contains 20 millions of cubical feet; and Sir J. E. Tennent concludes that to erect such a mass of masonry, even in the present day, 'would occupy 500 bricklayers from six to seven years,' at the cost of a million sterling. The Ambustella of Mihintala is another remarkable dagoba. A very famous object in connection with Buddhism in C. is the sacred Bo-tree of Anarajapoora (*Peepul, Ficus religiosa*), which was planted there 288 years B.C., and is by far the oldest tree in the world of which an authentic history exists. See BO-TREE. Amongst the antiquities of C. must be mentioned those wonderful monuments of the former greatness of the Singhalese people—the ruined tanks; with which almost nothing of a similar kind, whether ancient or modern, can be compared: 30 colossal reservoirs, and about 700 smaller tanks, still exist, though for the most part in ruins. The restoration of these magnificent works of irrigation has recently been begun. Brahmanism or Hinduism (q. v.) is the faith of the Tamils or Malabars, but the Moormen are Mohammedans. After the expulsion of the Dutch Christians, Protestant missions to the natives of C. were commenced by the Baptists in 1813. The Wesleyan Methodists followed in 1814, the Americans in 1816, the Church of England in 1818, and Christian instruction has made some progress amongst the native populations.

Of these the peasantry of the Kandyan hills have proved the least accessible to its influence. Schools, collegiate institutions, and female seminaries, under the direction of the missionaries, are in successful operation.

* Including 4732 British and 14,201 whites of European descent.

Government.—The administration of C. is vested in a governor, who is assisted by an executive council of five members, and a legislative council of fifteen members. The governor's salary is £7000 per annum. In 1876 the revenue was £1,375,888, and the expenditure £1,276,930. The chief items of revenue are the customs, averaging £286,000; licenses, £150,000; sales and rents of public lands, £230,000. In 1870—1880 the annual revenue varied from £1,068,471 to £1,596,205, and the expenditure from £1,064,-184 to £1,448,497. The civil establishments of C. cost nearly £300,000. The following table shows the values of imports and exports in various years during the decade 1870—1880.

Years.	Total Imports.	Total Exports.
1870	£4,634,297	£3,803,731
1873	5,574,358	5,439,591
1875	5,361,240	5,375,410
1877	5,885,969	5,730,050
1879	5,029,435	4,960,938

Years.	Imports into Ceylon from United Kingdom.	Exports from Ceylon to United Kingdom.
1870	£1,531,491	£2,907,146
1873	1,534,852	4,056,138
1875	1,417,115	3,709,012
1877	1,611,738	4,251,279
1879	1,149,058	3,635,479

The value of the staple coffee exported from Ceylon to the United Kingdom was, in 1867, £2,814,060; in 1869, £2,867,724; in 1871, £2,623,263; in 1872, £3,341,601; in 1873, £3,692,333; and in 1878, £2,508,893. In 1876, cocoa-nut oil valued at £236,856, and cinnamon at £119,700, were exported to the United Kingdom. To the ancient world, C. was famous as a place of traffic. Egyptians, Greeks, Romans, Persians, and Arabians traded to its ports; and many particulars, such as geographical position and natural productions, seem to identify Point de Galle with the Tarshish of the Hebrew historians.

The *history* of C., of which the limits of this article will only allow the briefest possible outline, may be conveniently divided into ancient and modern, and the latter into the Portuguese, Dutch, and British periods.

The records of its early history came to light in 1826, and Mr. Turnour, devoting himself to their study, composed an *Epitome of the History of C.*, from the year 543 B. C. to 1798 A. D.; and he records the reigns of 165 kings, who reigned during this space of 2341 years. The most famous of the Singhalese books is the *Mahawanso*, a metrical chronicle in the Pali language, which gives an account of the island during the above 23 centuries. The story begins with the invasion of Wijayo (543 B.C.), son of a petty Indian sovereign in the country watered by the Ganges. He subdued the Yakkhos, the aboriginal inhabitants; married a daughter of one of the native chiefs, whom he subsequently repudiated for an Indian princess; and founded a dynasty that held undivided sovereignty in C. for nearly eight centuries. He bestowed on his kingdom his patrimonial name of Sihala (whence Singhalese, Ceylon), and promoted the settlement of colonists from the mainland. In the reign of king Devenipiatissa (307 B.C.), Buddhism was established as the national religion, and his reign was further remarkable by the planting of the sacred Bo-tree, 288 B.C.; and now commenced the erection of those stupendous buildings already noticed. The next important epoch in Singhalese history is the usurpation of the Malabars (237 B.C.), foreign mercenaries from the Coromandel coast, to whom the native sovereigns had intrusted the defence of the island. Several Malabar invasions are chronicled in the history of C., and these foreigners long contended with the native princes for supreme authority. Passing on to 1071 A.D., a native dynasty was then re-established in the person of Wijayo Bahu, which, for 100 years, delivered the country from the dominion of the Malabars. Prakrama Bahu commenced a reign, in 1153, the most renowned in the records of Ceylon. He devoted himself to religion and agriculture, and besides many notable religious edifices, he caused no less than 1470 tanks to be constructed, subsequently known as the 'seas of Prakrama.' Thirty years after the death of this monarch, the Malabars landed with a large army, and speedily conquered the whole island. In 1235, a native dynasty recovered a part of the kingdom. During the reign of Dharma Prakrama IX. the Portuguese first visited C., 1505; but it was in 1517 that they first formed a permanent settlement at Colombo for trading purposes.

Their encroachments soon raised the patriotic Kandyans, and it is a remarkable fact, that though at the first visit of the Portuguese in 1505, they were even ignorant of the use of gunpowder, they, after a while, excelled their enemies as musketeers, and were finally able to bring 20,000 stand of arms to bear against them. 'Amity, commerce, and religion,' was the Portuguese motto; but their rule in C. is a sad story of rapacity, bigotry, and cruelty. They were at last driven from the island by the Dutch in 1658, after a contest of twenty years, when, as Sir J. E. Tennent remarks, 'the fanatical zeal of the Roman Catholic sovereign for the propagation of the faith, was replaced by the earnest toil of the Dutch traders to intrench their trading monopolies; and the almost chivalrous energy with which the soldiers of Portugal resisted the attacks of the native princes, was exchanged for the subdued humbleness with which the merchants of Holland endured the insults and outrages perpetrated by the tyrants of Kandy upon their envoys and officers.' But the purely military tenure of the Dutch was destined to give place to the colonization of the British. It was during the great European war succeeding the French Revolution, that the English gained possession of the island. On the 1st August 1795, an expedition under Colonel James Stuart landed at Trincomalee, which was speedily captured, and finally the garrison of Colombo surrendered on the 16th February 1796. By this capitulation, all the Dutch settlements and strongholds in C. were ceded to the English; though the island was not formally annexed to the British crown till the Peace of Amiens, 27th March 1802. The native sovereigns, however, continued in the possession of their mountain territory; but at length the Kandyan king, Wikrama Raja Singha, after perpetrating the most frightful atrocities on his own people, seized and murdered certain native merchants, British subjects, trading to Kandy. War followed, January 1815; Kandy was taken, and the tyrant sent a captive to the fortress of Vellore. On the 2d March 1815, a treaty was concluded with the native chiefs, by which the king was formally deposed, and his territories annexed to the British crown.

Since then, the island has made rapid strides in material prosperity. The mountain-forests have been replaced by plantations of coffee, of which there are now about 500 under cultivation, of 150,000 acres, giving an average crop of 950,000 cwts. per annum. Many important public works have been completed, and others are still in progress. Several good roads have been constructed, including a magnificent mountain-road between Colombo and Kandy, and there is a railway 92 miles in length.

In 1874 there were 243 government schools, with 11,719 pupils; 882 mission schools, with 44,449 pupils; and 329 private schools, with 9929 pupils.

See *Ceylon, Physical, Historical, and Topographical*, &c., by Sir James Emerson Tennent (Lond. 1859); *Christianity in Ceylon*, by the same author (Lond. 1850); *The Statesman's Year-book* for the current year; and *Ceylon, a General Description of the Island*, by an officer, late of the Ceylon Rifles (1876).

CEYX. See KINGFISHER.

CEZI'MBRA, a coast town of Portugal, in the province of Estremadura, about 18 miles south of Lisbon. C. has active fisheries, and a pop. of 6000.

CHABLIS, a village in France, dep. of Yonne, which gives name to a much esteemed white Burgundy (q. v.) wine.

CHA'CMA. See BABOON.

CHA'DDA. See BENUWE.

CHADWICK, EDWIN, C.B., a distinguished social and sanitary reformer of the present day, born in the vicinity of Manchester, 24th January 1801. He studied law, but early devoting his attention to questions of social, sanitary, and political science, he attracted the notice of Lord Grey's government, by whom he was appointed an assistant-commissioner to inquire into the operation of the poor-laws in England and Wales. His report, published with others in 1833, commanded most attention, being remarkable alike for the wide and searching character of its investigations, the happiness of its illustrations, and the convincing proofs it furnished as to the necessity of reform in the system of administration. Its merit was recognized by those who had the power to reward him; and on the organization of the new Poor-law Board, C. was appointed secretary. In connection with this Board, and the General Board of Health, C. for twenty years was energetic in the origination and administration of remedial measures relative to the distribution of poor-law funds and to the sanitary condition of the country. He has also given much attention to the constitution of the constabulary force, with a view to the better prevention of offences and the readier detection of criminals. On a change being made in the Board of Health in 1854, C. retired with a pension. He has since taken great interest in promoting competitive examinations for government offices, and indeed in almost all questions of social economy. He has been an active member of the association for the Promotion of Social Science. In 1859—1860, he collected evidence for the Education Commission.

CHÆRONEI'A, a city of Bœotia, in ancient Greece, near the Cephissus, on the borders of Phocis. It is celebrated on account of several important battles fought in the neighborhood. In 447 B.C., the Bœotians here obtaind a victory over the Athenians; and in 338 B.C., Philip of Macedon signally defeated the united forces of the Athenians and Bœotians, and so crushed the liberties of Greece. A mound of earth, about a mile from the modern village of Kapurna, which occupies the site of the old city, still marks the

place where the Thebans who fell in battle were buried; and a magnificent lion, which Colonel Mure pronounced to be 'the most interesting sepulchral monument in Greece,' was excavated from this tumulus some years ago. At C. also, 86 B.C., Sulla defeated the generals of Mithridates. Plutarch was a native of this town. A few ancient remains yet exist.

CHÆTODO'NTIDÆ, a family of acanthopterous fishes, nearly corresponding to the genus Chætodon (Gr. hair-tooth) of Linnæus; and also named SQUAMIPENNES (Lat. scaly-finned), because of the most distinctive character of the family, the incrustation of the soft portions of the dorsal and anal fins, and often of the spinous parts also, with scales, the fins appearing to taper gradually out of the thickness of the body, which is in general remarkably compressed, so that, without dissection, it is impossible to tell where they begin. The scales are strongly ctenoid (q. v.). The typical genus *Chætodon*, and those most nearly allied to it, have hair-like teeth, so that their jaws resemble brushes; some fishes of the family, however, have trenchant teeth on the jaws, and some, as *Brama* (q. v.), have card-like teeth both on the jaws and palate. Most of the C. are tropical; only one species, *Brama Raii*, is ever found in the British seas. They generally frequent rocky shores. Their colors are often extremely gay, and usually disposed rather in stripes or bands than in spots. 'The eye of man receives the greater pleasure from their contemplation, in that, being of moderate or small size, and haunting habitually the coral basins of the transparent tropical seas, they disport themselves in the beams of a vertical sun, as if desirous of exhibiting their splendid liveries to the greatest advantage in the blaze of day.' Many singularities of form occur in this family, as the long slender snout of the *Chelmons*, the whip-thong-like prolongation of some of the rays of the dorsal fins in *Heniochus* and *Zanclus*, the wing-like dorsal and anal fins of *Platax*, the sharp recurved horns of the Buffalo fish (*Taurichthys*), &c. To this family belong the archer fishes (q. v.), whose singular habits have been already noticed.—The flesh of most of the C. is of very fine flavor.

Chætodon.

CHA'FER, a common name of those beetles or coleopterous insects, which either in the perfect or larva state, are destructive to plants; particularly those which devour the wood, bark, or roots of trees. From these, however, it is sometimes extended to some coleopterous insects which have no such habit. The word C. is seldom used alone, but generally as part of a name, with some prefix; thus, we have *Cock-chafer*, *Rose-chafer*, *Bark-chafer*, &c.

CHA'FF-CUTTER, a name commonly given to an implement now much used by farmers for cutting hay and straw into half-inch lengths. The advantage of this consists not so much in facilitating mastication or digestion, as in preventing animals from wasting their food. No small amount of mechanical ingenuity has been applied to the construction of chaff-cutters, the simplest and oldest kinds of which are mere hand-machines with a single large knife, the hay or straw being pushed forward in a trough or box, whilst others are driven by horse, steam, or water power, and are not a little complicated.

CHA'FFINCH (*Fringilla cœlebs*), one of the most common British birds, a species of Finch (q. v.), and probably that to which the name Finch, now so extended in its signification, originally belonged; *fink*, the German form of the name, and *pink* and *twink*, English provincial forms still appropriated to the C., having some resemblance of sound to its common call-note. The whole length of the C. is about six inches. The tail is very slightly forked. The male, in summer, has the top of the head and nape of the neck bluish-gray; the back, chestnut; the wings almost black, with two conspicuous white bars; the tail, nearly black. The colors of the female are much duller than those of the male. The C. is a very widely distributed species, being found in almost all parts of Europe, in some parts of Asia, in the north of Africa, and as far west as the Azores. In the colder northern countries, it is migratory; in more southern regions, it is stationary. Linnæus gave it the specific name *cœlebs*, from observing that the flocks congregated in winter in Sweden consisted chiefly of males, the females having, as he supposed, sought a milder climate. A partial separation of the sexes is observed also in the great winter-flocks in Britain, but it is only partial; and Yarrell thinks that the young males of the previous season, which resemble the females in plumage, are associated with them, and have been mistaken for them. The flocks seen in Britain in winter are believed to be augmented by migration from Scandinavia. The eggs are usually four or five in number, of pale purplish buff color, sparingly streaked and spotted with reddish brown.

The C. feeds chiefly on insects, and does much service in summer by destroying aphides and caterpillars; but eats also seeds, and is sometimes persecuted, because in spring it pulls up and eats young turnips and radishes when in the seed-leaf. Great numbers of chaffinches are killed for the table in Italy. In Germany, this bird is in the highest esteem as a song-bird. Its notes are very clear and loud, but some individuals greatly excel the ordinary multitude of their species; and their superior notes, if heard on the Thuringian hills, speedily attract bird-catchers. Bechstein says that, in Thuringia, a cow has been given for a C. with a fine voice; and the Germans have taken the trouble to classify the different strains of chaffinches, giving them distinct names, and regarding those birds as particularly valuable by which certain of these strains are produced.—The common Scotch name of the C. is *Shilfa*.

CHAGRES, a river entering the Gulf of Darien on the north side of the Isthmus of Panama, near lat. 9° 18′ N. Though, towards its mouth, it varies in depth from 16 to 30 feet, it is yet, by reason at once of its rapidity and its falls, but little available for navigation. At its entrance is a port of its own name. Both the town, however, and the stream have recently lost nearly all the advantages of their position, through the establishment of an inter-oceanic railway, which, on the Atlantic side, commences at Aspinwall, about 8 miles to the north.

CHAILLU, PAUL B. DU, a distinguished traveler, was born in the south of France, about 1820. His father was for many years a merchant trading on the Gaboon (q. v.) River, in Western Africa, and thither he was carried when a boy. He lived there for several years, and became familiar with the habits and languages of the natives, thus—as well as in his habituation to the climate—unconsciously preparing himself for the explorations which he was afterwards to undertake. In 1842, the French made a settlement and built a fort on the Gagoon. Under the protection of this fort, both the elder and younger Du C. resided and carried on their commercial pursuits for some years. Du C. afterwards went to America, where he resided for a number of years, and was naturalized by the legislature of the state of New York. In October 1855, he sailed from New York to West Africa, where he spent four years in explorations, making many interesting discoveries, and traveling, as he himself tells us, about 8000 miles, always on foot, and unaccompanied by other white men. He returned to America, and after subjecting his specimnes in natural history and ethnological notes to the examination of the scientific men of New York and Boston, he crossed the Atlantic to England, and published a volume of travels—*Explorations and Adventures in Equatorial Africa, with Accounts of the Manners and Customs of the People, and of the Chase of the Gorilla, Crocodile, Leopard, Elephant, and other Animals* (Lond. 1861). His travels were in a region lying between N. lat. 1° 30′, and S. lat. 2°, and extending from the coast to about E. long. 14° 15′; and the work in which he gives an account of them contains very important contributions to geographical, ethnological, and zoological science.

Under the first of these heads must be ranked, as of chief importance, the information concerning the Fernand Vas, Ogobai, and Rembo rivers (see OGOBAI), and concerning the mountain chain which, between the equator and S. lat. 1°, stretches from west to east from the neighborhood of the coast far into the interior of Africa. He made known the existence and described the characteristics and habits of a number of African tribes, among which particular interest attached to his account of the Fans (q. v.), a cannibal tribe, inhabiting a region on the western side of the coast-range of mountains, just to the north of the equator. His contributions to zoology related not only to the gorilla and other remarkable apes, some of them previously quite unknown, but included also many new species of mammals and birds. Many of the statements contained in this volume, however, being very extraordinary, it was received with much distrust, and was subjected to very adverse criticism; to which it was the more exposed because the author's journals having been put into the hands of a literary gentleman in America to be prepared for the press, separate journeys were mixed up in the narrative, and the chronology was thrown into confusion. Much discussion took place in newspapers and periodicals, and some writers went so far as to assert their belief that Du C.'s stories about the gorilla were entirely fabulous, and that he had never seen the animal alive, but had purchased the specimens which he brought to England from natives on the coast. His descriptions of nest-building apes were, of course, also received with incredulity, and the truth of his account of the cannibal Fans was much doubted. The maps drawn up by Dr. Barth and Dr. Petermann in 1862 moved the positions of all the places which he had visited much nearer the coast than he had fixed them, so as greatly to reduce the length of his routes. The general trustworthiness of Du C.'s narrative was, however, maintained by some men of the highest eminence, and particularly by Sir Roderick Murchison and Dr. Owen. Du C. resolved to confute his opponents, and vindicate his own reputation, by another expedition to Africa, for which he prepared

himself by a course of scientific study, to enable him to make astronomical and other observations, and by acquiring the art of photography. During his first explorations, he had laid down the position of places from compass-bearings only. The substantial accuracy of his observations was, however, in the meantime confirmed by a French government expedition under Messrs. Serval and Griffon du Bellay, which explored the Ogobai River in 1862; and Dr. Petermann then reconstructed his map of that part of Africa as Du C. had originally laid it down. His statements regarding the cannibalism of the Fens were also confirmed by Captain Burton, who himself traveled among them.

Du C., however, proceeded on his second expedition. He freighted a small schooner, and sailed in her from England on 6th August 1863, carrying with him not only an ample store of scientific apparatus, but also of goods for presents to the natives, or barter with them. He reached the mouth of the Fernand Vas River on 10th October, and was warmly welcomed by the African chiefs whom he had formerly known; but he sustained a grievous misfortune in the loss of his scientific instruments and many other valuable articles, through the swamping of the canoe by the surf, as they were being landed from the schooner. He was compelled to send to England for another set of instruments, and to wait ttll they arrived. Meanwhile, he made several excursions in the neighborhood of the coast, through the almost impenetrable jungle which covers the western coast regions of equatorial Africa, and had abundant opportunity of confirming his former observations regarding the gorilla. He also had live ones caught and brought to him by the natives. In September 1864, Du C. having received his new supply of instruments from England, started on his expedition for the exploration of the interior. He was attended by a body-guard of ten Commi negroes, in thick canvas trousers, blue woollen shirts, and worsted caps, each man having a blanket to keep him warm at night. There was difficulty, however, in getting leave to set out on the expedition at all. It is the universal rule among the coast tribes of West Africa to prevent, if possible, all strangers from penetrating into the exterior, even if it be only to the next tribe, through fear that the exclusive privilege of trading with that tribe should be lost. A grand *palaver* was held on the subject, and it was at last agreed that Du C. should be allowed, as a special favor, to ascend the Fernand Vas or Ogobai, as his object was not to trade, but to shoot animals, and to bring away the skins and bones. 'Truly,' the chiefs and councillors said, 'we do not know what Chaille has in his stomach to want such things, but we must let him go.' Du C. revisited some of the scenes of his former explorations—the Ogobai, the Rembo, and their branches. He suffered great hardships, being sometimes at a loss even for food, and his attendants being almost all at one time ill of smallpox, which made fearful havoc among the native population, and exposed him to the dangerous suspicion of having caused it by witchcraft. He passed through a forest district so dense that animal life is scarcely found in it, and an almost unbroken silence prevails by day and by night. He found also in his journeyings many scenes of extreme beauty, scenes of mountain and meadow, hill and pasture-land, groves of plantains, groves of lime-trees remarkable for dark foliage, stately palms, and clear sparkling streams. An unfortunate misunderstanding took place at last between Du C.'s party and the inhabitants of a village which he had reached. A conflict took place, the natives became exasperated, and it was with difficulty that the traveler escaped, being obliged, however, to resign all thought of proceeding further. He reached the mouth of the Fernand Vas River on 21st of September 1865, and found a vessel there loading for London. He had lost everything but his journals; all the treasures in natural history which he had collected, were gone. He brought home, however, his astronomical observations. Du C. did not penetrate, on any of his journeys, much more than 240 miles in a direct line from the coast, but his discoveries have been numerous and important, and amongst them are about eighty new species of mammals and birds. No one now doubts the right of Du C. to be ranked amongst the most enterprising and truthful of travelers. The account of his second expedition to Africa is entitled *A Journey to Ashango-Land* (Lond. 1867). His ethnographical observations were published in *My Apingi Kingdom* (1870); and *The Country of the Dwarfs* (1872). His *Land of the Midnight Sun*, published in 1881, is a very interesting record of his experiences during a stay of several years in Norway and Sweden.

CHAIN, in surveying (called Gunter's Chain, from its inventor), is a measure of 22 yards long, composed of 100 iron links, each of which is thus 7·92 inches long. As an acre contains 4840 square yards, 10 square chains (22×22×10=4840 square yards), or 100,000 square links, make an acre.

CHAIN-BRIDGE. See SUSPENSION BRIDGES.

CHAIN-CABLE. See CABLE.

CHAIN-MAIL, or CHAIN-ARMOR, much used in the 12th and 13th centuries, consisted of hammered iron links, connected to one another into the form of a garment. Such armor was much more flexible and convenient to the wearer that that which was formed of steel or brass plates, but was less fitted to bear the thrust of a lance.

CHAIN-SHOT, a nearly obsolete kind of ammunition, chiefly used in naval warfare, consisting of two balls connected by a short chain. The object of the chain is to destroy the rigging, &c., which otherwise might escape. As grape-shot has been found to serve the same end, the making of C.-S. has been discontinued.

CHAINS, on shipboard, are strong iron links or plates, bolted at the lower end to the ship-timbers, and having a block or *deadeye* at the upper end. Their purpose is to fasten down the shrouds tightly. They are brought out laterally at the top by resting in the middle against the channels, which are broad thick planks, very strongly fixed, and projecting horizontally from the side of the ship, one pair for each mast.

CHAINS, HANGING IN. In atrocious cases, it was usual for courts of justice, in former times, to direct the bodies of malefactors, after execution, to be hung in C. upon a gibbet near the spot where the crime was committed; but this, says Blackstone, 'was no part of the legal judgment.' The reasons commonly assigned for the practice are two: first, that it might strike terror into other offenders; and second, that it might afford 'a *comfortable* sight to the relations and friends of the deceased.' This barbarous adjunct to capital punishment was not finally abolished till a very recent period, and it may surprise our readers to learn that two years after the passing of the Reform Bill, it was still in accordance with the law, if not with the custom of England. The act 'to abolish the practice of hanging the bodies of criminals in chains' (4 and 5 Will. IV. c. 26), was passed on 25th July 1834. The last case of hanging in C. mentioned as having occurred in Scotland, is that of Andrew Wilson, who poisoned his wife in 1755 (Hume, vol. ii., p. 482). See PUNISHMENTS and DISSECTION.

CHALA'ZA, in Botany, a membrane which unites the nucleus and integuments at the base of an ovule. It is traversed by vessels which supply nourishment to the ovule. It is often of a different color from the rest of the integuments, and is conspicuous in the ripened seed; but it is sometimes difficult to distinguish it, particularly in *orthotropal* seeds, when it is in contact with the *hilum*, the *foramen* or *micropyle* being at the opposite extremity of the seed. See OVULE and SEED.

The cords which bind the yolk-bag of an egg to the lining membrane at the two ends of the shell, and keep it near the middle as it floats in the albumen, are also called *chalazæ*. They appear to be formed of a peculiarly viscid albumen.

CHALCE'DON, a city of ancient Bithynia, at the entrance of the Euxine, opposite to Byzantium. It was founded 684 B.C. by a colony from Megara, and soon became a place of considerable trade and importance. It contained several temples, one of which, dedicated to Apollo, had an oracle. C. was taken by the Persians, suffered the vicissitudes of war during the strife for Grecian supremacy between the Athenians and Lacedæmonians, and finally merged into the Roman empire. During the Mithridatic war, it was the scene of a bold exploit of the Pontic sovereign. Having invaded Bithynia, all the wealthy Romans in the district fled for refuge to C., whereupon he broke the chains that protected the port, burned four ships, and towed away the remaining sixty. Under the empire it was made a free city, and was the scene of a general council, held 451 A.D., Chosroes, the Persian, captured it 616 A.D., after which it declined, until it was finally demolished by the Turks, who used its ruins to build mosques and other edifices at Constantinople. C. was the birthplace of the philosopher Xenocrates.

The *council* of C., to which allusion has been made, was the fourth universal council, and was assembled by the emperor Marcian for the purpose of drawing up a form of doctrine in regard to the nature of Christ, which should equally avoid the errors of the Nestorians (q. v.) and Monophysites (q. v.). Six hundred bishops, almost all of the Eastern or Greek Church, were present. The doctrine declared to be orthodox was, that in Christ there were two natures, which could not be intermixed (this clause was directed against the Monophysites), and which also were not in entire separation (this was directed against the Nestorians), but which were so conjoined, that their union destroyed neither the peculiarity of each nature, nor the oneness of Christ's person.

CHALCE'DONY (often misspelled *Calcedony*), a beautiful mineral of the quartz family, or rather a variety of quartz, from which it does not differ in chemical composition or in any essential character. It derives its name from Chalcedon in Bithynia, near which it is found in considerable abundance, and has been known by the same name from ancient times. It occurs in different kinds of rock, but most frequently in old lavas and trap-racks, and is found in almost all parts of the world where these exist, or where there are boulders derived from them.

It is common in Scotland, and specimens of great beauty are

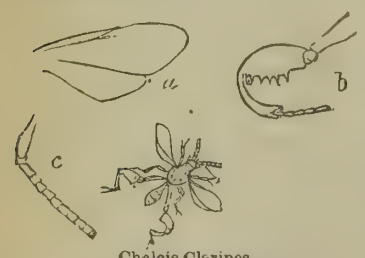
brought from Iceland and the Faröe Islands. It never occurs in crystals. It constitutes the whole or the principal part of many agates. It is generally translucent, sometimes semi-transparent, has not much lustre, and is in color generally white or bluish-white, sometimes reddish-white, sometimes milk-white, less frequently gray, blue, green, yellow, brown, or even black. Its fracture is even, or very slightly conchoidal.—C. is much used in jewelry, for brooches, necklaces, and ornaments of all sorts, the largest pieces being sometimes made into little boxes, cups, &c. It was much used by the ancients, and many beautiful engraved specimens appear in antiquarian collections. Chalcedonies with disseminated spots of brown and red, were once very highly prized, and were called *Stigmites* or *St. Stephen's-stones*. Petrified plants are sometimes found in C., in which they appear to have been encased whilst it was in course of formation. Specimens of C. are sometimes found enclosing a little water in the interior, which gives them a very beautiful appearance; but the water easily escapes, to prevent which, rings or other ornaments made of such stones are kept in distilled water when not worn. The ancients set a very high value on these *enhydrites* (Gr. *en*, in, and *hydor*, water). The Vicentin was celebrated for producing them.

CHALCE'DONYX (or, erroneously, *Calcedonyx*), a name given to agates formed of cacholong, or a white opaque chalcedony, alternating with a grayish translucent chalcedony.

CHA'LCIS, the capital town of the island and government of Eubœa, Greece, situated on the Euripus, a strait separating the island from Bœotia, and which at this point is only 120 feet wide. The Euripus is divided into two channels, of unequal breadth and depth, by a rock, which is surmounted by a castle, partly of Venetian and partly of Turkish construction. A stone bridge, of some 70 feet in length, connects the rock with the Bœotian shore, while a wooden and movable bridge, of about 35 feet, unites it with Chalcis. C. is a place of very great antiquity, having been founded as tradition asserts, before the Trojan war, by an Ionian colony from Athens. Its rise was rapid. It sent out numerous colonies, and was the center of the trade of the western Mediterranean. Governed at first by an aristocracy, it fell into the hands of the Athenians, who in 506 B.C. divided the lands of C. amongst some of their own number. It subsequently fell under the power of the Macedonians and Romans, and was at this time a place of great military importance, nearly 9 miles in circumference, and had many fine temples, theaters, and other public buildings. Aristotle died at Chalcis.

In the middle ages, it was prosperous under the Venetians, who held it for nearly three centuries, until its conquest by the Turks in 1470. The lion of St. Mark is, or was until within recent years, still to be seen over the gateway between the bridge and the citadel. Not many ancient remains now exist at Chalcis. The streets are narrow, but the houses, many of which owe their origin to the Venetians, are substantial and spacious. Pop. (1870) 6447.

CHA'LCIS, a genus of Saurian reptiles, the type of a family called *Chalcidæ*, some of which are popularly termed snake-lizards, because of the resemblance to snakes in the elongated form of the body, the limbs being also remarkably small, so that this family forms one of the transition links between the Saurian and the Ophidian reptiles. The scales are rectangular, and arranged in transverse bands, without being imbricated or disposed like tiles. The *Chalcidæ* are natives of warm climates, both in the old and new worlds.



Chalcis Clazipes,
One of the largest British species:
a, the wings of one side, magnified (very destitute of nervures); *b*, hind-leg, magnified; *c*, antenna, magnified.

The name C. has also been bestowed on a genus of the order *Hymenoptera*, allied to the Ichneumons, which has become the type of a tribe or family, containing a vast number of species —1500 being supposed to exist in Britain—all of them of small size, many very minute, many of them very brilliant in their colors, and the larvæ of all of them parasitic in the larvæ or pupæ, some even in the eggs, of other insects. The chrysalis of a butterfly or moth often nourishes a great number of these parasites; and they become useful in preventing the excessive multiplication of species which destroy valuable plants.

CHALCO'GRAPHY, a pedantic term used to signify engraving on copper, compounded of the Greek words *chalkos*, brass or copper, and *grapho*, I write. The term is inaccurate when applied, as it often is, to engraving on other metals, such as steel and zinc. For zinc-engraving, the still more objectionable word *Zincography* has been invented.

CHALDÆ'A. See BABYLON, BABYLONIA.

CHA'LDEE. See ARAMÆA.

CHALDER, an old Scotch dry measure, containing 16 bolls. See BOLL.

CHA'LDRON (Lat. *caldarium*, a vessel for warm water), an old dry measure used in selling coal, and containing 36 heaped bushels. Coal is now sold by weight.

CHALEUR BAY, an inlet of the Gulf of St. Lawrence, between Gaspe, a district of Lower Canada, and New Brunswick, having a depth of 90 miles from east to west, and a width varying from 12 to 20. The Ristigouche, which enters the gulf from New Brunswick at its very head, marks, at its mouth, the inter-provincial boundary.

CHA'LICE (Lat. *calix*, a cup). This ancient name for an ordinary drinking-cup has been retained for the vessels used for the wine in the holy sacrament. Chalices are commonly made of silver, but it was not unusual for them to be of gold, or gilt and jeweled. Chalices were also made of glass, crystal, and agate; but these substances have been abandoned, in consequence of their fragile nature. The C. is the attribute of St. John the Evangelist.

Chalice:
Found in a Stone Coffin of the 12th century in Chichester Cathedral.—Copied from Parker's *Glossary of Architecture*.

CHALK, a soft earthy variety of limestone or carbonate of lime, forming great strata, and claiming the attention of the geologist even more than of the mineralogist. It is generally of a yellowish-white color, but sometimes snow-white. It is easily broken, and has an earthy fracture, is rough and very meagre to the touch, and adheres slightly to the tongue. It generally contains a little silica, alumina, or magnesia, sometimes all of these. Although often very soft and earthy, it is sometimes so compact that it can be used as a building-stone; and it is used for this purpose either in a rough state, or sawn into blocks of proper shape and size. It is burned into quicklime, and nearly all the houses in London are cemented with mortar so procured. The silicious particles being separated by pounding and diffusing in water, it becomes whiting, of which the domestic uses are familiar to every one. Carpenters and others use it for making marks, which are easily effaced: the *blackboard* and piece of C. are now common equally in the lecture-rooms of universities and in the humblest village-schools. C., perfectly purified, is mixed with vegetable coloring matters, such as tumeric, litmus, saffron, and sap-green, to form pastil colors; but vegetable colors which contain an acid are changed by it. See CRAYON. The *Vienna white* of artists is simply purified chalk. In a perfectly purified state, it is administered as a medicine, to correct acidity in the stomach. C. is also extensively used as a manure. See LIME, as a manure.

CHALK, BLACK, is a mineral quite different from common chalk, and apparently receives its name from resembling it in meagreness to the touch, in soiling the fingers, and in being used for drawing, writing, &c. It is also called DRAWING-SLATE. It is of a slaty structure, of a bluish or grayish-black color, easily cut and broken, and makes a perfectly black mark on paper. It is used for drawing, and as a black color in painting. It becomes red by exposure to heat. It is essentially a kind of clay (q. v.), and derives its color from carbon, which it contains. It is found in primitive mountains, in Spain, France, Italy, &c., also in the coal formation in Scotland.—BRIANÇON CHALK and FRENCH CHALK are popular names for Soapstone (q. v.).—RED CHALK is *Ochry Red Clay-iron-ore*, consisting of clay and much peroxide of iron. It is a brownish-red color, and a somewhat slaty structure, the cross fracture earthy. The coarser varieties are used chiefly by carpenters for making marks on wood; the finer, by painters. It occurs in thin beds in clay-slate and grauwacke-slate in some parts of Germany.

CHALK-BEDS. See CRETACEOUS GROUP.

CHALKING THE DOOR, a mode of warning tenants to remove from burghal tenements, long known and still in use in Scotland. The practice is thus described by Mr. Hunter in his valuable work on Landlord and Tenant: 'A burgh-officer, in presence of witnesses, chalks the most patent door forty days before Whitsunday, which is held to be a legal warning. There is no execution at the parish church, but the officer makes out an execution of 'chalking,' in which his name must be inserted, and which must be subscribed by himself and two witnesses. This ceremony now proceeds simply on the verbal order of the proprietor, but anciently the interposition of a judge was requisite. In such a case, authority was given by one of the magistrates to the burgh-officer.' That judicial authority is still assumed to lie at the root of the proceeding, is apparent from the fact, that the execution bears that the warning has been executed in her Majesty's name and authority, and that of the magistrates of the burgh. The officer ought to notify to the tenant the object of his visit, though

It is not perhaps indispensable that he should do so. The execution of chalking is a warrant under which decree of removal will be pronounced by the burgh-court, in virtue of which the tenant may be ejected on the expiration of a charge of six days. See EJECTMENT.

CHALKY ISLAND, in New Zealand, near the south-west extremity of Middle Island, about lat. 46° S., and long. 166° 20′ E. It takes its name from being composed of a mass of white limestone, and imparts the same to the adjacent bay of 16 miles in length, and also to one of the harbors of the inlet.

CHA'LLENGE. See DUEL.

CHALLENGE. See JURY.

CHA'LMERS, GEORGE; an eminent historical antiquary, was born at Fochabers, Morayshire, Scotland, in 1742. Having attended King's College, Aberdeen, and afterwards studied law at Edinburgh, he went in 1763 to North America, where he practised as a lawyer till the breaking out of the war of independence. Being a keen loyalist, he returned to Britain where he was appointed clerk to the Board of Trade in 1786. The duties of this office he continued to discharge with diligence and ability till his death in 1825. Before his appointment, he had distinguished himself by various publications in political economy; and for some time after he devoted himself chiefly to editing the works of various authors and writing biographies. His great work is his *Caledonia: an Account, Historical and Topographical of North Britain;* a production displaying profound research into the history of Scotland, and aboundiug in varied erudition. It was intended to be completed in 4 vols. 4to. The first volume, containing the historical part, appeared in 1807; of the other three which were destined to give an account of the several counties, the second, embracing Roxburghshire, Berwickshire, Haddingtonshire, Edinburghshire, Linlithgowshire, Peeblesshire, and Selkirkshire, appeared in 1810; the third, containing the counties of Dumfries, Kirkcudbright, Wigton, Ayr, Lanark, Renfrew, and Dumbarton, appeared in 1824. A fourth volume is understood to have been left at his death, ready for the press.

Among his other publications are: *Political Annals of the United Colonies* (Lond. 1780); *On the Comparative Strength of Great Britain, during the present and the four preceding Reigns* (Lond. 1782, 1786, 1794, 1802, 1812); *A Collection of Treaties between Great Britain and other Powers* (2 vols. Lond. 1790); *Life of Daniel Defoe* (Lond. 1786); *Life of Thomas Ruddiman* (1794); *Life of Mary Queen of Scots* (Lond. 1818); editions of the works of Allan Ramsay (1800), and of Sir David Lindsay (1806), with memoirs; also various pamphlets apologizing for those, himself included, who had believed in the authenticity of the Shakspeare manuscripts forged by Mr. Ireland.

CHALMERS, THOMAS, D.D., LL.D., was born at Anstruther, in Fifeshire, 17th March 1780, educated at the university of St. Andrews, and in his 19th year licensed to preach the gospel. In 1803 he was ordained minister of the parish of Kilmany, in Fifeshire, about 9 miles from St. Andrews. At this period, his attention was entirely absorbed by mathematics and natural philosophy, to the neglect of the studies appertaining to his profession. To gratify his love of scientific pursuits, he even formed mathematical and chemistry classes in St. Andrews during the winter of 1803—1804, and by his wonderful enthusiasm and lucidity of exposition excited intense interest, and obtained for himself a great reputation. In 1808 he published an *Inquiry into the Extent and Stability of National Resources*, which proved his capacity for dealing with questions of political economy. Shortly after this, certain domestic calamities, and a severe illness of his own, opened up the fountains of his soul, and rendered him keenly susceptible to religious impressions. Having to prepare an article on Christianity for Brewster's *Edinburgh Encyclopædia*, he commenced an extensive study of the evidences, and rose from his investigations convinced that Christianity was a *fact*, and the Bible the veritable 'word of God.' Then the great genius of the man broke forth like sunshine. He grew earnest, eloquent, devout, and faithful to his pastoral duties. In July 1815, he was translated to the Tron Church and parish, Glasgow, where his magnificent oratory took the city by storm. His *Astronomical Discourses* were probably the most sublimely intellectual and imaginative that had ever been preached in a Scottish pulpit. They were published in 1817, and had a prodigious popularity. During the same year he visited London, where his preaching excited as great a sensation as at home. But C.'s energies could not be exhausted by mere oratory. Discovering that his parish was in a state of great ignorance and immorality, he began to devise a scheme for overtaking and checking the alarming evil. It seemed to him that the only means by which this could be accomplished was by 'revivifying, remodeling, and extending the old parochial economy of Scotland,' which had proved so fruitful of good in the rural parishes. In order to wrestle more closely with the ignorance and vice of Glasgow, C., in 1819, became minister of St. John's parish, 'the population of which was made up principally of weavers, laborers, factory-workers, and other operatives.' 'Of its 2000 families,' says Dr. Hanna, 'more than 800 had no connection with any Christian church, while the number of its uneducated children was countless.' We have not space to narrate at length how vast and successful were the labors of Chalmers. It is sufficient to say, that in pursuance of his favorite plan, he broke up his parish into 25 districts, each of which he placed under separate management, and established two week-day schools, and between 40 and 50 local Sabbath schools, for the instruction of the children of the 'poorer and neglected classes,' more than 1000 of whom attended.

In a multitude of other ways he sought to elevate and purify the lives of his parishioners. While in Glasgow, C. had matured his opinions relative to the best method of providing for the poor. He disliked the English system of a 'compulsory assessment,' and preferred the old Scotch method of voluntary contributions at the church-door, administered by elders. The management of the poor in the parish ef St. John's was intrusted to his care by the authorities, as an experiment, and in four years he reduced the pauper expenditure from £1400 to £280 per annum.

But such herculean toils began to undermine his constitution, and in 1823 he accepted the offer of the Moral Philosophy chair in St. Andrews, where he wrote his treatise on the *Use and Abuse of Literary and Ecclesiastical Endowments* (1827). In the following year, he was transferred to the chair of Theology in Edinburgh, and in 1832 published a work on political economy. In 1833 appeared his Bridgewater treatise, *On the Adaptatian of External Nature to the Moral and Intellectual Constitution of Man*. It was received with great favor, and obtained for the author many literary honors; the Royal Society of Edinburgh electing him a fellow, and the French Institute a corresponding member, while the Universtty of Oxford conferred on him the degree of D.C.L. In 1834, he was appointed convener of the Church-extension Committee; and after seven years of enthusiastic labor announced that upwards of £300,000 had been collected from the nation, and 220 new churches built. Meanwhile, however, troubles were springing up in the bosom of the church itself. The Evangelical party had become predominant in the General Assembly, aad came forward as the vindicators ef popular rights; the struggles in regard to patronage between them and the 'Moderate' or 'Erastian' party became keener and more frequent, until the decision of the civil courts in the famous 'Auchterarder and Strathbogie' cases brought matters to a crisis; and on the 18th of May 1843, C., followed by 470 clergymen, left the church of his fathers, rather than sacrifice those principles which he believed essential to the purity, honor, and independence of the church. See articles DISRUPTION and FREE CHURCH. The rapid formation and organization of the Free Church were greatly owing to his indefatigable exertions, in consequence of which he was elected Principal of the Free Church College, and spent the close of his life in the zealous performance of his learned duties, and in perfecting his *Institutes of Theology*. He died suddenly at Morningside, Edinburgh, May 30, 1847.

This is not the place for a criticism on the works of C., which extend to more than 30 vols. It is sufficient to say, that they contain valuable and, in some cases, original contributions to the sciences of natural theology, Christian apologetics, and political economy; while on minor topics, such as the church-establishment question, they exhibit both novelty and ingenuity of argument. As an orator, C. was unique and unrivaled. We read of men in the history of the Churistian church, whom we can believe to have been as eloquent, impassioned, and earnest, but nowhere do we eocounter a man in whom intellect, feeling, and imagination were so harmoniously combined—a nature so 'nobly planned, to warn, to comfort, and command.' Scotland never produced a greater or more lovable soul, one more gentle, guileless, genial-hearted, or yet more fervid, from the strength of a resolute and irresistible will, before whose impetus difficulties were dashed aside as by a torrent. There have been some loftier and more purely original minds in Scotlaud than C.'s, but there has never been a truer one, nor a heart whose Christian faith and piety were more intense, sincere, and humane.

CHALON-SUR-SAONE, a town of France, in the department of Saone-et-Loire, about 33 miles north of Mâcon. It is situated on the right bank or the Saone, at the point where the river is joined by the Canal-du-Centre, which unites the Saone with the Loire, and secures C. an extensive traffic with the central districts of France, as well as with the Mediterranean and Atlantic. The town is generally well built, good quays line the river, along which also the finest houses extend. Vineyards, wood, meadows, and cultivated fields surround and add variety and beauty to the situation. Its manufactures include hats, hosiery, vinegar, oil, pottery, jewelry, and imitation pearls; and it has a large trade in the agricultural and other produce of the district. Steamboats navigate the Saone from C. downwards. Pop. (1876) 20,571. C. occupies the site of the ancient *Cabillonum* or *Caballinum*.

CHALONS-SUR-MARNE, a town of France, in the department of Marne, 107 miles east of Paris by railway. It stands on the right bank of the river Marne, which is here crossed by a handsome stone bridge. C. is old; and the houses consist chiefly of timber, lath, and plaster. The situation, however, is agreeable, and the town contains some fine public buildings, the principal of which is the cathedral, in the sanctuary of which there is one of the finest grand altars in France. On the east side of the town there is the splendid *Promenade du Jard*, or park, which covers 19 acres. C. has manufactures of woollen, cotton, leather, &c., and a considerable trade in grain, hemp, rape-seed oil, and Champagne wine. Pop. (1876) 20,215. In 1284, the population was 60,000. In 451 A.D., the Romans and Goths defeated Attila and his host of Huns near C. In 1856, Napoleon III. formed the celebrated camp of C., to the north-east of the town. Hence, during the Franco-Prussian war, and upon the night of August 21, 1870, MacMahon withdrew his troops; and next day the town was occupied by the Germans.

CHALYBÆ'US, a genus of birds very closely allied to the Baritahs (q. v.), but having a rather thicker bill, and the nostrils pierced in a broad membranous space. The species are natives of New Guinea, and are birds of the most beautiful plumage, remarkable for the brilliancy of their metallic tints, and particularly for the resemblance to burnished steel, to which they owe their name (Gr. *chalyps*, *-ybos*, steel). On this account, they are sometimes included under the name of Birds of Paradise; and the skin of *C. paradisæus*, deprived of its feet, is sold as that of a Bird of Paradise.

CHALYBÆUS, HEINRICH MORITZ, a German philosopher, was born 3d July 1796, at Pfaffroda in Saxony, and educated at Leipsic. After spending some years in teaching, he was appointed in 1839 professor of philosophy in the university of Kiel, where he remained till his death in 1862. His chief works are the *Historische Entwickelung der speculativen Philosophie von Kant bis Hegel* (1836—English translations by Edersheim and Tulk); *System der speculativen Ethik*, (1850); *Philosophie und Christenthum* (1853); and *Fundamentalphilosophie* (1861).

CHALY'BEATE WATERS are those which contain a considerable proportion of iron in solution. They are of two kinds, *Carbonated* and *Sulphated*. The *Carbonated C. W.* contain carbonate of iron (FeO,CO_2) dissolved in excess of carbonic acid, and may be recognized by forming an ochry deposit of red oxide of iron (Fe_2O_3) on the surface of the stones near the mouths of the springs, owing to the escape of the carbonic acid on exposure to the air. Islington Spa near London, Tunbridge Wells, and Oddy's Saline C. W. at Harrogate, are examples of this class. Where an excess of carbonic acid is present, communicating a sparkling aspect to the water and an acidulous taste, as at Pyrmont, and other places, the term *acidulo-chalybeate* or *acidulo-ferruginous* is applied. The *Sulphated C. W.* contain sulphate of iron (FeO,SO_3) dissolved in them, and examples of this class are afforded at the Isle of Wight (the Sand Rock Spring), Vicars Bridge, Moffat, &c. C. W. are characterized by a more or less inky or styptic taste; by becoming of a purplish black tint when infusion of galls or tea, and some varieties of wine, are added; and by giving a pale-blue color on the addition of a few drops of ferrocyanide of potassium (yellow prussiate of potash). C. W. are of great service in cases of debility, and the *acidulc-carbonated* kind being lighter on the stomach, is generally preferred; but all C. W. are to be avoided in plethoric, febrile, and inflammatory conditions of the system.

CHAMÆ'ROPS, a genus of palms with fan-shaped leaves, less exclusively tropical than palms are in general, and of which one species, *C. humilis*, is the only palm truly indigenous to Europe. It extends as far north as to the neighborhood of Nice. It is sometimes called the PALMETTO. The flowers are in spathes about 6—8 inches long; the fruit is a triple blackish spongy drupe, which is eaten, as are also the young shoots. This palm is so tolerant of a cold climate, that a specimen has lived in the open air in the Botanic Garden of Edinburgh for more than fifty years, with the protection of matting in very severe winters. In its native regions, the leaves are much used for thatching, and for making brooms, hats, chair-bottoms, &c. They abound in an excellent fibre, which the Arabs mix with camel's hair, and make into tent covers: cordage, and sometimes sailcloth, are made of it in Spain; it is imported into France, and used for making carpets, under the name of *African Hair*. The French in Algeria make paper and pasteboard of it; and it is supposed that it may prove a valuable commercial commodity, as a material for paper-making.—Other species of the genus abundant in India, China, &c., serve similar purposes, and deserve attention in connection with paper.—To this genus belongs also the West Indian palm, which yields the material for chip-hats (see BRAZILIAN GRASS); and the Palmetto (q. v.) of North America is by some botanists referred to it.

Chamærops humilis.

CHA'MA, a genus of lamellibranchiate mollusks. The shell consists of two unequal valves, having two hinge-teeth in the one valve, and one in the other. The general form of the shell approaches to orbicular. The shell is generally thick, and is foliated with leaf-like projections, which arise in a somewhat regular manner from its surface; these and the colors of some of the species combining to make them very beautiful. The shells of the *Chamæ* are often called *Clams* or *Clamp*-shells, a name which they share with some of the *Pectens*, *Spondyli*, &c. They are found only in the seas of warm climates, none further north than the Mediterranean. The Linnæan genus C. contained many species now removed to other families, but the restricted genus C. is the type of a family *Chamidæ*. Thirty fossil species have been referred to C., four from the Cretaceous period, and twenty-six from the Tertiary.

CHAMA'DE. See PARLEY.

CHAMALA'RI, a peak of the Himalaya between Tibet and Bhotan, in lat. 28° 4′ N., and long. 90° E., said to have an elevation of 27,200 feet, or more than 5 miles and a furlong.

CHA'MBER, of a piece of artillery, or small arm, is a contracted part of the bore, at the breech end. The C. contains the charge of powder, but is too small to contain the shot or shell. Some of these cavities are spherical, some cylindrical, some conical with a hemispherical termination, and some pear-shaped. Carronades and shell-guns are usually chambered. The charge just fits the C., and the ball or shell comes in contact with it. Chambered guns are more slow to load and fire than those which are not chambered; and therefore the adoption of this form depends very much on the kind of service in which the weapon is to be employed. Its primary use is in kinds of ordnance in which the charge is small compared with the calibre, and in which, consequently, there would be great loss of power unless the charge were confined within a comparatively limited space at the time of the explosion.

CHAMBER-COUNSEL, a barrister or advocate who gives opinions in his own chambers, but does not, or rarely does, plead in court.

CHAMBER OF COMMERCE, a body of merchants and traders, associated for the purpose of promoting the interests of its own members, of the town or district to which the society belongs, and of the community generally, in so far as these have reference to trade and merchandize. Of the means by which these objects are sought to be accomplished, the following may be mentioned as the most prominent: 1. By representing and urging on the legislature the views of their members in mercantile affairs; 2. By aiding in the preparation of legislative measures having reference to trade, such, for example, as the Bankrupt Acts; 3. By collecting statistics bearing upon the staple trade of the district; 4. In some places, by acting as a sort of court of arbitration in mercantile questions; 5. By attaining by combination advantages in trade which might be beyond the reach of individual enterprise.

These institutions are of continental origin, and, like so many others which England has borrowed from that source, were first introduced into Scotland. The oldest C. of C. in France is that of Marseille, which dates from the end of the 14th or commencement of the 15th century. This chamber was invested with very remarkable powers. It shared in the municipal jurisdiction, and in the administrationof justice in mercantile questions.

It was several times suppressed and re-established, and it was not till 1650 that its powers were fixed, and that it received its ultimate organization. The second chamber in France was that of Dunkerque, which was established in 1700. The same year a council-general of commerce was instituted at Paris, which, in addition to six councillors of state, consisted of twelve merchants or traders, delegated by the principal commercial towns of the kingdom, an arrangement which led within the next few years to the formation of chambers of commerce everywhere in France. We thus find that the chamber at Lyon was instituted in 1702, those of Rouen and Toulouse in 1703, of Montpellier in 1704, of Bordeaux in 1705, &c. By an order of council of Aug. 30, 1702, a direct relation was established between these various chambers and the central Council of Commerce. These chambers were all suppressed by a decree of the National Assembly in 1791, but they were re-established by a consular edict in 1802, which fixed the population of the towns in which they might be established, and the number of their members, who were to be chosen from amongst the merchants who had carried on trade in person for a period of

not less than ten years. Sixty of the best known merchants, presided over by the prefect or the maire, were charged to elect the members of these new chambers. They then presented to the government two candidates for the office of member of the general council of commerce, instituted at Paris under the Minister of the Interior. This organization was again modified in 1832, and still later by the ordonnances of September 1851 and August 1852, by which these bodies are now regulated. In accordance with that decree, the members of these bodies are now elected by the chief merchants of each town chosen for that purpose by the prefect. Their number cannot be less than 9, nor more than 21. They hold office for six years, one-third of their number being renewed every two years, but the members resigning being re-eligible. The functions now assigned to these chambers in France are—to give to the government advice and information on industrial and commercial subjects; to suggest the means of increasing the industry and commerce of their respective districts, or of improving commercial legislation and taxation; to suggest the execution of works requisite for the public service, or which may tend to the increase of trade or commerce, such as the construction of harbors, the deepening of rivers, the formation of railways, and the like. On these and similar subjects, the advice of the chambers, when not volunteered, is demanded by the government. In most of the other countries of continental Europe there are similar institutions for the purpose of conveying information and advice to the central government, and making it acquainted with local feelings and interests in commercial matters.

The oldest C. of C. in Great Britain is believed to be that of Glasgow, which was instituted 1st January 1783, and obtained a royal charter, which was registered at Edinburgh on the 31st of the same month. That of Edinburgh was instituted in 1785, and incorporated by Royal Charter in 1786. The Edinburgh C. of C. was the first public body which petitioned for the abolition of the Corn Laws, and the adoption of free-trade principles; and stood almost alone in the United Kingdom in advocating the Suez Canal project. It also originated the movement that government should undertake the telegraph service in connection with the Post-office. Six hundred of the bankers, merchants, and shipowners of Edinburgh and Leith constitute the Chamber. The Manchester chamber since so famous for its exertions in the cause of free-trade, was not established till 1820, and for many years it continued to be the only institution of the kind in England. Its members number about 400. In Hull there has been a C. of C. since 1837, but those of Liverpool, Leeds, and Bradford, notwithstanding the great trading and manufacturing interests of these towns, were not established till 1850, in which year strangely enough, a similar institution was established in South Australia. The Liverpool C. of C. numbers nearly 600. The annual income of the Manchester chamber is upwards of £600, that of Liverpool about £800, contributed entirely by the subscriptions of members, amounting generally to £1, 1s. a year. There are now Chambers of Commerce in all the great mercantile towns of Great Britian and Ireland, and in 1860 there was established an 'Association of Chambers of Commerce of the United Kingdom.' In Canada, there is a Dominion Board of Trade, which consists of the Chambers of Commerce or Boards of Trade, as they are indifferently called, of a dozen of the most important cities of the Dominion.

CHA'MBERLAIN, Lord, or King's C., as he was formerly called, has been of the principal officers of state from very early times, and for centuries he was an influential member of the government. He has the function of endorsing the king's answer on petitions presented to him, and very often of communicating his majesty's pleasure to parliament and to the council. He was always a member of the council himself, *ex officio*. Though he has long ceased to have any share in the responsibilities of government, the C. is still an officer of very high standing in the royal household. He has control over all the officers and servants of the royal chambers, except those of the bedchamber, over the establishment attached to the Chapel Royal, the physicians, surgeons and apothecaries of the household. The C. has further the oversight of the Queen's musicians, comedians, trumpeters, messengers, &c.; and all tradesmen and artificers in her service are appointed by him.

When the office of Keeper and the Great Wardrobe was abolished in 1782, the duties of providing the state-robes of the royal family, the household, and officers of state, devolved on the lord chamberlain. All theaters in towns in which a royal palace is situated, require to be licensed by the Lord C., and no new play can be performed anywhere without his license. All persons desiring to be presented at levees or drawing-rooms, require to send their cards to the Lord C., and it is his duty to see that the persons thus applying are entitled by station and character to be presented to the Queen. The C. also issues her Majesty's invitations to balls, parties, &c. In accordance with ancient custom, the Lord C. is still a member of the Privy Council. His salary is £2000 a year, but his tenure of office depends on that of the political party to which he belongs.

The Vice-chamberlain is the deputy and assistant of the Lord C., and in his absence exercises the full authority which belongs to his principal. His office existed in the time of Richard II. He is also dependent on the administration, and is usually a member of the Privy Council. His salary is £924 per annum.

CHAMBERLAIN, The Lord Great, is a hereditary officer of great antiquity, and formerly of great importance. He has the government of the palace at Westminster, and, upon solemn occasions, the keys of Westminster Hall and of the Court of Requests are delivered to him. At these times, the Gentleman Usher of the Black Rod, the Yeoman Usher, and the door-keepers, are under his orders. At coronations, state trials, banquets, and the like, the fitting-up of the Hall devolves on him. When the Queen goes to parliament, he delivers the sword of state to any member of the administration whom he chooses, to be borne before her Majesty, he himself walking on her right hand. During the sitting of parliament, he has charge of the House of Lords, and issues tickets of admission on the opening or prorogation of parliament. Some fees and perquisites belong to him. This office, conferred by Henry I. on Alberic de Vere, was inherited by female succession from the De Veres, Earls of Oxford, by the Berties, and is now held conjointly by Lady Willoughby de Eresby and the Marquis of Cholmondeley, in right of their mothers, sisters and co-heirs of Robert, fourth Duke of Ancaster. They discharge the duties alternately in each succeeding reign, a lady acting by deputy. Lord Aveland is at present deputy Great Chamberlain.

CHAMBERS, Ephraim, the compiler of the first English encyclopædia. He was born at Kendal in the latter part of the 17th c., and began life as an apprentice to a globe-maker in London, where he conceived the idea of his encyclopædia. The first edition of the work, in 2 vols., folio, appeared in 1728; ten years later, the second appeared; and in the year following, the 3d. The 4th was issued in 1741, a year after the editor's death. A 5th appeared in 1746, and a 6th, with new matter, in 1750. This work forms the basis of Dr. Rees's Cyclopædia in 45 quarto vols., and may be considered as the forerunner of the now countless publications of an encyclopædic character (see Encyclopædia).

CHAMBERS, William and Robert, the editors and publishers of this *Encyclopædia* and other works; born at Peebles, W. in 1800, R. in 1802. Bearing up against the difficulties of his early life, W. C. began business as a bookseller in Edinburgh, 1819; afterwards adding printing to his business. Between 1825 and 1830, he wrote the *Gazetteer of Scotland*, 1 vol.; and the *Book of Scotland*, 1 vol. R. C. also began business as a bookseller in Edinburgh, and from 1823 to 1830 wrote successively the *Traditions of Edinburgh*, 2 vols.; *Popular Rhymes of Scotland*, 1 vol.; *Picture of Scotland*, 2 vols.; and *Histories of Rebellions in Scotland, and Life of James I.*, 5 vols. Next, he edited *Scottish Ballads and Songs*, 3 vols.; and *Biography of Distinguished Scotchmen*, 4 vols. His *Traditions of Edinburgh* procured him the friendship of Sir Walter Scott, who contributed various memoranda for the work. W. C. projected *Chambers's Edinburgh Journal*, and that periodical was commenced on the 4th of February 1832, about six weeks in advance of the *Penny Magazine*, and may be considered the pioneer of that class of cheap and popular periodicals of a wholesome kind now so generally diffused. The success of the *Journal* was materially promoted by the essays, moral and humorous, of R. C., who from the first was an able collaborateur. United from this period in the peculiar profession of writing, editing, printing, and publishing, W. and R. C. issued a series of works designed for popular instruction, including the *Journal*, (now amounting, in its different series, to 71 vols.). Among these works are *Chambers's Information for the People*, 2 vols.; *Chambers's Educational Course*, 250 vols.; *Cyclopædia of English Literature*, 2 vols.; *Miscellany of Useful and Entertaining Tracts*, 20 vols.; *Papers for the People*, 12 vols.; and the present *Encyclopædia*. In conducting these laborious undertakings, they necessarily depended on a number of accomplished literary assistants. In 1849, W. C. acquired the estate of Glenormiston in Peeblesshire, and a few years afterwards he founded and endowed an *Institution* in his native town for purposes of social improvement (see Peeblesshire).

His later productions are—*Things as they are in America*, 1 vol., the result of a visit to the United States in 1853); the *Youth's Companion and Counsellor*, 1 vol.; *History of Peeblesshire*, 1 vol. 8vo. (1864); pamphlets on *Improved Dwellings* and *Co-operation among the Working Classes; Wintering at Mentone*, written from personal knowledge of the place during two successive visits; *France: its History and Revolutions*, 1 vol. (1871); *Memoir of Robert Chambers, with Autobiographic Reminiscences*; and *Ailie Gilroy*, a story. More lately, *Stories of Remarkable Persons*, *Stories of Old Families*, and the *Story of St. Giles'* (1879). Twice elected Lord Provost of Edinburgh, W. C. occupied that office for four years (1865—1869), during which he promoted several important public acts, including one for the improvement of the older part of the city. R. C.

latterly wrote a work on *Ancient Sea Margins;* after which appeared his *Domestic Annals of Scotland*, 3 vols. He also edited the *Life and Works of Robert Burns*, 4 vols. A collection of his historical and miscellaneous papers was issued under the title of *Select Writings of Robert Chambers*, 7 vols. His latest production was the *Book of Days*, a most elaborate and exhaustive work in two large volumes, the preparation of which so injured his health, that he relinquished all further literary exertion. In 1863, he received from the university of St. Andrews the honorary distinction of LL.D. R. C. died at St. Andrews, 17th March 1871, leaving a high character for literary application, integrity, and geniality. In 1872, W. C. was made LL.D. of Edinburgh. In the years preceding 1883, he carried out, at his own cost, a thorough restoration of the ancient church of St. Giles' in Edinburgh. In 1883, it was intimated that the queen had resolved to recognize his public services by conferring a baronetcy on him; but he died on the 20th May, ere the baronetcy had been gazetted. On the death of W. C., Mr. Robert Chambers, eldest son of R. C., became head of the firm, the style of which is unchanged. The firm owns an extensive printing and publishing establishment in Edinburgh, and a publishing establishment in London. The whole of the works issued by W. and R. C. aim at popular instruction, free of all political or sectarian bias. Perhaps their greatest effort in these respects has been the present *Encyclopædia*.

CHAMBERY, a town of Sevoy, of which it is the capital, beautifully situated in a rich vine-clad valley, between two ridges of hills, about 45 miles west-south-west of Geneva. Though situated at an elevation of nearly 1000 feet above the sea, the climate of C. is mild; the scenery around, with the river Leysse flowing through the valley, is exceedingly fine. The town, itself, however, is dull and uninteresting. Some towers and other fragments of the old castle of the Dukes of Savoy, which dates from the 13th c. still remain. C. has manufactures of silk-gauze, soap, leather, hats, lace, and a trade in silk, wine, &c. Pop. (1876) 16,486. From the middle of the 16th c. to the peace of Utrecht, 1713, C. was under the dominion of France; and again from the Revolution to the Congress of Vienna, 1815, when it was restored to the House of Savoy; but in 1860, by the cession of Savoy, it has again come under the rule of France.

CHAMBORD, a celebrated royal castle of France, in the department of Loir-et-Cher, situated in the midst of a vast walled park 21 miles in circumference, about 12 miles east of Blois. Its foundation was laid in 1526, by Francis I., who employed 1800 men constantly in its erection until his death. The work was continued with less zeal by his successors, Henri II., Henri III., Charles IX.; and Louis XIV. and Louis XV. also made some additions to it. The building, which marks the transition between the fortified castle and the Italian palace, is surmounted by a vast number of turrets, minarets, and cones; its most prominent features, however, being six enormous round towers, each 60 feet in diameter. The double spiral staircase in the central tower is of great architectural interest, being so contrived that parties pass up and down without meeting each other. The castle has no less than 440 chambers. C. was the scene of the gallantries of Francis I. Here Henri II., Louis XIII., and Louis XIV. resided; and at one of the brilliant fêtes given at the castle by the latter, Molière performed, for the first time, his play of the *Bourgeois Gentilhomme*. Among the other occupants of C. were Marshal Saxe, Stanislaus, king of Poland, and Marshal Berthier, upon whom it was bestowed by Napoleon I. It was bought from Berthier's widow by a number of legitimists, and presented to the Duc de Bordeaux, who is hence called Comte de C. (q. v.).

CHAMBORD (Henri Charles Ferdinand Marie Dieudonné d'Artois, Duc de Bordeaux), Comte de, the representative of the elder Branch of the House of Bourbon, and of its claims to the French throne, was born in Paris, September 29, 1820. He is the grandson of Charles X., and the son of the Duke of Berri, who was murdered by Louvel, February 14, 1820. The Duke of Angoulême, Charles X.'s eldest son, being childless, the Duke of Berri was heir-presumptive; and as, at his death, he left only a daughter, the joy was great when, seven months after, his widow gave birth to a prince, who received the title of Duke of Bordeaux—that of Comte de C., by which he has latterly been known, being derived from the Castle of C. (q. v.), presented to him at his baptism. He was baptized amid circumstances of great pomp with water brought by M. de Châteaubriand from the river Jordan, and received the appelation of *l'Enfant du Miracle* ('the Miraculous Child'). When Charles X. abdicated the crown at the revolution in 1830, he did so in favor of his grandson, the Duke of Bordeaux. The people, however, insisted on the 'Citizen King,' and the elder Bourbons were banished. On the death of Charles X., the Duke of Angoulême assumed the title of Louis XIX., and another party proclaimed the Duke of Bordeaux king; but at last a reconciliation was brought about by Prince Metternich. In 1839, the prince visited Italy, accompanied by his mother, and was received by the petty courts with great distinction. After the death of the Duke of Augoulême in 1844, the heads of the different fractions of legitimists met to pay their united homage, and the Duke of Bordeaux made a 'pilgrimage to Belgrave Square' to receive it. In 1846, he married the eldest daughter of the Duke of Modena, who had never acknowledged the monarchy of July. After the revolution of 1848, many legitimists were returned to the National Assembly. In 1850, the Duke of Bordeaux, or Count of C. as he styles himself, appeared at Wiesbaden, where a congress of his adherents assembled to consult as to their future policy. As the Count of C. is without heirs, a union, or 'fusion,' as it is called, of the partisans of the elder Bourbons with the Orleanists was effected, but no attempt made to carry out the arrangement. After the capitulation of Paris in 1871, the Count of C. returned to France, and, under the title of Henry V., issued a proclamation, in which he promised, if placed by the nation at the head of its affairs, to maintain the temporal power of the pope. Neither this nor subsequent manifestoes have induced the French people to accept of him as their king.

CHAMBRE ARDENTE ('the Fiery Chamber'), a name given at different times in France to an extraordinary court of justice, probably on account of the severity of the punishments which it awarded, the most common being that of death by fire. In the year 1535, Francis I. established an Inquisitorial Tribunal, and a Chambre Ardente. Both were intended for the extirpation of heresy. The former, of which the pope was a corresponding member, searched out, by means of spies, cases of heresy, and instructed the processes; while the latter both pronounced and executed the final judgment. Under Henri II., the activity of the C. A. received a new impulse, the entrance of that monarch into Paris on the 4th July 1549 being signalized by the burning of several heretics. But Francis himself, gallant and gay, as courtly history represents him, also seemed to relish a spectacle of this kind, for on various occasions he and his mistress presided at a burning. By and by, the C. A. relaxed in its penalties, and a cry was got up among the more bigoted Roman Catholics that it was conniving at heresy. This seems to have roused the 'lurking devil' in its members, and in order to wipe away the reproach, they commenced a series of unheard-of cruelties, which, along with other events, contributed to originate the religious war of 1560. In 1679, Louis XIV. employed it for a new and more praiseworthy purpose—viz., to investigate the numerous reports of poisoning cases which the trial of the Marchioness Brinvilliers (q. v.) caused to be circulated. Many persons of the first rank, such as the Maréchal de Luxembourg, and the Princess Louise of Savoy, were examined on suspicion, but no one was executed except the pretended sorcerer, Voisin (1680), after whose time the C. A. ended its activity.

CHAMBRE INTROUVABLE (Fr. unfindable chamber; i. e., the chamber the like of which is not to be found again) was the name sarcastically given to that Chamber of Deputies in France which met after the second return of Louis XVIII. (July 1815), and which, by its fanatical royalty, began to throw the country and society anew into commotion. The former chamber, which had shown much moderation, had been dissolved under the influence of the court party; and the ministry, led by Talleyrand, had done everything to procure for the ruling party at least a manageable chamber adapted for business. The number of the deputies was arbitrarily raised from 259 to 392; and to secure the victory of a complete restoration, all rushed forward who saw in the constitutional charter an encroachment on their privileges and pretentions. When it is considered, in addition, that the elections, at least in the departments of the south, took place under terror and the sanguinary outrages of a populace in a state of political and religious excitement, that the press was stifled, and the people deprived of all freedom of expression by the foreign armies, ultra-royalism could not fail to be completely triumphant. When the ministers saw this startling result, they did not venture to open the session; they resigned, and gave place to the Richelieu ministry. Then broke out the most frightful excesses in the southern provinces. At the elections in Nîmes (22d August), more than 100 persons were killed by the royalist bands.

At last, on 7th October, the king opened the chamber, on which he enjoined quietness and moderation; and it appeared as if it did take this advice to heart for an instant. But when, in one of the first sittings, Boyer d'Argenson asked for the intervention of the chamber in behalf of the Protestants, who were being slaughtered in the south by the ultra-royalists bands, the speaker was called to order, and the chamber from that time ceased to observe any bounds or moderation. The fanatical legislation of this chamber inspired the ministers, the king, and especially the Emperor Alexander, with so much aversion and apprehension, and also met so decidedly with the disapprobation of all peaceful and sincere friends of the throne, that the news of its dissolution, on 5th April 1816, was received with universal rejoicing. The electoral law of 5th February 1817 prevented the return of a similar chamber; and it was not till by the modified electoral law of 1820 that ultra-roy-

alism regained a predominating influence in parliamnnt. It is said that Louis XVIII. first used the epithet *Chambre Introuvable* in an ironclad sense, and that the majority of the chamber took it seriously as a compliment.

CHAME'LEON, a southern constellation within the antarctic polar circle, and containing nine stars.

CHAMELEON (*Chamæleo*), a genus of saurian reptiles, constituting a distinct family, of very peculiar form and structure, and on various accounts highly interesting. The body is much compressed; the dorsal line sharp, in some of the species rising into an elevated crest; the back of the head is also elevated into a sort of cone. The neck is very short, and does not admit of the head

Chameleon.

being turned, for which, however, compensation is found in the remarkable powers of motion possessed by the large prominent eyes, which move independently of one another, and are covered with a membrane pierced only with a small hole for the pupil to look through. There are no external ears. The skin is not covered with scales, but, line shagreen, rough with granules. The legs raise the body rather higher than in most of the saurians; the toes, both of the fore and hind feet, are divided into two sets, one directed forward, and the other backward, so that each foot has the power of grasping like a hand. The tail is long and prehensile. The lungs are very large, and are connected with air-cells that lie among the muscles and beneath the skin, so that the animal has a remarkable power of inflating itself with air. The tongue is remarkably extensile, and is the organ by which the animal seizes the insects which constitute its food, being darted at them with unerring aim, whilst a viscous saliva causes them to adhere to it, and they are carried with it into the mouth. Chameleons are slow in their movements, except those of the eyes and tongue, and remain long fixed in one spot, awaiting the approach of insects, which they seize on their coming within reach.

They all live among the branches of trees. Their power of fasting is great, and along with their gulping of air in respiration, and their habit of inflating themselves with air, gave rise to the fable, current among the ancients and until recent times, of their living on air. Their celebrated power of changing color is not equally fabulous, and perhaps it would be rash in the present state of knowledge on the subject to assert how far it has been exaggerated. It is probably in part under the control of volition, and may be used, as has been asserted, to render the animal less easy of observation, by assimilating it to the color of surrounding objects; it may depend in part on the action of light; it is certainly connected with the fear and other passions of the creature. Milne Edwards has discovered that it depends upon the presence of two differently colored layers of pigment in the skin, generally yellow and blue.

Chameleons are natives of the warm parts of the Old World, but are most abundant in Africa. One species is found in some parts of the south of Europe, as near Cadiz. The whole number of known species is about fifty.—When brought, as they frequently are, to Great Britain, they soon die, appareatly from the coldness of the climate.

The fables which, in former times, were current regarding the C. were extremely numerous and ridiculous. It supplied not a few of those medicines to which absurd credulity ascribed the most marvelous powers.

CHA'MFERING. In Architecture, an angle which is slightly pared off, is said to be chamfered. The chamfer is sometimes made slightly concave, in which case it is called a *hollow* chamfer. Chamfers, in Gothic architecture, have frequently ornamental terminations of various kinds. The term is applied to wood-work as well as stone.

CHAMIER, FREDERIC, an English novelist, was born in London, 1796. He entered the navy as a midshipman in 1809, and distinguished himself in the American war. He left the service in 1833. The success of Marryat in depicting sea-life led C. to try the same field, in which he was not without success, though in invention and humor he falls short of his model. His best romances are—*Life of a Sailor* (3 vols., Lond. 1834), *Ben Brace* (3 vols., Lond. 1835), *The Arethusa* (3 vols., Lond. 1836), *Trevor Hastings* (3 vols., 1841), *Passion and Principle* (3 vols., 1834), *Tom Bowline* (3 vols., 1839), *Jack Adams* (3 vols., 1838), &c. All his novels have been translated into German. C. wrote a *Review of the French Revolution of* 1848 (Lond. 1849), in which he gives a rather prejudiced view of some of the prominent actors. He died on the 1st of November 1870.

CHAMISSO, ADELBERT VON, one of the most celebrated of German lyric poets, was born in 1781, at the castle of Boncourt, in Champagne. His parents settling in Prussia in 1790, he became a page of the queen, and entered upon a military career. But when the campaign of 1806 broke out, he returned to France, for though no admirer of Napoleon, he was unwilling to fight against his native land. At this time, he was thrown into the circle of Madame de Staël at Coppet, and there began that study of natural philosophy which he afterwards pursued at Berlin. In 1814, Count Rumjanzow, chancellor of the Russian empire, prepared an exploring expedition round the world at his own expense; C. accompanied it as naturalist. He embarked at Cronstadt under Captain Otto von Kotzebue, chief of the expedition, which, however, failed in its main object—that of discovering a *north-east* passage. Subsequently, he obtained a situation in the Botanical Garden of Berlin, was made a member of the Academy of Science; and after a happy domestic life, died there in 1838, universally loved and honored. He wrote several works on natural history, but his fame rests chiefly on his poetical productions. As early as 1804—1806, he together with Varnhagen von Ense, published a *Musen Almanach*. In 1813, he wrote his original and amusing fiction called *Peter Schlemihl*, the story of the man who loses his shadow, which has been translated into almost all the languages of Europe. The character of his poetry is wild and gloomy, and he is fond of rugged and horrible subjects. In his political songs, he succeeds well in humor and irony; nor is he deficient in deep and genuine feeling. Indeed, several of his ballads and romances are master-pieces in their way. We may instance one of his longest poems, *Salas y Gomez*, written in terza rima, as a proof how peculiarly German the cast of C.'s mind was, despite his French origin. His collected works, in six volumes, appeared at Leipsic in 1836—1839.

CHA'MOIS (*Antilope rupicapra*, Ger. *Gemse*), a species of antelope (q. v.) inhabiting the Alps and other high mountains of Central and Southern Europe, as the Pyrenees, the Carpathians, and the mountains of Greece; also those of some of the Mediterranean islands, Caucasus, Taurus, and other mountains of the west of

Chamois.

Asia. It is one of the antelopes sometimes designated *capriform* or goat-like, because of their departure from the typical or true antelope form, and approach to that of the goats. The C. is about the size of a large goat, but the neck is longer in proportion, and the body shorter; the horns seldom more thon six or seven inches long, black, rising nearly straight up from the forehead, and so bent back at the tip as to form a hook. The color is brown, deeper in winter than in summer; the tail is black; the head is of a pale-yellow color, with a dark-brown band along each cheek.

The usual summer resort of the C. is in the higher regions of the mountains which it inhabits, not far from the snow-line, and it is often to be seen lying on the snow. In winter, it descends to the higher forests. The aromatic and bitter plants of the mountain-pastures are its favorite food. It is—like the ruminants generally—very fond of salt; 'and many stones are met with in the Alps, hollowed out by the continual licking of the C., on account of the saltpetre with which they abound.' It is gregarious: flocks of one hundred are sometimes seen; but in the Swiss Alps, where the numbers have been much reduced by hunting, the flocks are generally very small, and often consist only of a few

individuals. Old males often live solitarily. The C. produces one or two young at a birth, in the month of March or April.

It is an animal of extraordinary agility, and flocks may often be observed sporting in a remarkable manner among the rocky heights. It can leap over ravines of 16 to 18 feet wide; a wall of 14 feet high presents no obstacle to it; and it passes readily up or down precipices which almost no other quadruped could attempt. It is said to descend obliquely almost perpendicular precipices of more than 20 feet, striking its feet once or twice against the rock, as if to stay and guide its descent, and alighting securely, often on a very narrow ridge of rock, with its hind feet first, and bringing the fore feet almost into contact with them.

The hunting of the C. is an occupation attended with great hardships and much danger, but of which, nevertheless, some of the Swiss peasants become passionately fond. The hunter sometimes goes out on the adventurous chase alone; but more frequently several go out together, dividing into parties; and whilst the flock of C. flee from those whose approach they first descry, an opportunity of using the rifle is obtained by their comrades. The scent of the C. is extremely keen; and when by this sense it is apprised of the approach of the hunter, it becomes alarmed and restless untill it sees him, upon which it rushes hastily in an opposite direction, and so falls into the ambuscade. When a flock of C. is feeding, one is always on the watch, and by a sort of whistle, announces apprehended danger.—The flesh of the C. is highly esteemed. Its skin is made into leather, and from it the original *shammoy*, or *shammy* leather, so much prized for softness and warmth, was obtained, although the name has now become common also to leather prepared from the skins of other animals. See LEATHER.—When taken young, the C. is easily tamed.—The C. of the Persian mountains is smaller and of a paler color than the European variety, and its horns bend from the base.

CHA'MOMILE, or CA'MOMILE (*Anthemis*), a genus of plants of the natural order *Compositæ*, sub-order *Corymbiferæ*, distinguished by imbricated bracts, a scaly conical receptacle, a ray of one row of female florets, those of the disk hermaphrodite, the achænia obscurely four-cornered, and destitute of pappus. The species are annual and perennial herbaceous plants, chiefly natives of Europe and other temperate parts of the world. Several are found in Britain, amongst which is the COMMON C. (*A. nobilis*), the most important species of the genus, well known for its medicinal virtues, a perennial plant with a stem about a foot long, procumbent and much branched, each branch terminated by a flower (head of flowers) more than an inch broad, with yellow disk and white ray, the whole plant intensely bitter and highly aromatic. Its medicinal virtues are ascribed to the essential oil which it contains, *Oil of Chamomile*, which abounds most of all in the involucre. This oil is of a greenish-yellow color, and is used in the preparation of some medicines. The dried flowers are often administered in the form of an infusion, as a stimulant of the nerves of the abdomen, an alterative and antispasmodic; or are applied to the skin as an anodyne, and on account of their power of promoting absorption and suppuration. The infusion also acts as an emetic, and is often used to assist the action of other emetics. C. flowers find a place in the pharmacopœia, and are also amongst the most esteemed of domestic medicines, the plant being extensively cultivated for their sake, and very generally finding a place even in cottage-gardens. Yet they ought to be used with caution, as they have been known to produce congestion in the brain, and are very apt to aggravate any malady of this kind already existing. A double-flowering variety of C. is more generally cultivated than the single, to supply the C. flowers of the shops, the flowers being whiter and more bulky, but it is otherwise rather inferior. C. is easily propagated by parting the roots. It delights in a dry and rather poor soil.

Chamomile (*Anthemis nobilis*).

The name WILD C. is given to a very similar plant also a native of Britain (*Matricaria Chamomilla*), an annual belonging to a genus closely allied to *Anthemis*. It may readily be distinguished by the want of scales on the receptacle. Its medicinal virtues resemble those of common C., and although now disused in Britain, it is in some parts of Europe preferred for internal use, because it is less bitter, less nauseous, and generally milder and more agreeable in its operation.—No small quantity of common C. is illegally used in the manufacture of beer in England, and is imported from Germany for this purpose. Yet this plant is so abundant in some parts of south England as to form a principal part of the pasture in sheep-walks, and to fill the whole air with its scent. The other British species of C. (*Anthemis*) are mere weeds; one of them, called Stinking C. (*A Cotula*), is so acrid as to blister the fingers, if much handled. But the flowers of the OX-EYE C., or DYER'S C. (*A. tinctoria*), a native of many parts of the continent of Europe, yield a beautiful yellow dye, on account of which the plant is often cultivated.

CHAMOND, ST., a town of Fance, in the department of Loire, situated at the confluence of the Gier and the Ban, about 7 miles north-east of St. Etienne, on the railway between that place and Lyon. It is a flourishing well-built town, with extensive manufactures of ribbons and stay-laces. C. has also several silk-mills and numerous iron furnaces and foundries; and extensive coal-mines exist in the vicinity. Pop. (1876) 14,420.

CHAMORERIL, a lake of Ladakh or Middle Tibet, in lat. 32° 55′ N., and long. 78° 15′ E. It lies at a height of 15,000 feet above the sea, on the plateau between the upper waters of the Sutlej and of the Indus, girt by mountains which rise, at some points, 5000 feet above its own level. Though it is beyond the recognized limits of perpetual congelation, yet it freezes only in winter, and is hence supposed to be of great depth. Necessarily receiving much water from the surrounding mountains, it is without any visible outlet—evaporation alone, even at this elevation, appearing to maintain one uniform surface or a length of 15 miles and a width of 2½.

CHAMOUNI, or CHAMONIX (Lat. *Campus munitus*), is the name of a wild and romantic valley and village among the Alps in Savoy. It lies at a distance from all the high roads, at an elevation of about 3400 feet above the level of the sea, and more than 2000 feet above that of the Lake of Geneva. The valley is about 13 miles long, and about 2 broad, and is traversed by the Arve. It is bounded at the east end by the Col de Balme, over which there is a mule-path to Martigny, in the upper valley of the Rhone, and from the other end issues the road to Geneva, which lies at a distance of 53½ miles from Chamouni. On the north side lies Mont Breven and the chain of the Aiguilles Rouges, and on the south, the giant group of Mont Blanc, from which enormous glaciers or rivers of ice slide down, even in summer, almost to the bottom of the valley.

The chief of these glaciers are—the Glacier des Bossons, des Bois, d'Argentière, and du Tour. By ascending to a point called Montanvert, we come upon the upper course of a glacier, where it expands into a great mountain-lake of ice called the Mer de Glace, in which there is a solitary rock or oasis called Le Jardin, about seven acres in extent, and covered with the most beautiful herbage. The excursion to the Jardin is one of the most striking excursions within the range of Chamouni. Until 1741, the valley was almost unknown; the region was considered a wilderness, and known by the name of Les Montagnes Maudites, or 'accursed mountains.' In the above year, it was visited by two Englishmen, Pocock and Wyndham, who ascended as far as Montanvert; and a granite block there still bears the name of the Englishmen's Stone. It was only, however, in 1775 that the attention of travelers was effectually called to it by Saussure and Bourrit. The valley is rich in peculiar plants, and furnishes an aromatic and perfectly white honey. The village of C. owes its origin to the Benedictine convent founded between 1088 and 1099. The population of the village is about 2400, who depend partly upon the strangers who visit the valley, and partly upon the pastures and upon hunting. There are several good hotels, and the best guides are to be found here for the neighboring Alps. It is from C. that Mount Blanc is usually ascended.

CHA'MPAC (*Michelia Champaca*), an Indian tree, possessing great beauty both of foliage and flowers, and much venerated both by Brahmanists and Buddhists. Images of Buddha are made of its wood. Its flowers have a pale-yellow tint, and a sweet oppressive perfume, much celebrated in the poetry of the Hindus.

CHAMPAGNE, formerly a province of France, now forming the departments of Seine-et-Marne, Aube, Yonne, Haute-Saone, and Ardennes. The province was about 180 miles long by 150 broad, its surface presenting extensive plains with ranges of hills, especially in the north and east. Upon these hills is grown the famous Champagne wine.

In ancient times, C. was known as a part of Gallia, was subjugated by Cæsar, and afterwards was annexed to the kingdom established by the Franks. After the 11th c., it had its own dukes, who were vassals of the French kings. By the marriage of Philippe IV. with Joanna, heiress to the kingdom of Navarre, Champagne, and Brie, C., in 1284, came to the French crown, and was

incorporated by Philippe VI. in 1328. During the campaign of 1792, the eastern part, and, in the campaign of 1814, the western part, of C. was the chief arena of warfare.

CHAMPA'GNE WINE is the produce of vineyards in the above-mentioned province of Champagne. There are white and red Champagnes; the white is either sparkling or still. Sparkling or effervescent (*mousseux*) C. is the result of a peculiar treatment during fermentation. In December, the wine is racked off, and fined with isinglass, and in March it is bottled and tightly corked. The fermentation being incomplete when the wine is bottled, the carbonic acid gas generated in a confined space dissolves in the wine, and communicates the sparkling property to Champagne. To clear the wine of sediment, the bottles are first placed in a sloping position with the necks downward, so that the sediment may be deposited in the necks of the bottles. When this sediment has been poured off, some portion of a *liqueur* (a solution of sugar-candy in cognac) is added to the wine, and every bottle is filled up with bright clarified wine, and securely re-corked. The effervescence of the wine thus prepared bursts many bottles, in some cases 10 per cent.; and in seasons of early and sudden heat, as many as 20 and 25 per cent. have been burst. Wine-buyers estimate the value of wine according to the breakage, that which breaks most bottles being considered best. Still or non-effervescent C. is first racked off in the March after the vintage. Creaming or slightly effervescent C. (*demi-mousseux*) has more alcohol, but less carbonic acid gas than sparkling Champagne.

The best varieties of this wine are produced at Rheims and Epernay, and generally on a chalky soil. Among white Champagnes of the first class, the best are those of Sillery, which are of a fine amber hue, dry spirituous, and possessing a superior *bouquet*; those of Ay and Mareuil are less spirituous, but are sparkling, with a pleasant bouquet. Other white wines of first class are those of Hautvilliers, Dizy, Epernay, and Pierry.

In the first class of red C., or Montagne, we have the varieties of Verzy, Verzenay, Mailly, St. Basle, Bouzy, and Thierry; all having fine color, clearness, good body, sufficient spirit, and a pleasant *bouquet*. The trade in Champagne wines is chiefly carried on in Rheims, Avise, Epernay, and Chalons-sur-Marne. The cellars in which the vintages are stored are cut out of the calcareous rock. The fact that the sale of C. is very extensive and lucrative, has naturally given rise to adulterations. Sugar, and the juices of pears or gooseberries, or birch-juice, &c., have been used for making spurious Champagne. It may fairly be reckoned that not even a third part of the wine sold for C. in Paris is genuine. The greater part of it is readily manufactured by simply charging other light wines with carbonic acid gas. Recently, the German purveyors have succeeded in preparing light wines—such as Rhenish, Main, Neckar, Meissner, and Naumburg—so much like genuine C., as to deceive even the connoisseur. Altogether, it is estimated that the district produces 1,100,000 hectolitres (24,200,000 gallons) of genuine C., of which, however, the finest growths make but a small part.

CHA'MPARTY, or CHA'MPERTY (Fr., from lat. *campi partitio*, a division of lands), an offence known to the law of England, which consists in a bargain between the plaintiff or defendant in a suit, and a third party, generally a lawyer, that the latter shall have part of the land, debt, or other thing sued for, in the event of success, and that in the meantime he shall carry on the suit at his own expense. This practice has been strictly forbidden by statute in England from very early times (3 Edward I., c. 25; 13 Edward I., c. 49; &c.); and in Scotland, the rule of the civil law by which the *pactum de quotâ litis* (q. v.) was held to be a *pactum illicitum* (q. v.), and as such void, has all along been part of the common law. Such practices were also forbidden by statute to members of the College of Justice (1594, c. 216). There is this difference between the laws of the two countries, however, that whereas in England the offence has always been punished criminally, in Scotland, the only penalty which it entails beyond nullity of the bargain, is deprivation of office. In former times, the evil chiefly apprehended from C. probably was, that the honesty of judges might be tampered with by advocates who were generally their friends, and not unfrequently their very near relatives, if permitted to be personally interested in the issue of the causes in which they were professionally employed. In our own day, the chief danger consists in the encouragement which might thus be given to dishonest and oppressive litigation, and the facilities which would be afforded for nefarious transactions between the agents on the opposite sides. That practices closely analogous to C., though unnamed, are not unknown in the lower strata of the legal profession in all countries, is but too probable. The necessities of trade have further introduced considerable equitable modifications into the law of C., which will be explained under CHOSE IN ACTION.

CHA'MPION (from a Gothic root signifying to contend, fight; Ang.-Sax. *camp*, fight). In the judicial combats of the middle ages, it was allowed to women, children, and aged persons, except in cases of high treason or of parricide, to appear in the lists by a representative. Such a hired combatant was called a champion. Those who followed this profession were generally of the lowest class, and were held disreputable; for besides the perils of the combat, they were liable to be executed as well as their clients. They were obliged to wear a peculiar dress of leather, and peculiar armor, which was also held disreputable. They were not allowed to fight on horseback, and appeared in the lists with their hair and nails cut short. Champions are mentioned as early as in the time of Charlemagne; and Otto I. employed them in deciding the succession to the empire. At a later period, in the age of Chivalry, the word C. came to have a more dignified acceptation, and signified a knight who entered the lists on behalf of an injured lady, of a child, or of any one incapable of self-defence. In England, the crown even had its C., who, mounted on horseback and armed to the teeth, challenged, at every coronation at Westminster, all who should deny the king to be the lawful sovereign of the three realms. This practice is understood to have been first introduced under Richard II., and it continues to make a part of the ceremonial of an English coronation to this day. The name of C. was also given to the knight who, during a tournament, had charge to see that no injury or insult should be offered to the assembled ladies.

CHAMPLAI'N, a lake separating the states of New York and Vermont, and penetrating at its north end, about six miles into Lower Canada. It empties itself into the St. Lawrence, about 45 miles below Montreal, by the Sorel or Richelieu. It is navigable throughout for vessels of about 100 tons, having its communications improved by one canal on its own river, and by another to the Hudson. It stretches in lat. from 43° 30′ to 45° 6′ N., and in long. from 73° to 73° 30′ W.; its extreme breadth, however, never exceeding 15 miles. Its principal towns are Whitehall at the south, Plattsburg on the west, and Burlington on the east. Both Lake C., and its tributary, Lake George, have been prominent in the history of the country—during the rivalry of France and England before the conquest of 1759—1760; during the revolutionary struggle of 1775—1782; and lastly, during the war of 1812—1814, between Great Britain and the United States.

CHAMPOLLION, JEAN FRANÇOIS, an illustrious name in modern Egyptian archæology, was born, December 23, 1790, at Figeac, in the department of Lot, France. In 1801, he was introduced to Baron Fourier, secretary to the *Institut d'Egypte*, who initiated him into the science of Egyptian antiquities. In 1807, C. went to Paris, in order to pursue, with more advantage, his oriental studies; and, in 1809, was appointed professor of history in the Lyceum of Grenoble. In 1811, he published his work, *L'Egypte sous les Pharaons*, intended as the forerunner of a more elaborate work on Egypt, of which only the geographical section appeared, in 1814. In his endeavor to decipher the Rosetta Stone, C. labored under the error of supposing that in this inscription the hieroglyphics were wholly ideographic, and the demotic and hieratic characters wholly phonetic. Afterwards, he was led to believe that the hieratic characters were of the same nature as the hieroglyphic, and this conviction he expressed in a communication to the *Académie des Inscriptions*, in August 1821. In the same year he published his essay, *Sur l'Ecriture Hiératique des Anciens Egyptiens* (Grenoble), a work which is now scarce. In this essay he continued to assert the common ideographic nature of both hieroglyphic and hieratic characters. Meanwhile C. had been made acquainted with the conclusions of the acute mathematician, Dr. Thomas Young (q. v.), respecting the phonetic use of hieroglyphic signs. Without doubt, it was this important discovery, of which Dr. Young, however, made no great use, that set C. on the right track of investigation, and led to those brilliant results which were regarded by Niebuhr as constituting the greatest discovery of the century. By a comparison of the name of Ptolemy on the Rosetta Stone with that of Cleopatra on the Philensian obelisk, he was enabled to lay the foundation of an alphabet, which he continued to elaborate until it now forms the basis of modern Egyptian archæology. His first decisive discoveries were made known in his celebrated *Lettre à Mons. Dacier* (Par. 1822), which was followed by the *Précis du Système Hiéroglyphique* (Paris, 1824; second ed. 1828); but his principal work, the *Grammaire Egyptienne*, was posthumously published in 1836.

In 1824, appeared his *Panthéon Egyptien;* and in 1825, his celebrated letters to the Duc de Blacas, in which he explains the names and titles of many of the Pharaohs, written on the monuments in Drovetti's Egyptian Collection at Turin, and attempts to class them into dynasties. His theory of *interpretation* was much controverted at first, but its importance was recognized by such distinguished scholars as Rosellini, Bunsen, Sir William Gell, and others.

In 1828 he was appointed by Charles X. to accompany a scientific expedition to Egypt, of which the results were given by Rosellini in the *Monumens de l'Egypte et de la Nubie* (Par. 1835—1845). On his return to Paris, 1830, C. was made a member of

the *Académie des Inscriptions*, &c.; and, in the following year, was appointed to the new chair of Egyptian Antiquities in the College of France; but soon after the commencement of his intended course of lectures, in May 1831, he fell ill, and died March 4, 1832. According to Silvestre de Sacy, 'few men, since the birth of letters, have rendered to erudition services equal to those which have consecrated to immortality the name of Champollion.'

CHAMPOLLION-FIGEAC, JEAN JACQUES a distinguished French archæologist, was born, 1778, at Figeac, in the department of Lot. After holding in Grenoble the offices of librarian and professor of Greek literature, he was appointed, in 1828, conservator of MSS. in the Imperial Library in Paris; but, after the February revolution, was deposed from office by Carnot. In 1849, he was appointed by Louis Napoleon, librarian of the palace of Fontainebleau. Besides the *Antiquités de Grenoble* (1807), his chief works include the *Annales des Lagides* and *Egypt Ancienne* (forming a part of *L'Univers Pittoresque*); *Les Tournois du Roi René*, a splendid work, with lithographs by Motte; and several publications of old French documents. After the death of his younger and more celebrated brother, C. was employed in editing the MSS. left by that distinguished scholar, and has given an account of them in the *Notice sur les Manuscrits Autographes de Champollion le Jeune* (Par. 1842). He died May 1867.

His son, AIME CHAMPOLLION-FIGEAC, follows the same path of historical antiquarianism, and has published several interesting and useful works.

CHANA'K-KALESSI' (Turkish, 'Pot Castle'), a town of Anatolia, deriving its name from its manufactures of crockery, is situated on the Dardanelles, about 28 miles south-west of Gallipoli. Its castle is the most important on the Dardanelles, which name is sometimes given to the town itself. Pop. some 3000 or 4000.

CHANCE, in its original and strict meaning, may be defined as that which determines the course of events, in the absence of law, ordinary causation, or providence. Strictly speaking, it is an idea which few would now be disposed to admit as corresponding to anything which really exists; the religious mind excluding it as inconsistent with the belief in the Divine government, and the philosophical mind rejecting it as inconsistent with a recognition of universal laws of causation. As a word, however, it has always been, and always will be popularly accepted; and its use is correct so far as we overlook, or choose for the moment to throw out of view, the more universal connection of events, and regard them as their emergence, on a superficial view, appears to be determined. The idea of C., as referring to some apparently capricious or at least inexplicable cause of an event, distinguishes it from the word probability, or the degree with which the expectation of an event approves itself to a particular mind, the first expressing what metaphysicians would call an objective, and the second a subjective idea. It is clear that C., being only legitimate as an expression in popular parlance—or if admitted as a term in philosophy, one that would at once lead into the most inextricable problems—is a term which is much too indefinite to admit of any kind of measurement; while what we call probability, or the degree with which an expectation approves itself, owing to certain data presented to the mind, does, as we shall hereafter see, admit of a kind of measurement which leads to very important consequences. For these reasons, the consideration of what is sometimes called the *Doctrine of Chances*, but what is more properly the *Theory of Probabilities*, will be found under the head of PROBABILITY.

CHA'NCEL (Lat. *cancellus*, a screen). The C., choir, or eastern part of a church, was often separated from the nave by a screen of lattice-work, so as to prevent general access thereto, though not to interrupt either sight or sound. As it was in this part of the C. that the service was always performed previous to the Reformation, the clergy were held to have a special right to it, in return for which its repairs in general still fall on the impropriator, rector, or vicar, and not on the parish. The chief pew in the C. belongs to the rector or impropriator, but the disposal of the seats in the church, with this exception, belongs to the ordinary, or, practically, to the churchwardens, to whom the authority of the ordinary is delegated. No monument, moreover, can be set up without the ordinary's consent. The term C. is usually confined to parish churches which have no aisles around the choir, or chapels behind it or around it; and in this case the C. and the choir have the same signification. But in larger churches there are sometimes chancels at the ends of the side aisles, and this whether the choir has the character of a choir in the larger sense, or of a chancel. See CHURCH.

CHA'NCELLOR (Lat. *cancellarius*). It is said that the chief notary or Scribe of the Roman emperor was called C., either because he was intrusted with the power of obliterating, *cancelling*, or *crossing out* (*cancellare*, to make lattice-work) such expressions in the edicts of the prince as seemed to him to be at variance with the laws, or otherwise erroneous; or because he sat *intra cancellos*, within the lattice-work or railings (*cancelli*) which were erected to protect the emperor from the crowding of the people when he sat in judgment. Neither the title nor the office of C. is at all peculiar to England. The C. of France (Chancelier de France), from a very early time, was an officer of state of great power and dignity, under whom several other officers, bearing also the title of C., were employed in the administration of justice and in the defence of the public order. The C. of France was the constitutional interpreter of the will of the sovereign; his functions being, on the whole analogous to those exercised by the C. of England. As an instance in the change of the value of money, not more remarkable than many which could be cited in our own country, it may be mentioned that, in 1290, the salary of this high official was six sous a day, with the privilege, to him and his, of eating at the court. When he was at Paris, and ate at his own lodgings, he had twenty sous a day. The office was abolished at the Revolution; and though it was restored by the Bourbons, and even under the first Napoleon the higher-sounding title of Archi-chancelier was revived, many of the functions of the old C. were transferred to the minister of justice, and have ever since been held by him.

In most of the other countries of Europe there are officers of state who bear this, or analogous titles, though their powers and duties are very various. The chief functionary in the Austrian Empire has often been termed C.; and on the re-constitution of the German Empire, Prince Bismarck was made 'C. of the Empire' (*Reichskanzler*). Besides these state-chancellors, there were officers in many other capacities to whom the title was given. Every bishop has his C. in the Church of Rome, and there are still Law C. of cathedrals, dioceses, universities, &c.

CHANCELLOR, LORD. It is usually said that the existence of the office in England, as in the other states of Europe, is to be ascribed to the influence which the constitution of the Roman empire had on the constitutions of the modern nations. This influence was exercised in no small measure through the medium of the church, the profession of the law being generally exercised by ecclesiastics; and it is for this reason, probably, that the bishop and the king are furnished with officers bearing the same title, and exercising analogous functions. The C. is always the confidential adviser of the sovereign in state affairs. It is for this reason that he has been called the keeper of his conscience, and that in England it is to him that the duty was intrusted of presiding over a court which acted on what were called—by way of contradistinction—equitable considerations. It is in this latter prerogative that the chief distinction exists between the C. and all other judges; for, whilst they are held by the letter of the law, he was at one time supposed to act rather *juxta bonum et æquum*.

In certain more special points of view, there is a similarity between the functions of the chancellors in different states. 'In all of them he seems to have had the supervision of all charters, letters, and such other public instruments of the crown as were authenticated in the most solemn manner; and therefore, when seals came into use, he had always the custody of the sovereign's great seal.'—Stephen's *Commentaries*, vol. iii. p. 398. It is from this last-mentioned circumstance that the office of C., or Keeper (q. v.), which, by 5 Elizabeth, c. 18, is declared to be exactly the same, is created without writ or patent, by the mere delivery of the great seal, and that the C., if a baron, takes precedency of every temporal lord not a member of the royal family, and of all bishops except the Archbishop of Canterbury. The C. is a privy-councillor by his office, a member of the cabinet, and prolocutor, or speaker of the House of Lords, by prescription. Though the form in which his tenure of office is terminated, is by the resumption of the great seal by the sovereign, the C. practically resigns office with the party to which he is attached. He has the appointment of all justices of the peace throughout the kingdom, but this privilege he exercises generally on the recommendation of the lord-lieutenants. But the most important, and, as it now seems, somewhat anomalous branch of his patronage, arises out of his having been originally an ecclesiastic. Though the last bishop who held the office was John Williams, Archbishop of York, who was Lord Keeper from July 10, 1621, to November 1, 1625, the C. still continues to be patron of all the crown livings of the value of £20 per annum, or under (though in 1863 about 300 were sold to augment the incomes of those sold and those retained), and visitor of all hospitals and colleges of the king's foundation. As representing the paternal character of the sovereign, again, the C. is the general guardian of all infants, idiots, and lunatics, and has the supervision of all charitable uses in the kingdom. As regards his judicial patronage, the arrangement is, that the C. appoints in general all the judges of the superior courts, except the two chief-justices, who are nominated by the prime-minister of the day. Of inferior appointments, the latter also has reserved to him the commissioners of bankruptcy and the judges of the county courts.

All these functions the C. performs in addition to his extensive duties as the supreme judge of the Court of Chancery, both as an ordinary court of common law and of record, and as an extraordinary court of equity. Much inconvenience had arisen from the

accumulation of duties in the single person of this high dignitary, and various expedients had been devised for lessening the evil. Vice-chancellors had been appointed, and the duties of the Master of the Rolls had been extended. In 1875 a considerable change was made by consolidating all the Vice-Chancellors' Courts into one division, called the Chancery Division of the High Court. And the C.'s duties in the House of Lords as the highest appeal court were lightened in 1876. The proposal of a minister of justice has, however, not yet found favor. The salary of the C. is £10,000 a year, and he has an annuity of £5000 on his retirement from office. The style of the C., since the Union with Scotland, has been Lord High Chancellor of Great Britain; but he has scarcely any jurisdiction in Scotland, and in Ireland there is a separate C., having powers in most respects the same as those of the C. of Great Britain. To slay the C. is treason under 25 Edward III. c. 2.

CHANCELLOR OF A CATHEDRAL is an officer who superintends the arrangemants for the celebration of the religious services. His office is quite distinct from that of the

CHANCELLOR OF A DIOCESE, who, as vicar-general to the bishop, is an ecclesiastical judge, appointed to assist the bishop in questions of ecclesiastical law, and hold his courts for him. By 37 Hen. VIII. c. 17, it is provided that the C. of a diocese may be a layman, whether married or single, provided he be doctor of the civil law, lawfully create and made in some university. By the canon of 1603, he must be a bachelor of law, at the least, or a master of arts. There are certain cases, however, in which the bishop must sit in person. In case of complaint against a clerk in holy orders, for any ecclesiastical offence against the Church Discipline Act (3 and 4 Vict. c. 86), the bishop is to hear the cause, assisted by three assessors; of whom the dean of his cathedral, or one of his arch deacons, or his chancellor, must be one; and a sergeant-at-law, or advocate who has practised 5 years in the court of the archbishop of the province, or barrister of 7 years' standing, another.

CHANCELLOR OF A UNIVERSITY. The highest honorary office connected with a university is generally that of chancellor. See UNIVERSITY.

CHANCELLOR OF SCOTLAND. Previous to the union of the two kingdoms in 1707, when the office was abolished, the C. of S. performed functions in many respects analogous to those which belong to the Lord High Chancellor of Great Britain. He presided in parliament, and was the head of all the courts of judicature; he was the chief counsellor of the king, and keeper of the great seal. From the fact of the distinction between law and equity in the English sense never having been recognized in Scotland, the C. had no judicial functions separate from those of the ordinary courts of law, but he had the principal direction of the Chancery, the constitution of which is described below. In early times, the C. of S., as of England, was very frequently an ecclesiastic; but the first, Constantine, Earl of Fife, in the reign of Alexander I., and the last, the Earl of Seafield, who held the office at the Union, were both laymen; and many other nobles, Earls of Argyle, Angus, Huntly, &c., appear in the lists given in Crawford's *Officers of State*, and Chalmer's *Caledonia*. On the abolition of the office, a Keeper of the Great Seal was appointed, who acts merely ministerially in affixing it to the writs which pass under it. See GREAT SEAL.

CHANCELLOR OF THE EXCHEQUER. See EXCHEQUER.

CHANCE-MEDLEY, AND CHAUD-MEDLEY, or MELLÉ (Fr. *chaud*, hot; and *mêlée*, a fray), as it is called in Scotland, are French expressions borrowed by our law. Though often spoken of as synonymous, they are, in reality, distinct in meaning—the one signifying a casual affray; the other, an affray in the heat of blood or passion. Both are in this country, and in most others, recognized as pleas in mitigation of the offence of *homicide* (q. v.). See also SANCTUARY.

CHA'NCERY (Lat. *cancellaria*). As the Roman emperors, and after them the various sovereigns who divided the vast inheritance of the empire, had each a Chancellor (q. v.), so in every European kingdom there was an establishment called a *C.*, where these officers performed their functions. If we imagine a large chamber divided by lattice-work (*cancelli*), the outer half devoted to the people, the inner occupied by the chancellor and his subordinates, engaged in framing edicts, letters of nobility, and the like, and engrossing them on parchment, and sealing them with the king's own seal in proof of their authenticity, and then handing them through the railings to the people without, we shall have a pretty good conception of the C. in its earliest form.

In France, as there were subordinate chancellors attached to the parliaments of the respective provinces, so there were subordinate chanceries; but the grand C. of France, which followed the person of the king, was alone, in strictness, entitled to the name.

The apostolic C. at Rome, in which, in addition to the documents pertaining to his temporal sovereignty, the bulls and briefs of the pope are authenticated, is presided over by a cardinal, with the title of Vice-chancellor.

CHANCERY, or CHA'NCELLARY, of Scotland, is a public office in the General Register House, at Edinburgh, managed by the director of C. and his deputies, in which all charters, patents of dignities, gifts of offices, remissions, legitimations, presentations, commissions, brieves, retours, and other writs appointed to pass the great and quarter seals, are recorded. See GREAT SEAL.

CHANCERY, COURT OF, IN ENGLAND. Besides the functions pertaining to the chancellor in other countries, the Chancellor of England had early assigned to him the office of a judge; and the English C. consequently became a court of law, the peculiar character of which will be rendered intelligible by the following considerations: In assigning judicial functions to the chancellor's department, it was not intended that it should interfere with that other department of government which has everywhere been distinguished both from the legislative and the executive—viz., the judicial. But in all departments, according to the imperial theory from which the idea of the C. at least was derived, the sovereign was supreme, and to his will, or to his sense of justice, there was consequently an appeal in judicial, as in other matters. His chancellor, however, was his adviser in all matters whatsoever; and thus, though not a judge in the stricter sense, it is manifest that his counsel, in judicial matters of the highest importance, would constantly be called in. But further, the king governed by laws, even before he was governed by them; and for the sake of order and his own convenience, he would naturally add to or supplement the law which he had established, only where it could be shown to him that it did not meet the substantial justice of the particular case. He would consequently be a judge, not of the interpretation or application of the law, which he would leave to his ordinary judges, but of its adequacy to circumstances which had changed, or had not been anticipated; and when he interfered, it would be to some extent in the character of a legislator, as well as of a judge. The king would thus be a judge in equity, in the popular and intelligible sense of that word; and acting in this capacity himself, it would be in this capacity that he would call in the aid of his chancellor. It is not mysterous, then, how in early times the Court of C. came to be a court of equity; and the chief difficulty regarding its origin seems to attach to the other of the two great departments into which it is divided, and in which it exercises jurisdiction as a court of common law. But as the free constitution of England developed itself, it soon became apparent that equity, in the old despotic or patriarchal sense—in which it was not so much the administration as the making or modifying of law—was inconsistent with its principles, whether it proceeded from a judge or from the monarch himself.

The popular sense of equity was consequently abandoned; and a technical sense, unknown to the jurisprudence of every other nation, was given to it. The proceedings of the Court of C. 'on its equity side,' which had hitherto been a mere supplement to law, came now to be hedged in by rules and precedents as closely as those of any court of common law. What henceforth continued to be the distinction *in principle* between law and equity, or between the functions of the courts of common law and the Court of C., or even of the two great departments of this court itself, it is perhaps impossible to state. The arbitrary line which has been drawn between the class of cases assigned to the one set of courts and to the other, will be considered under EQUITY.

The judicial duties of the chancellor have long been shared by the Master of the Rolls, an officer of high rank, who was originally appointed only for the superintendence of the writs and records appertaining to the common-law departments of the court, but who was accustomed also to sit as a separate though subordinate judge on the equity side. The disputes which had arisen regarding his powers were set at rest by 3 Geo. II. c. 30, which declares that all orders made by him, except such as by the course of the court are appropriated to the great seal alone, shall be valid, subject nevertheless to be discharged or altered by the Lord Chancellor, and so as that they shall not be enrolled till they are signed by his lordship. By 3 and 4 Will. IV. c. 94, the master's powers are further increased, and he may now hear motions, pleas, and demurrers, as well as causes generally. The salary of the Master of the Rolls (q. v.) is £6000 a year. The vast increase of business, and the still greater increase of arrears, during the previous half-century, rendered it necessary, in 1813 (53 Geo. III., c. 24), to appoint another assistant to the chancellor, under the title of Vice-chancellor of England; and in 1841, when the equity business of the Exchequer was transferred to the C., two more vice-chancellors were added. Each of these judges sits separately from the Lord Chancellor, and their functions extend to both departments of the court. Their salaries are £5000 a year. Another important addition (14 and 15 Vict. c. 83) was that of the lords justices of the Court of Appeal for all courts. This court consisted of the Lord Chancellor, together with these judges; but the

lords justices, when sitting without the chancellor, possess the same jurisdiction which belongs to him, and their existence does not prejudice his right to sit alone. The lords justices possess the same authority in matters of lunacy as the chancellor; and they, sitting together, constitute, without the chancellor, the Court of Appeal in Bankruptcy. An appeal, which may also be entertained by the Lord Chancellor sitting alone, lies to this court from all the separate courts of the Chancery Division; and from this appellate jurisdiction there is an appeal in turn to the House of Lords. The lords justices may also take up original causes, though these, in practice, are mainly confined to the Divisional Courts of the High Court. Till recently, certain parts of the equitable jurisdiction of the Court of C. were confided to the Masters in Ordinary (see MASTERS IN CHANCERY) and the Accountant-general. The office of the masters has been abolished, but that of the accountant continues to be one of the most important connected with the court. Besides these more important officers, the Court of C. has always had a large body of subordinates, registrars, taxing-masters, and a staff of record and writ clerks attached to it.

The subdivision of courts into those of equity and common law had long been found mischievous, inasmuch as it in some cases doubled the expense to the suitor, by sending him from one Court to another for instalments of the justice which he sought. For many years this anomalous arrangement had been given up as indefensible; and bills from time to time were introduced into parliament, in order to rearrange the courts, so as to administer entire justice in every case. Great changes were necessary in this department of the law, and the only question was at last reduced to the best mode of settling the details of the High Court of Justice, which was to supersede the previously existing courts. For the changes ultimately carried through under the Judicature Acts of 1873–1876, and the constitution of the new High Court of Justice, see COMMON LAWS. The C. Court is now the Chancery Division of the re-constituted High Court.

In various colonies of the British empire, local courts have been established in imitation of the High Court of C., an institution which, from its cumbrous, anomalous, and unscientific character, scarcely merited imitation; but in America, though the distinction between law and equity was at first adopted and long adhered to with the tenacity with which Englishmen cling to their native customs, it has been abolished in the state of New York, and law and equity there, as elsewhere in the world, now constitute one system, administered in one series of tribunals of original and appellate jurisdiction. On the continent, the English Court of C. has always been a subject of ridicule; and a recent French writer, in speaking of it, says: 'Nothing ever comes to an end in it; and the unhappy man who has a process there, can be sure of but one thing—viz., that whether he gains it or loses it his ruin is certain.' The acts by which evils which were inseparable from the constitution of the Court of C.—and which spring from the distinction between law and equity, on which its very existence depended—had been mitigated, were the following: 15 and 16 Vict. cc. 80, 86, and 87, 21 and 22 Vict. c. 27, 23 and 24 Vict. cc. 38, 128, 25 and 26 Vict. c. 2.

CHA'NCRE. See SYPHILIS.

CHA'NDAH, a town of India, on the south-west frontier of the territory of Nagpore, on the left bank of the river Eraee, near its junction with the Wurda, 90 miles south of the town of Nagpore. Its walls, built of cut stone, and surrounded by a high parapet, are 6 miles round, from 15 to 20 feet high, and flanked with round towers large enough for the heaviest guns. Within the place, and almost equidistant from the north and south faces, is a citadel; the rest of the interior consists of straggling streets, detached houses, and plantations. It is well supplied with water. In 1818, C. was taken by the British. Pop. 16,233. C. is capital of a British administrative district having an area of 9700 square miles, and a pop of 534,431.

CHANDERNAGO'RE, a French city, with a scanty territory of about 2000 acres, on the right or west bank of the Hoogly, 21 miles above Calcutta by railway, on the opposite shore, in lat. 22° 50′ N., and long. 88° 23′ E. The population, estimated at about 30,000, consists of a few Europeans and Eurasians, the great bulk being natives of unmixed blood. Independently of political considerations, the place has, through the gradual silting up of the river, lost some of its commercial advantages. Within 100 years back, ships of the line ascended to C.; now, however, vessels even of far inferior burden seldom get above Diamond Harbor, which is nearly 50 miles further down. C. was established in 1676, and for awhile rivaled Calcutta. It was captured by Clive in 1757, but finally restored to the French in 1816.

CHANDHAIREE', or CHANDERI, a town of Gwalior, India, in a hilly and jungly district, near a tributary of the Jumna. It is at present much decayed, on account of Mahratta oppression, the scourge of war, and the decay of its manufactures, which are undersold by the cheaper fabrics of Britain; but the extent and architectural excellence of its ruins indicate its splendor and importance in former times, when it is said to have contained 14,000 stone houses, 384 markets, 360 caravanserais, and 12,000 mosques. The fort of C. formerly deemed impregnable, consists of a strong rampart of sandstone, flanked by circular towers, and is situated on a high hill. Among other remains of former greatness, is a pass cut through a solid rock 100 feet high. During the native wars, being a place of importance, C. was frequently besieged. Under Mahratta sway, it became a haunt of freebooters, very troublesome to the native districts under British rule or protection; and on the conclusion of the treaty of 1844, it was, among other lands, assigned for the maintenance of the increased Gwalior contingent, commanded by British officers.

CHANDLER, DR. RICHARD, a scholar and antiquary of considerable eminence of the last century, was born at Elson, in Hampshire, in 1738, and educated at Oxford. He first became known as the editor of the magnificent work, *Marmora Oxoniensia*, published by the Oxford University in 1763. He afterwards traveled through Greece and Asia Minor, with Revett, an architect, and Pars, a painter, at the instance of the then flourishing Dilettanti Society, with a view to collect information regarding the former state of these countries, and to procure exact descriptions of the ruins. The result of their united labors appeared in 1769, in 2 vols., entitled *Ionian Antiquities*. C. also published a valuable account of the ancient inscriptions of Asia Minor and Greece; and his account of his travels in these countries, issued in 1775—1776, is still a standard work. He also published a *History of Troy*. He died in February, 1810.

CHANDO'RE, a town and fort in the district of Nassick, presidency of Bombay, its lat. and long. being 20° 20′ N. and 74° 14′ E. C. is a flourishing place, with a population of (1872) 5662. The fort, which commands an important pass on the route between Candeish and Bombay, is situated on the summit of a hill naturally inaccessible everywhere but at the gateway. It surrendered to the British in 1804; and being subsequently restored to Holkar, was finally ceded by him in 1818.

CHA'NDOS CLAUSE. During the discussion of the clauses of the Reform Bill (q. v,) in 1831, the Marquis of Chandos (Tory), afterwards Duke of Buckingham, proposed the insertion of a clause giving the county franchise to *tenants at will* occupying lands for which they paid an annual rent of £50. This was opposed by the ministers on the ground that the class proposed to be enfranchised would be subject to the coercion of the landowners, who would thus virtually determine the elections. The amendment, however, was supported by many of the Radicals, who at that time regarded any extension of the suffrage as a boon, and was carried by a majority of 84. The clause was incorporated in the bill of the following year, and was finally carried by a majority of 272 to 32. The result proved a material accession to the Conservative element in counties. Under the Reform Act of 1867, occupants of lands of a rateable value of £12 are entitled to the county franchise.

CHANDPOO'R, a town of British India, in the North-west Provinces, district of Bijnour, about 930 miles north-west of Calcutta, and 80 north-east of Delhi. It is of considerable size, and has a pop. (1872) of 12,033.

CHA'NFRON. See CHARGER.

CHANGARNIER, NICOLAS ANNE THÉODULE, a French general, was born at Autun in 1793—and received his education at the military school of Saint-Cyr. In 1830, he went as lieutenant to Algeria, where he distinguished himself, and rose to the rank of general of division. After the proclamation of the Republic in 1848, he was appointed governor-general of Algieria, in the room of Cavaignac; but being chosen a member of the National Assembly, he returned to Paris, when he was appointed commander-in-chief of the garrisons of Paris and of the National Guard. He held this double office till the middle of May 1849, and again for some time after the insurrectionary movements of June of that year. C. was a member of the Legislative Assembly, where he held a sort of neutral position between the Orleanists and Legitimists, and opposed to the Bonapartists. At the *coup d'état* in December 1851, after being imprisoned in Ham, he went into exile till the Franco-Prussian war, when he offered his services to Napoleon III. He was in Metz with Bazaine; and, on its capitulation, retired to Brussels. He returned to France in 1871, entered the Assembly, and assisted M. Thiers in reorganizing the army. He died in February 1877.

CHANG-CHOW-FOO, or CHAOU-CHOW, a city of China, and capital of a department of the same name, in the province of Keang-su, in 31° 50′ N. lat., and 3° 24′ long. E. of Pekin.

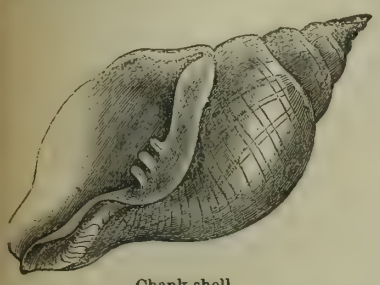
CHANG-CHOW-FOO, a city of China, and capital of a department of the same name, in the province of Fuh-keen, in 24° 31′ N. lat., and 1° 24′ long. E. of Pekin.

CHA'NGELING. It was at one time a common superstition, that infants were taken from their cradles by fairies, who left in-

stead their own weakly and starveling elves. The children so left were called *changelings*, and were known by their peevishness, and their backwardness in walking and speaking. As it was supposed that the fairies had no power to change children that had been christened, infants were carefully watched until such time as that ceremony had been performed. This superstition is alluded to by Shakspeare, Spenser, and other poets; and it has not yet quite died out of some of the rural districts in Britain.

CHANG-SHA-FOO, a city of China, capital of the province of Hoo-nan, in 28° 20′ N. lat.

CHANK-SHELL, the popular name of the shell of several species of *Turbinella*, a genus of gasteropodous molluscs of the group *Siphonostomata* (q. v.), natives of the East Indian seas. These shells are obtained chiefly on the coasts of the south of India and Ceylon, and form a considerable article of trade to Calcutta. They are much used as ornaments by Hindu women, the arms and legs being encircled with them; and many of them are buried with the bodies of opulent persons. Those which are thrown up on the beach, after the death of the mollusc, and have become whitened, are little valued, but fresh shells readily find purchasers. The commercial returns show an exportation of chank-shells from Madras amounting to the number of 2,460,727 in one year, 1853—1854, the value of which was about £10,000. The quantity ordinarily exported is smaller. A chank-shell opening to the right is rare, and is highly prized in Calcutta, so that a price of £50, or even £100, is sometimes paid for one.



Chank-shell.

CHA'NNEL, English—the *Mare Britannicum* of the ancients—is that arm of the Atlantic Ocean which divides England from France, gradually narrowing to the Strait of Dover. It is often called the Channel; and the fleet stationed in it the Channel Fleet. A company was formed to make a tunnel from England to France beneath the Channel, and began operations. In 1882, the English government made them suspend the works, most of the military authorities having reported against it as endangering the security of the United Kingdom.

CHANNEL ISLANDS, a group of islands belonging to Great Britain, lying off the north-west coast of France, between Normandy and Brittany. They are about 120 miles south-west of Southampton, and the nearest distance from the French coast is about 10 miles. The C. I. are the only parts of the dukedom of Normandy now belonging to the English crown, to which they have been attached since the Conquest. King John, about the year 1200, lost all Normandy, except these isles. The chief islands of the group are Jersey, Guernsey, Alderney, and Sark. The area of the whole is 112 square miles; pop. in 1871, 90,596, and in 1881, 87,731. They are more particularly described under Jersey.

CHANNING, William Ellery, D.D., a celebrated Unitarian preacher and author, was born 7th April 1780, at Newport, Rhode Island, in the United States, entered Harvard University at the age of 14, and took his degree in 1798. In 1803, he was ordained minister of a church in Boston. During the earlier years of his ministry, his theological peculiarities had little prominence in his discourses, and in consequence he stood upon friendly terms with his brethern in more orthodox churches. In 1819, however, he preached a sermon at the ordination of the Rev. Jared Sparks, in which he advocated the Unitarian doctrine with so much zeal and ability, that he was termed the 'Apostle of Unitarianism.' This involved him in controversy, a thing which he naturally loathed. Nevertheless, to the end of his life, he preserved a devoutly Christian heart, shrinking with the delicate instinct of a pious nature from everything cold, one-sided, and dogmatic, whether Unitarian or Trinitarian. As late as 1841, he wrote: 'I am little of a Unitarian, have little sympathy with the system of Priestley and Belsham, and stand aloof from all but those who strive and pray for clearer light.' In 1821, he received the title of D.D., from Harvard University, on account of the high talent he had exhibited in his tractate on the Evidences of Christianity, his Address on War, and his Sermons. In 1822, he visited Europe, and made the acquaintance of several great English authors, such as Wordsworth and Coleridge, both of whom were strongly impressed in his favor. Coleridge said of him: 'He has the love of wisdom and the wisdom of love.' In 1823 he published an *Essay on National Literature;* in 1826, *Remarks on the Character and Writings of John Milton;* in 1829, the *Character and Writings of Fénelon;* in 1835, a work in opposition to *Negro Slavery;* and in 1838, an essay on *Self-culture*. Besides these, he wrote a variety of other essays and treatises, all characterized by vigor, eloquence, pure taste, and a lofty tone of moral earnestness. He died October 2, 1842, at Bennington, Vermont. An interesting memoir of him has been published by his nephew, William Henry Channing (3 vols., London, 1848).

CHANTILLY, a town of France, in the department of Oise, about 23 miles north-north-east of Paris. Being one of the most beautiful places in the vicinity of the metropolis, it attracts thence immense numbers of visitors. Apart from its natural beauty, it is interesting as the place where the great Condé spent the latter years of his life in the society of such men as Boileau, Racine, and Bosseut. The magnificent château in which he resided was pulled down at the revolution of 1793; but a lesser château, one of the finest specimens of the renaissance in France, still remains. The park and grounds are very charming. C. is also noted for its extensive manufacture of the *blonde* lace. Pop. (1876) 3476.

CHANTREY, Sir Francis, an eminent English sculptor, was born at Jordanthorpe, in Derbyshire, on 7th April, 1781, not 1782, as has been generally said. His father, who was a carpenter, and rented a small farm, died when C. was only 12 years of age, leaving his mother in narrow circumstances. It is said that she gave him 'as liberal an education as her limited means would admit;' but much cannot be meant by the phrase, if it be true, as asserted by Holland in his *Memorials*, that his attendance at the little lane-side school was very irregular, and that 'for a while he certainly drove an ass daily, with milk-barrels, between Norton and Sheffield.' C.'s mother married a second time, and the boy was, in 1797, apprenticed for 7 years to a carver and gilder in Sheffield called Ramsay. It was in this humble department that C. acquired the rudiments of his future art. It was during this period that his first attempts at modelling in clay were made, and that by the help of casts taken from the faces of his fellow-apprentices and his own, he began the work of portraiture, in which his great eminence ultimately consisted. C.'s apprenticeship was cancelled two years before its expiry; but his subsequent career is not very accurately known. It is certain that he visited both London and Dublin in 1802, probably in the capacity of a journeyman carver and gilder; and in that year he seems to have received instruction as a pupil of the Royal Academy. It was probably then that he commenced seriously to prepare himself for the work of his future life. In the earlier part of his career as an artist, C. is said to have been under great obligations to Nollekens, who had the shrewdness to see, and the generosity to see without envy, his great promise in the branch in which he himself was eminent. In 1816, C. was elected an Associate, and in 1818 a Member of the Royal Academy; and in 1819 he visited Italy for the first time. Like the lives of many other eminent men, that of C. presents few claims on our interest after his early struggles were ended. As an ideal artist, he never attained a high rank, and, in comparison with Flaxman, he possessed little reputation in this country and none abroad.

But he executed, with much truth to nature, as it presented itself to his eye, an endless variety and almost countless number of works of individual portraiture, so that there is scarcely any town of importance in Great Britain which cannot show specimens of his skill. As a result of his diligence in this department of art, C. accumulated a very considerable fortune, the greater part of which, after providing for his widow, he bequeathed for artistic purposes. In this respect, he formed a remarkable contrast to Flaxman, whose modest savings were sworn under £4000; whilst Nollekens, whose name is almost forgotten, realized the enormous sum of £150,000, it is even said £200,000. C. died childless on the 25th November 1841, and was buried in a tomb prepared by himself at Norton. Lady C. died in January 1875, and the interest of her husband's gift to the Royal Academy, amounting to about £3000 a year, is now at the disposal of the Council, for the 'promotion of British art.'

CHA'NTRY (Fr. *chantererie*, from *chanter*, to sing). The term C. is applied alike to endowments or benefices, to provide for the chanting of masses, and to the chapels in which the chanting takes place. These endowments were commonly made in the form of testamentary bequests, the object being to insure the erection of a chapel near, or over the spot where the testator was buried, and to remunerate the priests for saying masses in it for the benefit of his soul, or of the souls of others named in his will. Many such chantry chapels are still to be seen in English parish churches; but they were more common in abbeys and monastic establishments, in which it was considered a privilege to be buried, and where some such offering to the brotherhood was in a measure the price of sepulture. These chapels, which have generally the tomb of the founder in the middle of them, are separated from the aisles or nave of the church by open screen-work, a circumstance which has sometimes led to their being called Chancels (q. v.). Sometimes, again, they are separate erections, projecting from the church externally; but in cathedrals and the larger churches they are generally constructed within the church, often

between the piers. Many chantries are lavishly enriched with sculpture and tracery of all descriptions, and some of them are adorned with gilding and painting.

CHA'OS signified, in the ancient cosmogonies, that vacant infinite space out of which sprang all things that exist. Some poets make it the single original source of all; others mention along with it Gæa, Tartaros, and Eros. By some also only the rough outlines of heaven and earth were supposed to have proceeded from C., while the organization and perfecting of all things was the work of Eros. Still later cosmogonists, such as Ovid, represent it as that confused, shapeless mass out of which the universe was formed into a *kosmos*, or harmonious order. Hesiod makes C. the mother of Erebus and Nox.

CHAOS, or BIRD ISLANDS, is the name given to several rocky islets situated at the entrance of Algoa Bay, South Africa, about 35 miles east of Port Elizabeth. It was on one of these islands that Bartholomew Diaz, the navigator, died in 1500.

CHA'OU-CHOW-FOO, a city of China, and capital of a department of the same name, in the province of Kwang-tung, in 23° 36′ 6″ N. lat., and 0° 46′ 40″ long. W. of Pekin.

CHAOU-KING-FOO, a city and capital of a department of the same name, in the province of Kwang-tung, 50 miles west of Canton, in 23° 4′ 48″ N. lat., and 4° 24′ 30″ long. W. of Pekin.

CHAP BOOKS, the name given to a variety of old and scarce tracts of a homely kind, which at one time formed the only popular literature. In the trade of the bookseller, they are distinguishable from the ordinary products of the press by their inferior paper and typography, and are reputed to have been sold by chapmen (see CHAPMAN) or pedlers; hence their designation. The older C. B. issued in the early part of the 17th c. are printed in black letter, and are in the form of small volumes. Those of a later date are in the type now in use, but are equally plain in appearance. Of either variety, they were mostly printed in London; many being without dates. They were of a miscellaneous kind, including theological tracts, lives of heroes, martyrs, and wonderful personages, interpretations of dreams, fortune-telling, prognostications of the weather, stories of giants, ghosts, hobgoblins, and witches, histories in verse, and songs and ballads. See *Notices of Fugitive Tracts and Chap Books*, also *Descriptive Notices of Popular English Histories;* both by J. O. Halliwell, printed for the Percy Society. An inferior class of tracts succeeded these books for the common people, and are best known as *Penny Chap Books.* For the most part they consisted of a single sheet, duodecimo, or 24 pages. Besides the title, the first page usually contained a coarse wood-cut embellishment. The paper was of the coarsest kind adapted for printing, and the price, as the name imports, was a penny each. The subjects, besides being of a similar nature to the above, included stories of roguery and broad humor. These penny C. B. were issued by an obscure class of publishers in London and several English provincial towns, of which we might particularize Newcastle-on-Tyne. They were also issued from the presses of Edinburgh, Glasgow, Falkirk, and Paisley. It is a curious fact, that nearly all the penny C. B. of this homely kind which were latterly popular, were written by Dougald Graham, who, previous to his death in 1779, filled the office of bellman or town-crier of Glasgow. The most reputable production of this humble genius was a *History of the Rebellion* in a Hudibrastic meter, which was a great favorite with Sir Walter Scott, and is now scarce; see *Chambers's Journal*, First Series, vol. x. p. 84; also the *Paisley Magazine* (1829), an extinct publication of great rarity, in which is given a biographic sketch of Dougald Graham, with a list of his productions.

In some parts of Scotland and the north of England, Graham's penny C. B. are still seen on stalls at markets; but the general advances in taste, along with the diffusion of an improved literature, have displaced them in almost all other quarters. Collections of the older C. B. are now found only in the libraries of bibliomaniacs, by whom they have been picked up at extravagant prices from dealers in second-hand books. In various continental countries, there are numerous varieties of C. B. at exceedingly small prices. The French government being desirous to substitute a wholesome class of tracts of this kind for what are generally objectionable on the scorce of taste and morality, have latterly, through commissioners, taken some steps on the subject. See Ashton's *Chap-Books of the 18th Century* (1882); Nisard's *Histoire des Livres Populaires.*

CHAPA'LA, the largest lake in Mexico, containing about 1300 square miles. It is about lat. 20° 20′ N., and ranges in W. long. from 102° to 103° 25′. It is merely an expansion of the Rio Grande de Lerma, which enters the Pacific at San Blax. C. lies on the table-land of Anahuac, and has many islands.

CHA'PEL (Fr. *chapelle*), a word derived from *capa*, which originally signified a case, or chest in which were contained the relics of a saint, and afterwards the place where the chest was kept. The term now signifies a building erected for the purposes of public worship, but not possessing the full privileges and characteristics of a church. In this sense, all places of worship erected by dissenters are now called chapels in England, and the term is also applied to supplementary places of worship, even though in connection with the established church—such as parochial chapels, chapels of ease, free chapels, and the like. In former times, it was applied either to a domestic oratory, or to a place of worship erected by a private individual or a body corporate. In the latter sense, we speak of chapels in universities and colleges. But its earliest signification was that of a separate erection, either within or attached to a large church or cathedral, separately dedicated, and devoted to special services. See CHANTRY. Chapels had no burying-ground attached to them, and the sacrament of baptism was not usually administered in them.

CHAPELLE, LA, the name of several places in France, the most important of which forms a northern suburb of Paris. Chemicals, salt, starch, liqueurs, &c., are manufactured.

CHAPELLE DE FER. See HELMET.

CHA'PERON, a hood or cap worn by knights of the Garter. Such a hood was at one time in general use, but was latterly appropriated to doctors and licentiates in colleges. A person who acts as a guide and protector to a lady at public places, is called a C., probably from this particular piece of dress having been used on such occasions. The name was also applied to devices which were placed on the heads of horses at pompous funerals.

CHA'PLAIN was originally the title of the ecclesiastic who accompanied an army, and carried the relics of the patron saint. See CHAPEL. It has now come to signify a clergyman not having charge of a parish, but employed to officiate at court, in the household of a nobleman, or in an army, garrison, ship, &c. Such officials began early to be appointed in the palace of the Byzantine emperors. The practice afterwards extended to the western empire, and to the courts of petty princes and even of knights, and continued to subsist after the Reformation. Forty-eight clergymen of the Church of England hold office as chaplains of the Queen in England, four of whom are in attendance each month. Six clergymen of the Church of Scotland have a similar title in Scotland; but their only duty is to conduct prayer at the elections of Scottish representative peers. A statute of Henry VIII. limits the right of nominating private chaplains in England: thus, an archbishop may have eight, a duke six, a baron three; and chaplains so appointed have certain privileges, and may hold two benefices with cure of souls.

An ARMY CHAPLAIN is a clergyman whose services are retained especially by the government for the soldiery of the army. There have been such chaplains for many generations, and the office was at one time regarded as a saleable perquisite; but the system was reorganized and improved in 1796. In recent years, Roman Catholic and Presbyterian chaplains have also been appointed, a practice which indicates the progress of toleration. The chaplains belong, not to *regiments*, but to the staff of the army, so as to be generally available. At home, they are attached to the military stations; but in the field they are located at headquarters, at the hospitals, and with the divisions. The officers at the stations usually arrange for the men to attend divine service at the nearest parish church; but this still leaves the chaplains many duties to fulfil. Where, as sometimes happens, there is no regular church or chapel near at hand, the C. reads and preaches to as many men as can conveniently group themselves around him at one time, and thus serves many different congregations at different times of the Sunday. He visits the sick at the hospitals, and examines and encourages the regimental schools. Among the wooden huts at Aldershot Camp, a church has been built, which is rendered available for chaplains of different religious denominations in succession.

When the system of army-chaplains was remodelled in 1796, a *chaplain-general* was appointed; this office was abolished by the Duke of Wellington soon after the termination of the great war, but revived by Mr. Sidney Herbert in 1846. The C.-general, who receives £1000 per annum, has duties partaking somewhat of those of an arch-deacon. He assists the War Office in selecting chaplains, and in regulating the religious matters of the army, so far as Church of England matters are concerned. His office forms one of the eight departments under the new organization of the War Office. There are 78 chaplains on the staff, besides officiating clergymen (not belonging to the army), and chapel-clerks. The commissioned chaplains receive from 10*s.* to 22*s.* 6*d.* per day, besides allowances; and there are always some on half-pay, while the officiating clergymen receive head-money for the troops attending their ministrations. The whole expenditure for chaplains, and other charges connected with divine service, figures in the Army estimates at near £50,000 annually.

NAVY CHAPLAINS. Every ship in commission, down to, and including fifth-rates, has a chaplain. The Navy Estimates provide for above 80 commissioned chaplains, at stipends varying from £219 to £401 per annum. The chaplains perform divine

service at stated times on shipboard, visit the sick sailors, and assist in maintaining moral discipline among the crew.

CHA'PLET, a garland or head-band of leaves and flowers. In heraldry, a C. is always composed of four roses, the other parts being leaves.

CHA'PMAN, a trader, but popularly applied in a more limited sense to a dealer in small articles, who travels as a pedler or attends markets. C. is from *chap*, equivalent to *cheap*, a word which in its origin signified a market or place for trading; hence *Cheapside, Eastcheap*. See CHAP BOOKS.

CHAPMAN, GEORGE, a dramatist and translator, was born in 1557, educated at Cambridge and Oxford, and was the contemporary and friend of Spenser, Jonson, and Shakspeare. His first play, entitled *The Blind Beggar of Alexandria*, was printed in 1598. Up to 1620, he supplied the theater with tragedies and comedies, and some of these, after the fashion of the time, were written in conjunction with other dramatists. As a writer for the stage, C. does not rank high. Despite many nervous passages, his plays want the irradiation of a constant genius, and his characters are unnatural. His translation of Homer is the most vigorous that has yet been executed in England, and in reading it, many have felt with Keats—

Like some watcher of the skies
When a new planet swims into his ken.

C. seems to have led a long, temperate, and happy life, unblasted by poetic fire. He died in 1634. Swinburne, the poet, published an edition of C.'s works, with a critical introduction, in 1875.

CHAPPED HANDS AND CHILBLAINS, a lesser and a greater form of disease of the skin, produced by undue exposure to extremes of cold and heat, and affecting chiefly the most exposed joints, the skin over which swells and cracks, with itching, pain, and heat; in the most severe cases there is ulceration, which is difficult to heal in proportion to the length of time the disease has been neglected. Chilblains may generally be avoided if the hands are washed always with tepid water, and not habitually exposed to great cold, or when cold, to the heat of a fire. When formed, they may be treated with oxide of zinc ointment; or with a dilute solution of borax in glycerine and water; or with glycerine alone, slightly diluted with water; the hands being in any case habitually covered with woollen gloves in cold weather.

CHA'PTER-HOUSE (Fr. *chapitre*), the building in which the monks and canons of monastic establishments, and the dean and prebendaries of cathedral and collegiate churches, meet for the management of the affairs of their order or society. See CATHEDRAL. Chapter-houses frequently exhibit the most elaborate architectural adornments, as, for example, those at York, Southwell, and Wells. The original stained-glass windows remain at York, and are of exquisite beauty. On the walls of that at Westminster, the original painting has been discovered. Chapter-houses are of various forms: those at York and Westminster are octagonal; those at Oxford, Exeter, Canterbury, Gloucester, &c., are parallelograms; Lichfield is an oblong octagon; Lincoln, a decagon; and Worcester a circle. They are always contiguous to the church, and are generally placed to the west of the transepts. They generally either open into the church, or are entered by a passage. Chapter-houses were often used as places of sepulture, and have sometimes crypts under them, as at Wells and Westminster.

CHARA'CEÆ, aquatic plants, forming, according to some botanists, a distinct natural order of acotyledonous plants; according to others, a sub-order of *Algæ*. Their stems are tubular, consisting either of a single tube, or of parallel tubes, a central one with smaller ones applied to its surface; they are either pellucid or incrusted with carbonate of lime, which is not to be regarded as a mere accidental incrustation, but belongs to their proper structure; and they have whorls of symmetrical tubular branches. They grow in stagnant waters, both fresh and salt, are always submersed, and often completely conceal muddy bottoms. A number of species are natives of Britain, all belonging to the genus *Chara*. The organs of reproduction are of two kinds—lateral *globules*, and axillary *nucules*. These organs have caused no little difficulty to botanists; the nature and use of the globules in particular being by no means well understood. The simple cellular structure of the C., apart from all consideration of their reproductive organs, associates them with the lower Algæ, rather than with phanerogamous plants. None of them is of any known use. It was in the C. that the beautiful phenomena of *Cyclosis* (q. v.) were first observed. Sir David Brewster discovered that each of the minute calcareous particles incrusting the C. possesses double refraction, and has regular neutral and depolarizing axes.

Chara Vulgaris.

Fossil Characeæ.—The calcareous incrustation which covers the organs of reproduction, as well as the stems of some C., has, from its power of resisting decomposition, caused the abundant preservation of this order in the Tertiary fresh-water strata. The nucules originally described under the name of *gyrogonites*, and supposed to be foraminiferous shells, have been noticed by E. Forbes in strata as old as the Middle Purbeck beds. No remains of these have been observed in newer deposits, until we find them in the Tertiaries. The nucules, associated with *Lymnæa* and *Planorbis*, are very abundant in the Eocene Bembridge beds (q. v.).

CHARACI'NIDÆ. See SALMONIDÆ.

CHA'RACTER (Gr. *charasso* or *charatto*, which signifies to scrape, cut, or engrave), means what is engraven on an object, either physically by the action of another external object or objects, or morally by the passions, the affections, by good or evil fortune, and by what we designate generally as 'circumstances.' In art, the expression of C., either in animate or inanimate objects, is, after correct delineation, the most important matter to be attended to. Though, properly speaking, all distinguishing marks are included under it, it is more generally used to designate those which mark individual from individual, than species from species, or genus from genus.

CHARACTER TO SERVANT. The master is under no legal obligation, either in England or in Scotland, to give a character to his servant, however long, faithfully, or efficiently he may have served him; the duty of bearing testimony in his favor being one which, however binding in morality, it has not been found convenient to enforce by positive law; but, if given, the character must be strictly true, or, at all events, in accordance with the master's belief, otherwise he may be exposed to an action of damages, either by the servant whom he has calumniated, or by a subsequent employer, whom he has deceived. If true, however, the fact of its being prejudicial will expose the master to no risk. In order to justify the giving of a bad character, however, it must, in general, be asked for by the servant, as the master is not entitled needlessly to publish the servant's defects. In that case, it will lie with the servant to prove its falsehood, not with the master to prove its truth. The case of the servant being known by the master to have committed felony while in his service, is, however, an exception to this rule, as, in a case so extreme, the master is at liberty to warn others against taking him into their employment. Even though strictly true, the character, if prejudicial, must not be more so than the circumstances render necessary. Acts of petty dishonesty, such as are too common amongst servants, will not warrant the master in branding him as a thief. The safe course, in such a case, is to state the offence, and not to describe it by a general epithet, which may convey an erroneous impression of its magnitude.

It is probable that, partly from thoughtless good-nature, and partly from a selfish desire to get rid of a bad servant in the most comfortable manner, false characters are given in favor of servants very much more frequently than to their prejudice. It is desirable that masters and mistresses should have in view that they may render themselves liable in reparation of any damage which can be shown to be the direct result of thus inflicting on a stranger a wrong which is unquestionably within the reach of the law.

By 32 George III. c. 56, personating a master, and thus giving a false character to a servant, or asserting in writing that a servant has been hired for a period of time, or in a station, &c., contrary to truth; and any person offering himself as a servant, pretending to have served where he has not served, or producing a false certificate, or altering a certificate, or pretending not to have been in any former service, &c., are offences at common law, punishable on conviction before two justices with a fine of £20. This statute does not extend to Scotland.

CHARACTERI'STIC. See LOGARITHMS.

CHARA'DE, or 'syllable-puzzle' as the Germans call it, is an amusement which consists in dividing a word of one or more syllables into its component syllables, or into its component letters, predicating something of each; and then, having reunited the whole, and predicated something of that also, the reader or listener is asked to guess the word. As a specimen of the C. depending upon syllables, we adduce the following:

'My *first* is ploughed for various reasons, and grain is frequently buried in it to little purpose. My *second* is neither riches nor honors, yet the former would generally be given for it, and the latter are often tasteless without it. My *whole* applies equally to spring, summer, autumn, and winter; and both fish and flesh, praise and censure, mirth and melancholy, are the better for being in it. Ans. *Sea-son*.'

As a specimen of the second class of charades, we take the following happy example from the French :

'Quatre membres font tout mon bien,
Mon dernier vaut mon tout, et mon tout ne vaut rien.'

The word is *zero*. It is composed of four letters, of which the last—viz., *o*, is equal to *zero;* the whole, zero itself, being equal to nothing.

But besides charades of this nature, there is another kind rather popular at evening-parties—the *acted* C.: the character of which is entirely dramatic. Half a dozen or so of the company retire to a private apartment, and there agree to select a certain word, as the subject of the C.; let us suppose INNKEEPER. The next thing done is to take the first syllable, INN, and arrange a little scene and dialogue, each member taking a certain part. This being accomplished, the amateur actors return to the drawing-room, and commence their performance, the rest of the company constituting the spectators. Care is taken to mention conspicuously, and yet not obtrusively, in the course of the dialogue, the word INN, which is the subject of the scene. On its conclusion, they again retire, and devise a new series of incidents for the word KEEPER, generally something in connection with a menagerie or a madhouse. This being also represented, they retire for a third time, to contrive the final scene, into which both words, or rather the whole word, Innkeeper, must be dexterously introduced at an odd moment when the spectators are thought to be off the scent. The company are then asked to guess the word. In order to the effective performance of a C. of this sort, the actors must possess a good share of inventiveness, self-possession, and ready talk, as the greater portion of the dialogue has to be extemporized.

CHARADRI'ADÆ, a large family of birds, of the order *Grallatores*, and tribe *Pressirostres*, chiefly abounding in the temperate parts of the Old World, and generally frequenting sandy unsheltered shores and open moors and downs. They have a short bill, generally soft at the base, hard and often a little inflated towards the tip; long and powerful wings; long legs; and short toes, generally only three in number, and all directed forward, but sometimes they have also a very small hinder toe. They run with great swiftness: they generally congregate in flocks, at least during certain parts of the year; many of them are nocturnal in their habits; many are migratory. The Plovers (*Charadrius*) have given their name to the family, which includes also Lapwings, Pratincoles, Oyster-catchers, Turnstones, Sanderlings, &c.

CHARBON ROUGE, or RED CHARCOAL, is a variety of charcoal obtained by subjecting wood to the action of heated air from the furnaces, or of steam, which has been raised to a temperature of 572° F. Air-dried wood, by the ordinary process of charring, yields at the best 21 to 26 per cent. of black charcoal; but when acted on by heated air or steam, as mentioned above, 36 or 42 per cent. of C. R. is obtained. It is now prepared largely in France and Belgium, and is used in stoves for heating, and in the preparation of gunpowder. It has a dark-red color, and consists of about 75 per cent. of pure carbon, and 25 per cent. hydrogen and oxygen.

CHA'RCOAL is a popular term applied to charred wood, or coal produced by charring wood. There are several other varieties of C., however, for which see CARBON, ANIMAL CHARCOAL, WOOD CHARCOAL, COKE, BLACK-LEAD, &c.

CHARCOAL BLACKS are made both from animal and vegetable substances—e. g., burnt ivory, bones, vine-twigs, peach-stones, nut and other shells, the smoke of rosin condensed, &c. Those which are derived from vegetable substances, when mixed with white, are usually of a blue tint. See LAMP BLACK.

CHARENTE, a considerable river in the west of France, rises in the department of Haute-Vienne, about 14 miles north-west of Chalus. It first flows north-west to Civray, where it turns southward into the department of Charente to Angoulême, thence it flows westward past Châteauneuf, Jarnac, and Cognac, and entering Charente-Inférieure, it runs north-west past Saintes, and falls into the Atlantic below Rochefort, and opposite the islands Oléron and Aix. This river gives its name to two departments, both remarkable for the productiveness of their vineyards; but the wines are mostly used in the preparation of brandy and liqueurs.

CHARENTE, a department of France, formed chiefly out of the old province of Angoumois, and situated in lat. 45° 10′—46° 8′ N., and long. 0° 50′ E. and 0° 30′ W. Area, about 2200 square miles. Pop. (1881) 367,451. It is generally hilly, and is watered by the river Charente, above noticed, and its tributaries, the Tardouère and the Bandiat, with the rivers Vienne and Dronne. The highest chain of hills in the north of C. is a continuation of the heights of Limousin, forming the watershed towards the Loire. Remains of marine productions show that the basin of the C. was once filled by the ocean. The soil is mostly limestone, here and there interrupted by banks of clay and gravel. Only a portion of the arrondissement Confolens has a rich vegetable clay-mould. The clay-soil is cool and moist, while the limestone district is dry and hot. The hills are in many places clad with chestnut forests. The climate is generally mild and healthy. The wines grown are spirituous and fiery in flavor, and are chiefly used in the manufacture of Cognac, which forms the most important of the exports. Truffles grow abundantly in several parts. Industry is in rather a backward condition. C. is divided into the five arrondissements of Angoulême, Cognac, Ruffec, Barbezieux, and Confolens.

CHARENTE-INFÉRIEURE, a maritime department of France, which includes the former province of Angoumois, with the greater part of Saintonge, and a small portion of Poitou. It lies in lat. 45° 5′—46° 19′ N., and long. 0° 7′ E.—1° 13′ W. The Bay of Biscay washes its western boundary—the coast-line, which is very broken, measuring about 100 miles. Area, 2740 sq. m. Pop. (1881) 462,659. It is watered on its boundaries by the Sèvre-Niortaise and the Gironde and in the center by the navigable Charente and the coast-stream Sendre. The surface is level; and the soil—near the coast, intersected by ridges of rock and sand-banks, and protected from the sea by dikes—is mostly chalky and sandy, but very fertile, producing hemp, flax, saffron, and wine in great quantities. The commerce, facilitated by the structure of the coast, and by canals in the interior, is considerable, consisting chiefly of brandy and sea-salt, which is found in the department in great abundance. The oyster and pilchard fisheries are important. The chief harbors are those of Rochefort, and La Rochelle, the latter of which is the chief town. C. is divided into the six arrondissements of La Rochelle, Rochefort, Marennes, Saintes, Jonzac, and St. Jean-de'Angely.

CHARENTON-LE-PONT, a town of France, in the department of Seine, situated on the right bank of the Marne, 5 miles south-east of Paris. The bridge over the river, which is important, from a military point of view, being considered one of the keys of the capital, and which has frequently been the scene of conflicts, is defended by two forts, forming a part of the fortifications of Paris. At the other side of the river is the National Lunatic Asylum, formerly called Charenton St. Maurice, and now St. Maurice simply. Pop. (1876) 8744.

CHARGE, in Heraldry. The figures represented on a shield are called charges, and a shield with figures upon it is said to be charged (Fr. *chargé*). The charges in a shield ought to be few in number, and strongly marked, both as regards their character and the mode of their representation. The family shield, belonging to the head of the house, almost always is simpler, i. e., has fewer charges than the shields of collaterals, or even of junior members.

CHARGE, in Military Warfare, is a sudden and impetuous attack on the enemy, by horse or foot, or both. Its object usually is to drive the enemy from a particular position; but if made with a much stronger force, it may result in his actual destruction.

CHARGE, in Military Pyrotechny, is sufficient combustible material for one firing or discharge. It is applicable to all kinds of firings, fireworks, and explosions; but the name is generally given to the quantity of gunpowder requisite for firing off a gun, &c. In cannon, this varies greatly, from $\frac{1}{4}$ to $\frac{1}{18}$ of the weight of the shot; some of the rifled ordnance now coming into use are remarkable for the smallness of the C. with which they are fired. The quota of C. will be mentioned in connection with the various kinds of firearms described in the *Encyclopædia*. In breaching a wall, a greater C. is necessary than in attacking a ship or a column of troops, even with the same kind of gun and projectile.

CHARGE. In the law of Scotland, a C. is a command to perform an act, conveyed in the letters of the sovereign. The same term is applied to a messenger's copy for service, requiring the person to obey the order contained in the letters—e. g., a C. on letters of horning, or a C. against a superior.

CHARGER is a name sometimes given to a war-horse, accustomed to the din of battles, and reliable under circumstances of confusion and danger. In the middle ages, when armor was used, and gunpowder unknown, the military horses were *barbed* or *barded* when ridden by men-at-arms—that is, they were nearly covered with armor. The face, the head, and the ears were covered with a mask called a *chanfron*, to prevent fright when charging the enemy; and an iron spike projected from the middle of the forehead. The neck was defended by small plates called *crinières;* the breast by a *poitrinal;* and the buttocks and haunches by *croupières*. These various pieces of armor were mostly made of metal, but sometimes of tough leather. The horse was occasionally covered with chain-mail; and in other instances with a *gambeson* of stuffed and quilted cloth. The man-at-arms generally rode another horse when not charging, to relieve the C. from his great burden. The barbed or *bardé* horse received its name from an old French word implying covered, clothed, or armed. A war-horse is still called a C., though not armed as in ancient times.

CHARGÉS D'AFFAIRES are fourth-class diplomatic agents, accredited, not to the sovereign, but to the department for foreign affairs; they also hold their credentials only from the minister, and are sometimes only empowered by an ambassador to act in his absence.

CHA'RIOT, in ancient times, was a kind of carriage used either for pleasure or in war. According to the Greeks, it was invented by Minerva; while Virgil ascribes the honor to Erichthonius, a mythical king of Athens, who is said to have appeared at the Panathenaic festival founded by him, in a car drawn by four horses. The ancient C. had only two wheels, which revolved upon the axle, as in modern carriages. The pole was fixed at its lower extremity to the axle, and at the other end was attached to the yoke, either by a pin or by ropes. The Greeks and Romans seem never to have used more than one pole, but the Lydians had carriages with two or three. In general, the C. was drawn by two horses. Such was the Roman *Biga* (q. v.), but we also read of a *triga*, or three-horse C., and a *quadriga*, or four-horse one. The last was that in which the Roman generals rode during their triumphal entrance into the city, and was often adorned with splendid art. The war-C. held two persons—the soldier himself and the driver, the latter of whom usually occupied the front; but the chariots used by the Romans in their public games held only the charioteer.

The oldest war-chariots of which we read are those of Pharaoh (Exodus xiv. 7). All the eastern nations used them, while we learn from Cæsar (*De Bell. Gall.* v. 19) that the Britons also were familiar with their use.

CHA'RITABLE USES AND LAW OF CHARITIES. The law of England has always anxiously, though too often ineffectually, sought to provide for the preservation and proper application of the public and private endowments in that country for charitable purposes. The preceding efforts of the legislature in this direction may now be said to have been superseded by the Charitable Trusts Acts (16 and 17 Vict. c. 137, 18 and 19 Vict. c. 124, 23 and 24 Vict. c. 136, and 32 and 33 Vict. c. 110). See CHARITY COMMISSIONERS. As these statutes now contain a species of code of charity-law, it will here only be necessary to mention certain general principles which govern the law of England in its relation to charities. The courts of equity are those which in general take cognizance of all charitable uses, or trusts of a public description. Under the authority of these tribunals—or, in cases in which the annual income does not exceed £50, in accordance with the act just quoted, under that of the county courts of the district—trustees may be called to account for the funds committed to their charge, or new trustees may be appointed, improvident alienations may be rescinded, schemes for carrying the donor's object into effect may be judicially considered and adopted, and every species of relief afforded which such institutions require. Where the management of the charity has been confided by the donor to governors and other functionaries, the law will not interfere with their proceedings unless they can be shown to be squandering the revenues or otherwise abusing the trust. Where the crown is founder, the Lord Chancellor is visitor, but in his personal character only, and not as judge of the Court of Chancery. As regards the nature of the trusts to which the equitable jurisdiction of the Chancery extends, it is necessary to remark that the word *charitable* here includes institutions for the advancement of learning, science, and art, and, indeed, for all useful public purposes, as well as for the support of the poor. It also comprises all donations for pious and religious objects, under which are included all those which tend to the benefit of the Church of England, or of any body of dissenters sanctioned by law. Roman Catholics were admitted into this category by 2 and 3 Will. c. 115, and Jews by 9 and 10 Vict. c. 59, s. 2. The charity, or other benevolent purpose, however, must be public; 'for if a sum of money be bequeathed, with direction to apply it to such purposes of benevolence and liberality as the executor shall approve,' or even 'in private charity,' the law will take no notice of such a trust.

Legacies to pious or charitable uses are not by the law of England entitled to a preference, though such was the doctrine of the civilians; but where a deficiency of assets arises, they are abated in proportion with the others.

CHA'RITY, SISTERS OF. See SISTERS OF CHARITY.

CHARITY COMMI'SSIONERS. A body of commissioners was created in 1853, by the Charitable Trusts Act, 16 and 17 Vict. c. 137 (see CHARITABLE USES), with power to inquire into all charities in England and Wales, with reference to their nature, objects, and administration, and the amount and condition of the property belonging to them. The commissioners have power to call for the production of accounts and documents from trustees, and to appoint inspectors to visit and report on their management. The statute does not extend to Scotland or Ireland, to the English universities, or to the city of London. An annual report of their proceedings must be laid before parliament by the commissioners.

CHARIVARI is a French term used to designate a wild tumult and uproar, produced by the beating of pans, kettles, and dishes, mingled with whistling, bawling, groans, and hisses, and got up for the purpose of expressing a general dislike to the person against whom it is directed. The etymology of C. is obscure; the Germans translated it by *Katzenmusik*, to which in English *Cat's-concert* corresponds. In France, during the middle ages, a C. was generally raised against persons contracting second nuptials, in which case the widow was specially assailed. On these occasions, the participators in it, who were masked, accompanied their hubbub by the singing of satirical and indecent verses, and would not cease till the wedding couple had purchased their peace by ransom. C. answers to the English concert upon 'marrow-bones and cleavers,' with which it was customary to attack a married couple who lived in notorious discord. It was also got up against an unequal match, such as where there was great disparity in age between the bride and bridegroom.

Similar customs seem to have existed under different names in all parts of Europe, and sometimes they were of such licentious and violent character as to require military interference to put them down. Even as early as the 14th c., the church found itself forced to threaten punishment, and even excommunication, against those who participated in them. In more recent times, the C. has taken a purely political coloring; as, for example, during the Restoration in France, at which time, however, the popular voice began to seek vent by casting its satirical darts against public men through the press. The papers published for this purpose were called C., the most famous among which is *the* CHARIVARI, which was established in Paris, December 2, 1832, corresponding to the English publication, *Punch* (q. v.).

CHARKO'V. See KHARKOV.

CHA'RLATAN, a mountebank, quack-doctor, or empiric, and hence any one who makes loud pretensions to knowledge or skill that he does not possess. The word seems to be derived from the Ital. *cialare*, to babble or talk, the chief art of the C. consisting in talk. Charlatanism abounds in all departments of life, and manifests itself in various ways according to the subject and character of the person. It changes also in form with the spirit of the time. The medical C. no longer appears on a stage in the guise of Doctor Ironbeard, but as a fine-dressed gentleman, receiving grateful acknowledgments through the newspapers, and publishing popular medical books, with the address of the author, and recommendations to apply to him. It has not unfrequently happened, however, that extraordinary men who were so far before their age as not to be understood by it, such as Paracelsus, have passed for charlatans until more justly estimated by later times. Several books have been written on the charlatanism of scholars. J. B. Mencke's satire, *De Charlataneria Eruditorum* (Leip. 1715), is a classical work, which has been continued by Büschel in his book, *Ueber die Charlatanerie der Gelehrten seit Mencke.*

CHARLEMAGNE, i. e., Charles the Great, king of the Franks (768—814 A.D.), and Roman emperor (800—814 A.D.), was born on 2d April 742, probably at Aix-la-Chapelle, and was the son of Pepin the Short, the first Carlovingian (q. v.) king of the Franks, and grandson of Charles Martel (q. v.). On Pepin's death in 768, he and his brother Carloman jointly succeeded to the throne. By Carloman's death, and the exclusion of both his sons from the throne, C. became sole king. In 772, it was resolved in the Diet at Worms to make war against the Saxons, for the security of the frontiers, which they continually threatened, and for the extension of the Christian religion. C. advanced as far as the Weser in 772, securing his conquests by castles and garrisons. Pope Adrian I. now called him to his aid against Desiderius, king of the Lombards. C. had married the daughter of Desiderius, and had sent her back to her father because she bore him no children, and married Hildegarde, daughter of the Swabian duke, Godfrey. Desiderius had sought revenge by urging the pope to crown the sons of Carloman, and on the pope's refusal, had laid waste the papal territory. C. crossed the Alps from Geneva, with two armies, by the Great St. Bernard and Mont Cenis, in 773, and overthrew the kingdom of the Lombards in 774. The Lombard dukes acknowledged him as their king, and he secured the pope's favor by confirming the gift which Pepin had made to the papal see, of the exarchate of Ravenna. In 775, he was again employed in the most northerly part of his dominions, reducing the Saxons to subjection; in 776, he suppressed an insurrection in Italy; in 777, he so completed his victory over the Saxons, that their nobles generally acknowledged him as their sovereign in an assembly at Paderborn. Being now invited to interpose in the wars of the Arabs and Moors in Spain, he hastened to that country in 778, and added to his dominions the regions between the Pyrenees and the Ebro. From Spain he was summoned in haste by a new insurrection of part of the Saxons, who had advanced almost to Cologne, but whom he drove back to the Elbe. In 781, he went to Italy, where the pope crowned his second son, Pepin, king of Italy, and his third son, Louis, an infant of three years old, king of Aquitaine.

The Saxons once more rising in arms, defeated and destroyed a Frankish army on the Süntel in 782, which C., after a new victory, fearfully revenged by causing no fewer than 4500 prisoners to be executed as rebels in one day. A more general rising of the Saxons followed, but in 783—785, the Frankish monarch succeeded in reducing them completely to subjection, and in persuading their principal chiefs to submit to baptism, and to become his faithful vassals. Subsequent insurrection and wars in Germany, between this year and 800, resulted in victories over the Bulgarians and Huns, and in the further consolidation and extension of his empire, the eastern boundary of which now reached to the Raab.

In 800, C. undertook an Italian campaign, which was attended with the most important consequences. Its immediate purpose was to support Pope Leo III. against the rebellious Romans. When C., on Christmas Day, 800, was worshiping in St. Peter's Church, the pope unexpectedly, as it appeared, set a crown upon his head, and amidst the acclamations of the people, saluted him as Carolus Augustus, emperor of the Romans. Although this added nothing directly to his power, yet it greatly confirmed and increased the respect entertained for him, such was still the lustre of a title with which were associated recollections of all the greatness of the Roman empire. A scheme for the union of the newly revived Western Empire with the Empire of the East, by C.'s marriage with Irene (q. v.), the Byzantine empress, failed by reason of Irene's overthrow. After this C. still extended and confirmed his conquests both in Spain and in Germany. He labored to bring the Saxons to a general reception of Christianity, and founded bishoprics for this purpose. To the end of his reign, he was incessantly engaged in wars, and insurrections were always apt to break out in the frontier parts of his dominions; which he endeavored to secure, however, not only by military power and arrangements, but by improvements in political and social institutions. His views were liberal and enlightened to a degree rare for many subsequent ages. Whilst he made the power of the central government to be felt in the utmost extremities of his empire, he recognized in his subjects civil rights, and a limitation of monarchic power by their assemblies. He zealously endeavored to promote education, agriculture, arts, manufactures, and commerce. He projected great national works, one of which was a canal to connect the Rhine and the Danube; but he deemed nothing beneath his attention which concerned the interests of his empire or of his subjects. He required his subjects to plant certain kinds of fruit-trees, the cultivation of which was thus extended northward in Europe. His own domains were an example of superior cultivation. He had a school in his palace for the sons of his servants. He built sumptuous palaces, particularly at his favorite residences, Aix-la-Chapelle and Ingelheim—for he had no fixed capital—and many churches. Learned men were encouraged to come to his court. He himself possessed an amount of learning unusual in his age; he could speak Latin and read Greek. He attempted to draw up a grammar of his own language. C. was of more than ordinary stature, and of a noble and commanding appearance. He was fond of manly exercises, particularly of hunting. He was too amorous, but in eating and drinking he was very moderate. His fame spread to all parts of the world: in 768, Harun-al-Raschid sent ambassadors to salute him. He enjoyed good health till shortly before his death, 28th January 814. He was buried at Aix-la-Chapelle (q.v.), in the church which he had built there. He was succeeded by his son styled Louis le Débonnaire, the only one of his sons who survived him; but the greatness of his dynasty terminated with his own life. C. is styled Charles I. in the enumeration both of the French kings and of the German or Roman emperors. Besides his *capitularies* (q. v.), there are extant letters and Latin poems ascribed to him. His life was written by his secretary, Eginhard.

Crown of C. now at Vienna.

CHARLEROI, a Belgian town and fortress in the province of Hainaut, stands on the Sambre, between Mons and Namur, on the line of the Brussels and Namur Railway. The pop. is (1873) 12,150, who carry on considerable manufactures in hardware, glass, woollen-yarn, &c. The district is rich in coal, and the number of smelting-furnaces and nail factories in the neighborhood is very great. The ironworks of Couillet, which yield a third of all the cast iron produced in Belgium, lie within a mile or two of the town. C. possesses considerable historical and political interest as a fortress. The fortifications were begun by the Spaniards in 1666, but falling into the hands of the French next year, they were completed by Vauban. After six exchanges of masters between the French and Spaniards, the Peace of Aix-la-Chapelle, 1748, left C. in the possession of Austria. In 1794, after a protracted and desperate resistance, it was surrendered to the French by capitulation, when the fortifications were demolished. The importance of the place in a strategic point of view having become apparent during the campaign of 1815, the fortifications have been since restored.

CHARLES, surnamed MARTEL—i. e., the Hammer—was the son of Pepin of Heristal, mayor of the palace under the last Merovingian kings, and was born about 690 A.D. After his father's death in 714, he was proclaimed mayor of the palace by the Austrasian party. King Chilperic and he now quarreled, and a civil war arose, which ended in C. becoming undisputed mayor of the palace and ruler of the Franks. During the latter years of his life, he indeed allowed the nominal throne to remain occupied —the titular kings being mere puppets in his hands. He was much engaged in wars against the revolted Alemanni and Bavarians, the Saxons, &c., but his importance as a historic personage is chiefly due to his wars against the Saracens, who, having conquered Septimania from the Western Goths in 720, advanced thence into Aquitaine, conquered Bordeaux, defeated the Duke of Aquitaine, crossed the Garonne, advanced to the Loire, and threatened Tours. C. defeated them between Tours and Poitiers in 732, in a great battle, in which their leader, Abd-ur-Rahmân, fell, and a stop was put to their progress in Europe, which had filled all Christendom with alarm. He defeated them again in 738, when they had advanced in the Burgundian territories as far as Lyon; deprived them of Languedoc, which he added to the kingdom of the Franks; and left them nothing of their possessions north of the Pyrenees beyond the river Aude. He died on 22d October 741, at Quiercy on the Oise, in the midst of his victories, his projects, and his greatness, leaving the government of the kingdom to be divided between his two sons—Carloman, and Pepin the Short.

CHARLES, Archduke of Austria, third son of the Emperor Leopold II., was born at Florence, 5th September 1771. Whilst yet a youth, he pursued military studies with much ardor; and after having greatly distinguished himself as a general in inferior commands, he was intrusted, in 1796, with the chief command of the Austrian army on the Rhine. He fought with great success against Moreau at Rastadt, defeated Jourdan in several battles, drove the French over the Rhine, and concluded his victories by taking Kehl in the winter. In 1799, he was again at the head of the army on the Rhine, was several times victorious over Jourdan, protected Swabia, and successfully opposed Massena. In 1800, bad health compelled him to retire from active service; but being appointed governor-general of Bohemia, he formed a new army there. After the battle of Hohenlinden, he was again called to the chief command, and succeeded in staying the rapid progress of Moreau, but almost immediately entered into an armistice with him, which was followed by the peace of Luneville. In 1805, he commanded the army opposed to Massena in Italy, and fought the hard battle of Caldiero; but upon bad tidings from Germany, retreated from the left bank of the Adige to Croatia. This retreat was one of his greatest military achievements. In 1809, he won the great battle of Aspern, which first showed to Europe that Napoleon was not invincible; but he did not promptly enough follow up his victory, and Napoleon, who hastened to reinforce his army, retrieved his fortunes at Wagram, and the archduke was now compelled to give way before the enemy, till he reached Znaim, where an armistic was concluded on 12th July. In the campaign of 1813 and 1814 he had no part; and lived in retirement till his death, 30th April, 1847.

CHARLES I., king of England, Scotland, and Ireland (1625—1649), was born at Dumfermline, 19th November 1600, and was the second son of James I. of England (VI. of Scotland). On the death of his elder brother, Henry, in 1612, he became Prince of Wales, and heir-apparent to his father's throne; to which he succeeded in 1625, but found both in England and Scotland a contest in progress between king and people. He had inherited from his father the most extreme notions of kingly prerogative, and he mistook the general movement in the public mind for an agitation amongst a few disaffected persons. He had deeply imbibed his father's notion, that an Episcopal church was the most consistent with the proper authority of kings; and he adopted severe and persecuting measures against the Puritans in England and the Presbyterians in Scotland. He married a Roman Catholic, Maria Henrietta of France, a marriage most displeasing to the nation; and even so far dispised public opinion as to make his father's favorite, the Duke of Buckingham his prime minister, and chief adviser. The English parliament, which he assembled in 1625, was resolved upon the vindication of the national liberties, and was therefore very sparing in its grants of subsidies, while that of 1626, instead of freely granting supplies, resolved upon the impeachment of Buckingham; whereupon the king threw into prison two of the boldest members, Elliott and Digges; dissolved parliament; and, to procure money, had recourse to the arbitrary measures of forced loans, and a tax upon the seaports (*ship-money*), imposed by the mere exercise of royal authority. By all this, public feeling was more and more embittered. In 1628, C. found it necessary again to summon a parliament; and the parliament, very resolute to maintain the liberties of the nation, presented the petition known in history as the *Petition of Right* (q. v.). C. temporized,

conceded, and finally, although the assassination of Buckingham had removed one cause of strife, assumed a threatening tone, and dissolved the parliament, 10th March 1629. He even caused some of the leading members of the House of Commons to be imprisoned.

He now governed for eleven years without a parliament, having Laud (q. v.) and Strafford (q. v.) for his chief advisers, and obtaining for his edicts the semblance of a legal sanction by means of the Star Chamber (q. v.). All this while, the storm was gathering, the love of liberty increased, and republican principles were developed and extended. The policy which C. adopted was that of more severe repression. At length, in 1638, Scotland assumed an attitude of determined resistance to the imposition of a liturgy and of Episcopal church-government. The National Covenant (q. v.) was subscribed, Presbyterianism was completely restored; and in 1639, the king having assembled an army for the purpose of reducing Scotland to subjection, the Scottish Covenanters also took up arms, and advanced to the English border, many of the English regarding their approach with joy. Civil war was, however, prevented for the time, by concessions on the part of the king. Unable to do without supplies any longer, C. summoned an English parliament in 1640, which, instead of listening to his demands, began to draw up a statement of public grievances. C. soon dissolved the parliament, and assembled an army to resist the Scots, who had again taken up arms and entered England; but his army was defeated by them at Newburn-upon-Tyne, and they advanced southward, with the sympathy and good-wishes of no small part of the king's English subjects. Much against his will, C. was now compelled again to call a parliament, whose memorable sittings began on 3d November 1640. Both Houses were resolute in their opposition to his despotism. They began by the impeachment of the ministers and high officers of state, and declared the decrees of the Star Chamber and Court of High Commission to be null and void. They passed a bill in favor of triennial parliaments; and the king, in trepidation, gave it his assent. He also consented, although against his own convictions, to the execution of Stafford; and even gave his assent to an act which provided that the present parliament should not be dissolved, prorogued, or adjourned, without its own consent. Hoping to win the favor of the Scots, he now visited Scotland; but whilst he was there, a rebellion broke out in Ireland, accompanied by a fearful massacre of Protestants. The prospect of a peaceful accommodation was now almost destroyed; the English parliament enlarged its demands; the king, after seeming to yield, took the extraordinary step of suddenly, on the 4th January 1642, appearing in the House of Commons, accusing five members—Pym, Hampden, Hollis, Hazelrig, and Stroud—of high treason, and demanding that they should be delivered up to him. Both Houses of parliament espoused their cause, and the city of London showed a determination to defend them by arms. C. left London with his family, and the parliament declared the kingdom in danger. Civil war began; the royalists had at first the advantage, but the national feeling was with the parliament. Negotiations were from time to time opened or renewed, but always in vain. After the battle of Naseby, on 15th June 1645, in which his army was almost annihilated by the parliamentary troops under Fairfax and Cromwell, C. was compelled to seek refuge in the Scottish camp. Negotiations still proving fruitless, he was delivered up to the English parliamentary army. Negotiations were still attempted with C. in his captivity; but resulted in nothing.

Finally, C. fled, was taken, refused the ultimatum of the army, and so enraged Cromwell and the Independents, that parliament was obliged to pass an act declaring all negotiation with the king to be treason. The Presbyterians of England and the Scots, who were always haunted by the idea that there was something sacred and inviolable in monarchy, thought to rescue the king from the hands of the Independents, but were defeated, and all the Presbyterians were forcibly expelled from the English House of Commons, which now consisting only of about 60 members—the *Rump parliament*—appointed a court composed of persons from the army, the House of Commons, and the city of London, to try the king. The court was opened with great solemnity in Westminster Hall on 20th January 1649. About 70 members took part in its proceedings. On the 27th of January, C. was condemned to death as a tyrant, murderer, and enemy of the nation. The Scots protested, the royal family entreated, and the court of France and States-General of the Netherlands interceded, but in vain. On 30th January 1649, he was beheaded in front of the palace of Whitehall. In his last hours he showed great calmness and presence of mind. In his private character, C. was a man of cultivated mind, kind, and of irreproachable life; but in political affairs he was unscrupulous, and had recourse to dissimulation and falsehood for the accomplishment of his purposes. In the estimation of many who do not condemn it on moral grounds, his execution was a great political blunder. From the restoration of Charles II., the 30th of January was observed in the Church of England with special religious services, as the day of *King Charles the Martyr*. This commemoration, offensive to great part of the community, and of the members of the Established Church itself, was abolished by act of parliament in 1859.

CHARLES II., king of England, Scotland, and Ireland (1649—1685), the eldest son of Charles I., was born 29th of May 1630, and went with his mother to France during the civil war. He was at the Hague at the time of his father's execution, and immediately assumed the title of king. He meditated an expedition to Ireland for the assertion of his claims, when the Scots offered him their crown in 1650, and proceeding to Scotland, he was crowned at Scone in the beginning of 1651. The limitations, however, under which he received the crown, were disagreeable to him, and he hated the restraint put upon his inclinations by the Presbyterian clergy. After the defeat of the Scots at Dunbar, he put himself at the head of their army, in hope of rousing the royalists of England to his support; but was completely defeated by Cromwell, at Worcester, on 3d September 1651. He made his escape, amidst many dangers, to France, where his situation was by no means agreeable, and from which he went to Cologne, and afterwards to the Netherlands. After Cromwell's death, the desire of the English for a settled government leading to the restoration of the House of Stuart, he landed at Dover, on 26th May 1660, was received with acclamation by the people, and ascended the throne almost untramelled by a single condition. He was surrounded by men of extreme party-feeling, among whom the most influential was the chancellor, Clarendon (q. v.).

The persons immediately concerned in the death of Charles I. were brought to the scaffold; Episcopacy was restored; and the Presbyterians and other Noncomformists, both in England and Scotland, were subjected to great hardship and persecution. The king was extravagant, and soon found himself in want of money; he married the Princess Catharine of Portugal, for the sake of her large dowry; he shamefully sold Dunkirk and Mardyke to the French; and for a pecuniary consideration agreed to make war against the United Provinces, although such a war was contrary to all the feelings of the English people and the interests of English commerce. The Dutch fleet, under De Ruyter, entered the Thames, and C. was compelled to make an ignominious peace. After the fall of Clarendon, the ministry known as the Cabal (q. v.) ministry came into power—a ministry hateful to the country, composed of unprincipled men, and bent upon the restoration of Popery and absolute monarchy. C. sought to conciliate the people by the *Triple Alliance*, in May 1668, with Sweden and the States-General; but the French court soon found means to persuade him again to make war against the United Provinces. He basely accepted pecuniary gifts and a pension from the French government; and, as even this, with all that he could get from his parliament, was insufficient for his expenses, he had recourse to illegal means of raising money. The story of the *Popish Plot* (q. v.) against the life of the king caused prodigious excitement amongst the people, and Lord Stafford and many other persons were most unjustly brought to the scaffold. The parliament of 1679, very much against the will of the court, enacted the celebrated *Habeas Corpus Act* (q. v.); and a bill was under consideration for the exclusion of the king's brother, the Duke of York, from the throne, on account of his avowal of the Roman Catholic religion. The king, at this period of his reign, had, however, completely crushed the Presbyterians of Scotland, and was more absolute than any of his predecessors had been on either of the British thrones. Most arbitrary measures were adopted. The city of London was deprived of its privileges, because of the election of a sheriff disagreeable to the court. The *Rye-House Plot* (v. v.), a widely extended conspiracy, and in which the king's natural son, the Duke of Monmouth (q. v.) was concerned, was discovered in 1683, and cost the lives of a number of persons, amongst whom were Lord Russell and Algernon Sidney. C., however, appears to have recognized the necessity of a more liberal policy, when he was unexpectedly carried off by death, on 6th February 1685. In his dying hours, he called in the assistance of a Roman Catholic priest, although he had not previously avowed his attachment to that religion. His reign was full of events dishonorable to his country, and of which he himself was generally the cause. His life was most dissolute; his adulteries, and the profligacy of his court, scarcely paralleled in British history. He had an affability, however, which won for him a certain sort of popularity.

CHARLES V., surnamed the Wise, king of France (1364—1380), was the son of King John, and was born on 21st January 1337. His father being made prisoner by the English at the battle of Poictiers, on 19th September 1356, he assumed the regency. The most significant events which occurred under his rule, were the vigorous efforts of the *bourgeoisie* to deliver themselves from the tyranny of the nobles and the court, and the peasant war called the *Jacquerie* (q. v.). His father dying, 8th April 1364, C., ascended the throne, and by his cautious policy rescued the kingdom from some of its troubles, and re-established the power of the crown, which had been much shaken. War with England

raged for a number of years, but with results highly favorable to C., who stripped his enemies of all their conquests in France, except a few fortified places. He died 16th September 1380. C. was fond of books and the company of learned men, but was not above the natural weakness of kings of outward pomp and magnificence.

CHARLES VI., king of France (1380—1422), born at Paris, 3d December 1368, was the son and successor of Charles V. He was only 13 years of age when his father died. For several years, his uncle, the Duke of Anjou, acted as regent. In 1388, C. took the reins of government into his own hand, but during his lifetime was so often afflicted with insanity, that party-strife raged without much check. The two great families whose influence divided the nation, were those of Orleans and Burgundy. It was the Orleans party which called in the assistance of the English, and brought about the battle of Agincourt, so disastrous to the French nation. Subsequently the Burgundians allied themselves to the English, who laid waste the whole of northern France. In the midst of these calamities, C. died 21st October 1422.

CHARLES VII., king of France (1422—1461), the son and successor of Charles VI., was born on 22d February 1403. On his father's death he was at the head of an army, with which he held possession of the southern provinces of the kingdom; Paris and the north being in the hands of the English, who proclaimed Henry VI. of England king of France, and appointed the Duke of Bedford regent. For some time the events of war were unfavorable to C., who was compelled, in 1424, to evacuate Champagne, and, in 1425, Maine. In 1426, the Count Dunois gained the first victory over the English at Montargis; but in the year following they besieged Orleans, a place of great importance to C., as securing a connection with the north, and he was roused to fresh energy. At this time, also, Joan of Arc (q. v.), the Maid of Orleans, by her wonderful courage and confidence of a heavenly mission, roused the fervor both of nobles and people.

The siege of Orleans was raised in May 1429; the English retired disheartened, and gradually lost their acquisitions in France. A treaty between the French king and the Duke of Burgundy greatly advanced the French cause. In 1436, C. entered Paris; and during the further progress of the war, the English lost all their strongholds except Calais. In 1452, they were finally defeated at Castillon. After he was established on his throne, C. devoted himself to the reorganization of the government, in which everything had fallen into confusion, but showed a strong anxiety to frame it according to a scheme of perfect despotism, and for this purpose to provide himself with a powerful and well-disciplined standing army, which caused some discontent among the nobles of his kingdom. His government, however, was mild, and under it France recovered in some measure from the effects of the terrible calamities which it had endured. His last years were embittered by the conduct of his son, the Dauphin, afterwards Louis XI.; and his apprehension that his son would poison him was so strong, that his consequent abstinence from food is supposed to have hastened his death, which took place at Melun on 22d July 1461.

CHARLES VIII., king of France (1483—1498), was born at Amboise on 30th June 1470, and succeeded to the throne on the death of his father, Louis XI. For some time the government was carried on under the regency of his sister, Anne of Beaujeu. When C. attained his twenty-first year, he took the royal power into his own hand, and soon developed a bold and ambitious spirit. The most important incident of his career was his conquest of Naples in 1495, to the throne of which he believed he had a claim. The Italian princes and other European potentates were alarmed by his success. A league was hastily formed between the pope, the emperor of Germany, Ferdinand of Spain, the republic of Venice, and Sforza, Duke of Milan, to oppose his return to France. C., however, gallantly broke through the allied forces near Piacenza, and effected a retreat to his own country. It was with difficulty he was hindered by his councillors from resuming his warlike designs on Italy. C. is also said to have meditated the expulsion of the Turks from Europe, and making himself emperor of Constantinople; having received from Andreas Palæologus, the grandson of the last Grecian emperor, a transference of his claims to the Byzantine throne. He died 7th April 1498.

CHARLES IX., king of France (1560—1574), the second son of Henry II. and of Catharine de' Medici (q. v.), was born at St. Germain-en-laye on 27th June 1550, and on 5th December 1560, succeeded to the throne on the death of his brother, Francis II. His character was a compound of passion, acuteness, heartlessness, and cunning. Although only 24 years of age when he died, so well had his detestable mother trained him to a love of perfidy and cruelty, that he found time, with her assistance and that of the Guises, to perpetrate an act so hideously diabolical, that all civilized Europe still shudders at the recollection. The massacre of St. Bartholomew's (q. v.), 24th August, 1572, was the culmination of a series of treacheries towards the Huguenots, which disgraced his reign. The result was, that civil war broke out anew, and assumed a very threatening character, as political malcontents associated themselves with the Protestants. C. died May 30, 1574.

CHARLES X., king of France (1824—1830), third son of the Dauphin Louis, and grandson of Louis XV., was born at Versailles, 9th October 1757. He received the title of Count d'Artois, and in 1773 married Maria Theresa of Savoy. After the events of 14th July 1789, he and the Prince of Condé took the lead in the emigration. In 1796, he sailed from England with a squadron under Commodore Warren, on an expedition to the western coasts of France, whereupon twenty departments rose in insurrection; but he had not courage to land and place himself at the head of the insurgents, whom he basely left to the vengeance of the republicans. Detested now by the royalists of France, and despised by the British, he lived in obscurity until the allies entered Paris in 1814, when he appeared in France as lieutenant-general of the kingdom, and issued a proclamation announcing the end of despotism, of conscriptions, and of oppressive taxes. After the second restoration, he took little open part in politics, but lived surrounded with priests, Jesuits, and nobles of the old school; and in this circle originated the tyrannical and unconstitutional measures to which even Louis XVIII. made considerable opposition, but which at this time disgraced the government of France. The death of Louis, on 16th of September 1824, brought C. to the throne. He took the oath of adherence to the charter, but soon displayed his intention of restoring as much as possible the absolutism of the old French monarchy. Popular discontent rapidly increased. A royal speech, of a threatening character, on 2d March 1830, was followed by an address of remonstrance, signed by 221 deputies, upon which the king dissolved the chambers. The deputies who signed the address were all re-elected, but the court taking fresh courage from the success of the expedition to Algiers, the celebrated ordinances of 25th July were signed by the king, putting an end to the freedom of the press, already largely curtailed, appointing a new mode of election, and dissolving the recently elected chamber. The capital took up arms, the guards refused to act, and the king soon found himself compelled to flee. As a last resource, he abdicated the throne, on 2d August 1830, in favor of his grandson, Henry, Duke of Bordeaux; the Dauphin also consenting to this act. But it was too late; the revolution was accomplished, and Louis Philippe, Duke of Orleans, was chosen king of the French. C. made his escape to England, resided for some time at Holyrood, and afterwards at Prague. He took no part in the political intrigues and attempts of the Duchess de Berri. He died of cholera at Görz, on 6th November 1836. His only surviving descendant, in the male line, is his grandson, the Count of Chambord (q. v.).

CHARLES IV., German emperor (1346—1378), was born at Prague in 1316, and was the son of King John of Bohemia, of the House of Luxembourg, who fell in the battle of Crecy. At the instigation of Pope Clement VI., to whom he had previously taken an oath of humiliating submission at Avignon, he was elected emperor by a portion of the electors on 11th July 1346, although Louis IV. then actually filled the imperial throne. But even after the death of Louis, it was not without difficulty that he obtained secure possession of it. He was crowned king of Italy at Milan in 1354, and emperor at Rome in 1355. In 1356, he issued the Golden Bull (q. v.), the fundamental law concerning the election of German emperors; in defiance of the very letter of which he afterwards, by large bribes, secured for his own son, Wenceslaus, the succession to the empire. He died at Prague, 29th November 1378. C. was an artful politician, but destitute of true greatness. He sought the support of the clergy by undue concessions, sold rights and privileges in Italy and other parts of the empire for money, and cared chiefly for the prosperity of his hereditary kingdom of Bohemia.

CHARLES V., German emperor, was born at Ghent on 24th February 1500. He was the eldest son of Philip, Archduke of Austria, and of Joanna, the daughter of Ferdinand and Isabella of Spain. Philip's parents were the Emperor Maximilian and Maria, daughter and heiress of Charles the Bold, Duke of Burgundy. On the death of his grandfather, Ferdinand, in 1516, C. took possession of the throne of Spain by the title of Charles I., his mother Joanna being of disordered intellect and incapable of reigning. He was not, however, very favorably received by the Spanish nobles, who were doubtful of his right, and jealous of the followers whom he brought from the Low Countries, where he had been educated. All the abilities of his famous minister Ximenes (q. v.) were requisite to prevent an open revolt. On the death of Maximilian in 1519, C. was elected German emperor from amongst a number of competitors, chiefly through the influence of the Elector Frederic of Saxony. In his earlier years he had been frivolous and dissolute, but he now became mindful of the duties and dignity of his high position. On 22d October 1520, he was crowned at Aix-la-Chapelle, and received from the pope the title

of Roman emperor. He ascended the imperial throne at a time when Germany was in a state of unprecedented agitation concerning the doctrines proclaimed by Luther. To restore tranquillity, a great diet was held at Worms in 1521, Luther's declaration of his principles before which forms a well-known and important passage in the history of the Reformation. In 1522 he reduced to subjection the towns of Castile, which had leagued themselves together for the maintenance of their ancient liberties. He was likewise successful in his war against the Turks under Solyman the Great. C. was involved also in a struggle of long duration with France, in which, after many alternations of fortune, his armies at last drove the French from the greater part of their conquests in Italy; and Francis I. of France fell into his hands as a prisoner, after a battle by which the siege of Pavia was raised on 24th February 1525.

The pope, however, began to grow alarmed at his victories, and therefore allied himself with France and the principal Italian states, and released the king of France from the obligations under which he had come by his treaty with Charles. It was the pope's object to exclude C. from all dominion in Italy; but the emperor's forces under Charles of Bourbon, the former Constable of France, took Rome itself by storm, plundered it, and made the pope prisoner. C. pretended great regret for this, went into mourning with all his court, and caused prayers to be said for the pope's liberation, whilst by his own directions the pope was kept for seven months a captive. Peace was concluded in 1529, on terms most favorable for the emperor. He now thought to put an end to the religious differences in Germany, and to repel the Turks, who had overrun Hungary and laid siege to Vienna. But the Diet at Augsburg in 1530, proved how vain was the hope of restoring the former state of things in Germany; and the emperor refusing to recognize the confession of the Protestants, they refused to help him against the Turks. In 1531, the Protestant princes formed the League of Smalcald (q. v.), and allied themselves with France and England for their own protection. This, and the continued assaults of the Turks, compelled the emperor to yield in some measure to the demands of the Protestants. In 1535, C. undertook an expedition from Spain against the pirate Barbarossa, who had established himself in Tunis, and whose vessels did prodigious injury to the commerce of Spain and Italy. In this expedition he was completely successful, and set free no fewer than 22,000 Christians, who had been held as slaves. War again broke out with France; an armistice for ten years was concluded in 1538; and C. even visited Paris, where he was magnificently entertained. But the war broke out afresh in 1542, and terminated in favor of the emperor; who also triumphed in the battle of Mühlberg, 25th April 1547, over the Protestant princes of Germany, and deprived the Elector John Frederic of Saxony of his territories. But he showed so plainly his intention of converting the German empire into a hereditary possession of his family, that new opposition arose, and C. was compelled to flee before the arms of Duke Maurice of Saxony and the Protestants, and in 1552 to promise them the peaceful exercise of their religion, which was confirmed by the Diet at Augsburg in 1555. Henry II. of France also took from C. some parts of Lorraine. His health failing, C. now declared in an assembly of the States at Louvaine, his resolution to seek repose, and to devote the remainder of his days to God. He resigned the government of his dominions to his son, for whom, however, he vainly sought to secure the imperial throne; and having relinquished to him the crown of Spain on 15th January 1556, he retired to the monastery of Yuste, in Estremadura, where he spent two years partly in mechanical amusements, partly in religious exercises, which are said to have assumed a character of the most gloomy asceticism, and died on 21st September 1558. By his wife Isabella, daughter of King Emmanuel of Portugal, he had one son, his successor, Philip II. of Spain, and two daughters. His brother Ferdinand succeeded him in the empire.

CHARLES VI., German emperor (1711—1740), the last of the proper male line of the House of Hapsburgh, was the second son of the Emperor Leopold I., and born 1685. His father intended for him the crown of Spain; but Charles II. of Spain, yielding to French intrigues, assigned it by testament to Philip of Anjou, whereupon arose the great war of the Spanish succession—Britain and Holland taking part with the emperor against France, for the maintenance of the balance of power in Europe. C. was acknowledged by the allies as Charles III. of Spain, but had not succeeded in obtaining permanent possession of the kingdom, when the death of his brother, the Emperor Joseph I., recalled him to Germany in 1711; and as he now became emperor of Germany, Britain and Holland concluded the Peace of Utrecht with France in 1713. C. continued the war for some time longer; but was at last obliged to give up his claim to Spain, being confirmed, however, in possession of the Spanish Netherlands and of the Spanish possessions in Italy. Success attended his arms in a war against the Turks, and in a war with Spain, which arose out of the projects of the Spanish minister Alberoni, and in which the *Quadruple Alliance* was formed—France, Britain, and Holland joining the emperor against Spain. But C., having lost his only son, and being very anxious to secure the throne to his own descendants, named his daughter, Maria Theresa (q. v.), as his heiress, by a *Pragmatic Sanction* (q. v.), to which he had much difficulty in obtaining the consent of some of the German states and some foreign powers; and to accomplish this object he gave up Tuscany, Parma, and Piacenza, and afterwards Naples, Sicily, Lorraine, and some parts of Milan. Meanwhile he was unsuccessful in wars with France and Spain, and with the Turks, who compelled him, in 1739, to resign his former conquests. He died 20th October, 1740. He was of a mild and benevolent disposition, but full of superstition and of prejudices in favor of feudalism and ecclesiastical domination.

CHARLES VII., German emperor (1742—1745), was born at Brussels in 1697, and was the son of Maximilian Emmanuel, Elector of Bavaria, and for some time governor of the Spanish Netherlands. After the conquest of the Bavarian territories, and the pronunciation of the ban of the empire against his father by the Emperor Joseph I., he was for some time the emperor's prisoner; but after the decease of Joseph, he married his youngest daughter; and having, in 1726, succeeded his father as Elector of Bavaria, refused his consent to the Pragmatic Sanction (see preceding article); and on the death of Charles VI. in 1740, advanced a claim to the Austrian dominions in right of his wife, and upon the further ground of a testament of Ferdinand I. Success at first attended his arms; he was acknowledged as Archduke of Austria, and then as king of Bohemia, upon which he was also, in 1742, elected emperor. But the tide of fortune now turned against him. The Hungarians rose in favor of Maria Theresa, and he was driven from Austria and from Bohemia, and for a time even from his Bavarian capital, Munich. Disease and calamities combined to cause his death, 20th January, 1745, shortly before which he said, 'Misfortune will never leave me, till I leave it.'

CHARLES X., or CHARLES-GUSTAVUS, king of Sweden, was born at Nyköping, 8th November 1622. After studying at the university of Upsala, he traveled through France, Germany, and Switzerland, joined the army of Tortensohn (q. v.) in 1642, fought at the battles of Yankovitz and Leipzig; and at the close of the war was the representative of Queen Christina at the conferences which were held for giving effect to the treaty of Westphalia. On the abdication of Christina, Charles-Gustavus, who was the son of Gustavus Adolphus's eldest sister Catharine, and John Casimir the Palatin of Zweybruck in Clerburg, succeeded as next heir, 17th June 1654, to the throne of a kingdom which, after his accession, he discovered to be in an almost bankrupt condition. There was a debt of 10,000,000, while the revenue did not amount to 800,000 crowns, out of which one-fourth was granted as a pension to the ex-queen, whose carelessness and extravagance had brought about this deplorable state of matters, and who, in the words of the aged chancellor Oxenstierna, 'had cost Sweden dearer than ever an enemy did.' She had taken away everything belonging to the royal residences which was portable; and C. was forced at first to borrow even a set of kitchen utensils. C. was the second of the three great warrior-monarchs of Sweden, but unlike his uncle, who could plead religious grounds, and his grandson, who was at first forced to fight for self-preservation, C. seemed to make war principally for war's sake. First he attacked Poland in July 1655, because the Polish monarchs had not resigned their claim to the Swedish throne; captured in the same year Warsaw, Cracow, Thorn, Elbing, Posen and Kalicz; and drove the king to take shelter in Silesia: he then assailed the Danes, who had declared war against him, crossed the Belts on the ice, and speedily made himself master of all the continental possessions of Denmark. Next marching from isle to isle over the frozen sea, he ultimately, by menacing Copenhagen, compelled the treaty of Roskild (7th March 1658), which gave to Sweden, Holland, Scania, Bleckingen, Bornholm, and the other Danish possessions beyond the Sound, and emancipated Sweden from the Sound Dues. Charles, however, still cherished enmity against the Danes; and after fruitlessly proposing to the Dutch and English a partition of Denmark, he invaded Zeeland, and attacked Copenhagen in 1659. The capital, however, defended itself valiantly, aided by succor from the Prussians and Dutch; and the Swedish monarch was compelled to abandon the siege. Soon after, while laboring to effect a complete reconciliation with Poland in order to be free to attack the Danes in Norway, he died suddenly at Gothenburg, February 23, 1660.

CHARLES XI., one of the ablest kings of Sweden, was the son of King Charles (X.) Gustavus, and was born November 24, 1655. While he was little more than four years old at his father's death, the government was committed to his mother Hedwig, as regent, and a council. The peace of Oliva (May 3, 1660) with Poland, by which Sweden obtained Esthonia, part of Livonia, and Oesel, and the Polish monarch renounced all pretensions to the Swedish crown; and that of Copenhagen (June 6, 1660), generally

confirmatory of the treaty of Roskild with Denmark, were the first important acts of the government. A treaty with Russia on the basis of the *status quo* followed in 1661; and from this period till 1672, the kingdom was free from foreign wars. In December 1672, C. (whose education had been so ill attended to that he had reached manhood before he could read) took the reins of government, and by the allurements of France, was induced to make war on Brandenburg. This unprovoked attack was disastrous to the Swedes, for they suffered a severe defeat from the elector at Fehrbellin (1675); and though C. revenged himself by defeating the Danes (who were allied with Prussia) at Halmstadt, Lemd, and Landskrona, his fleet was defeated by the Dutch near Oeland, and again by the Danes at Bleking and Kiöge; and many of Sweden's recent acquisitions were wrested from her. These, however, were restored by the peace of Saint-Germain-en-Laye (17th September 1679), which closed this needless and unfortunate contest. In 1680, a struggle commenced between the crown, supported by the burghers and peasants, on one hand, and the nobles on the other; and a considerable diminution of the power of the nobles was the consequence. The resumption of all the crown lands which had been alienated since 1609, was a fatal blow to the preponderating power of the nobles; and by a voluntary declaration of the states, December 9, 1682, the king was invested with absolute authority. This voluntary erection of a despotism by the people, a thing of rare occurrence in the world's history, is yet more extraordinary at the close of the 17th c.; and it speaks highly for C. that he never employed his unlimited authority otherwise than for the best interests of his kingdom. By a judicious administration of the revenues, he was enabled to extinguish the public debt (1686), reorganize the fleet and army, and by 1693 to dispense with the calling up of extraordinary subsidies. Though absolute, he never imposed a tax but with consent of the states; and he every year published a detailed account of revenue and expenditure. In 1693, he was formally declared absolute by an act of the diet. The foreign policy of the country was also conducted in a manner equally satisfactory and effective. Deux-Ponts fell to him as heir to his cousin Friedrich-Ludwig, the last palatine, in 1681; the attempts of the Danes upon Holstein were rigorously repressed, and many small outlying territories were brought under his sway. His anxiety for his subjects' welfare was particularly shown by commercial and maritime regulations superior to any that then existed in Europe; and by his numerous journeys to all parts of his dominions to examine for himself into the remote details of the administration. A codification of the laws was commenced, but was unfinished at his death, which took place at Stockholm, 15th April 1697.

CHARLES XII., king of Sweden (1697—1718), was the son of Charles XI., and was born at Stockholm on 27th June 1682. On the death of his father in 1697, he ascended the throne, and notwithstanding his youth, the States declared him of age to assume the reins of government. The neighboriug powers thought this a favorable time to humble Sweden, then the great power of the north; and Frederick IV. of Denmark, Augustus II. of Poland, and the Czar Peter I. concluded a league for this object. The Danes began by invading the territory of the Duke of Holstein Gottord, who had married C.'s eldest sister, and who applied to him for assistance. The young king immediately resolved on the most active measures, and approached Copenhagen with such a force as presently compelled the Danes to make peace. C. now hastened to meet the Russians; and although they lay in an intrenched camp beneath the walls of Narva, 50,000 strong, he stormed their camp on 30th November 1700, with 8000 Swedes, and defeated them with great slaughter. He next dethroned Augustus II., and procured the election of Stanislaus Leszczynski as king of Poland. Augustus supposed himself safe at least in Saxony, his hereditary dominion, but was followed thither, and humbling terms of peace were dictated at Altranstädt in 1706. C. obtained from the emperor liberty of conscience for the Protestants of Silesia. Leaving Saxony with an army of 43,000 men in September 1707, he proposed to advance direct upon Moscow; but at Smolensk he was induced, by the representations of the Cossack *hetman*, Mazeppa, to change his plan and proceed to the Ukraine, in hope of being joined by the Cossacks. In this hope, however, he was disappointed, and after enduring many hardships, he was defeated by the Russians at Pultowa, on the 27th June 1709, and fled to Bender in the Turkish dominions.

Augustus II. now revoked the treaty of Altranstädt, and the czar and the king of Denmark assailed the Swedish territories. But the regency in Stockholm adopted measures of effective and successful resistance, and C. prevailed with the Porte to declare war against Russia, in which Peter seemed at first likely to have suffered a severe defeat. But Russian agents succeeded in inspiring the Turks with suspicions concerning the ultimate designs of C., who was conveyed to Adrianople, but after some time escaped, and made his way through Hungary and Germany, pressing on by day and night with extraordinary speed, till he reached Stralsund, where he was received with great joy, on 11th (22d) November 1714. He was soon, however, deprived of Stralsund by the allied Danes, Saxons, Prussians, and Russians. After he had adopted measures for the security of the Swedish coasts, his passion for war led him to attack Norway. Success appeared again to attend his arms, when, in the siege of Friedrichshald, on 30th November 1718, he was killed by a musket-bullet. On his death, Sweden—exhausted by his wars—ceased to be numbered among the great powers. He was a man capable of comprehensive designs, and of great energy in prosecuting them. His abilities appeared not merely in military affairs, but in his schemes for the promotion of trade and manufactures. His self-willed obstinacy, however, amounted almost to insantity; in fact, he has been termed 'a brilliant madman.' His habits were exceedingly simple: in eating and drinking, he was abstemious; and in the camp, he sought no luxuries beyond the fare of the common soldier.

CHARLES XIII., king of Sweden (1809—1818), born October 7, 1748, was the second son of King Adolphus Frederick, and of the sister of Frederick the Great of Prussia. He was trained for naval command, and was long the High Admiral of Sweden, in which capacity he distinguished himself by a great victory over the Russians in the Gulf of Finland in 1788, and by bringing back his fleet safe to Carlscrona in the most perilous season of the year. He was on several very important occasions called to an active part in political affairs—in the revolution of 1772, when he was made governor-general of Stockholm and Duke of Södermanland; after the assassination of his brother Gustavus III. in 1792, when he was placed at the head of the regency; and after the revolution of 1809, when he became administrator of the kingdom, and subsequently king. The Swedish monarchy now became limited instead of despotic. Having no child, C. concurred with the States of the kingdom in choosing as his successor the French general, Bernadotte, who became crown-prince of Sweden, and ascended the throne on the death of C., February 5, 1818. The prudence of the king and crown-prince secured the union of Norway with Sweden in 1814, as a compensation for Finland.

CHARLES XIV., king of Sweden and Norway (1818—1844), originally JEAN BAPTISTE JULES BERNADOTTE, was born at Pau, in the South of France, January 26, 1764. He was the son of a lawyer. He entered the French army as a common soldier; became an ardent partizan of the revolution; greatly distinguished himself in the wars of Napoleon, and soon attained the highest military rank. But he was distrusted by Bonaparte, whose ambitious schemes he took no part in promoting; and Napoleon having taken offence at his conduct after the battle of Wagram, Bernadotte left the army in disgust, and returned to Paris. He was afterwards sent by the ministerial council to oppose the British, who had landed at Walcheren, but the breach between the emperor and him grew wider. In 1810, he was elected crown-prince, and heir to the throne of Sweden. Almost the only condition imposed on him was that of joining the Protestant church. He changed his name to Charles John; and the health of the Swedish king, Charles XIII., failing in the following year, the reins of government came almost entirely into his hands. He refused to comply with the demands of Napoleon, which were opposed to the interests of Sweden, particularly as to trade with Britain, and was soon involved in war with him. He commanded the army of the allies in the North of Germany, and defeated Oudinot at Grossbeeren, and Ney at Dennewitz. He showed great reluctance, however, to join in the invasion of France, and was tardy in his progress southward.—He became king of Sweden on the death of Charles XIII., February 5, 1818. He won for himself the character of a wise and good king. Education, agriculture, manufactures, commerce, and great public works, as well as the military strength of the kingdom, were promoted by his care. He died March 8, 1844, and was succeeded by his son Oscar.

CHARLES ALBERT, king of Sardinia (1831—1849), born 2d October 1798, was the son of the Prince Charles Emmanuel of Savoy-Carignan, and in 1800, succeeded to his father's title and estates in France and Piedmont. In 1817, he married Maria Theresa, daughter of the Archduke Ferdinand of Tuscany. When the revolutionary movement took place in Piedmont in 1821, he was made regent, upon the abdication of Victor Emmanuel, until Charles Felix, the brother of the late king, should arrive to assume the sovereignty. He displeased both the liberal party and their opponents, and Charles Felix disallowed all his acts, and for some time forbade his appearance at court. In 1829, he was appointed viceroy of Sardinia. On the death of Charles Felix, 27th April 1831, he ascended the throne. The liberals had great expectations from him, but were for a long time disappointed; his government much resembled the other Jesuitic and despotic Italian governments, except that he sought to promote the interests of the country, and to restrict the influence of the clergy in political affairs. It was not till after the elevation of Pius IX. to the popedom, when a new impulse was given to the cause of reform, that the Sardinian government adopted the constitutional and liberal policy to which

it has since adhered. C. A. entered warmly into the project of Italian unity, and evidently expected to place himself at the head of the whole movement and of the new kingdom of Italy. When the Lombards and Venetians rose against the Austrian government, he declared war against Austria, 23d March 1848, and at first was exceedingly successful, but was insufficiently supported by the Lombards, and finally defeated by the Austrians; so that after the fatal battle of Novara, 23d March 1849, he was obliged, for the preservation of the integrity of his kingdom, to resign the crown in favor of his son, Victor Emmanuel. He afterwards retired to Portugal, and died at Oporto on 28th July of the same year.

CHARLES EMMA'NÜEL I., Duke of Savoy (1580—1630), called the Great, was born at the castle of Rivoli, 12th January 1562, and succeeded his father Emmanuel Philibert in 1580. He married a daughter of Philip II. of Spain, and at first allied himself politically with Spain, and made war against France for the marquisate of Saluzzo (or Saluces), which he obtained in 1601, upon the cession of some other territories to France. But he afterwards joined France and Venice to oppose the preponderant power of Spain in Italy; then allied himself with the House of Hapsburg, and set up a claim to Montferrat, but suffered, in consequence, the direst calamities, great part of his dominions being conquered by the French, and in their hands when he died, 26th July 1630. He was a prince of vast ambition, and for whom no enterprise was too bold.

CHARLES THE BOLD, Duke of Burgundy (1467—1477), son of Philip the Good, of the House of Valois, and of Isabella of Portugal, was born at Dijon on the 10th November 1435, and bore, during his father's life, the title of Count of Charolais. He was of a fiery, ambitious, and violent disposition. From an early period to the end of his life he was a declared enemy of Louis XI. of France, the nominal feudal superior of Burgundy. Louis having caused Philip to deliver up some towns on the Somme, C. left his father's court, and formed an alliance with the Duke of Bretagne and some of the great nobles of France for the maintenance of feudal rights against the crown. Their forces ravaged Picardy and Isle-de-France, they threatened Paris, and defeated the king at Montlhéry. The result was a treaty by which the Count of Charolais obtained the towns on the Somme and the counties of Boulogne, Guines, and Ponthieu for himself. In 1467, he succeeded his father as Duke of Burgundy. Richer and more powerful than any prince of that time, he conceived the design of restoring the old kingdom of Burgundy, and for this purpose of conquering Lorraine, Provence, Dauphiny, and Switzerland. Whilst he was making preparations for war, Louis invited him to a conference; he hesitated, and Louis by his agents stirred up the citizens of Liege to revolt. Meanwhile C. consented to the conference, and the news coming of what had taken place at Liege, he seized the king, and if he had not been withheld by his councillor Comines, would have put him to death. He compelled Louis, however, to accompany him to Liege, and apparently to sanction the cruelties which he inflicted on the citizens. War raged between them afterwards with little intermission, till 1475. In September of that year, C. found himself at leisure to attempt the prosecution of his favorite scheme of conquest, and soon made himself master of Lorraine. In the following year he invaded Switzerland, stormed Grandson, and hanged and drowned the garrison; but was soon after terribly defeated by the Swiss near that place, and lost his baggage and much treasure. Three months after, he appeared again in Switzerland with a new army of 60,000 men, and laid siege to Morat, where he sustained, on June 22, 1476, another and more terrible defeat. After this he sank into despondency, and let his nails and beard grow. But the news that the young Duke René of Lorraine was attempting to recover his territories, roused him, and he laid siege to Nancy. His army was small; Italian auxiliaries, whom he had hired, went over to the enemy; and in the battle which he too rashly fought, he lost his life, January 5, 1477. His daughter and heiress, Maria, married the Emperor Maximilian I. With his life ended the long successful resistance of the great French vassals to the central power of the monarchy.

CHARLES'S WAIN, a common name for the constellation of Ursa Major (q. v.).

CHA'RLESTON, the chief city of a district of its own name in South Carolina, and the commercial capital of the state, is situated in lat. 32° 46′ N., and long. 79° 57′ W. With straight and regular streets, it occupies the fork of the Cooper and the Ashley, which, as deep tideways of the respective widths of 1400 and 2100 yards, here unite with their common estuary of 7 miles in length to form Charleston harbor. This haven is beset to seaward by a sand-bar, which has its uses, however, as a breakwater and a bulwark. The more practicable of its two passages—showing 16 feet at ebb and 22 at flood—is commanded by Fort Moultrie and Fort Sumter. The city is built upon ground raised but a few feet above the water. In 1860, the population of C. was 40,522; (1870) 48,956; (1880) 49,999. The exports, which are always of much greater value than the imports, amounted in 1858 to $16,924,436; in the year ending March 31, 1875, $19,532,393. Cotton and rice are the chief exports. In 1878 the taxable property of C. was worth $26,591,778. The public debt was $4,716,754. There are about 40 churches, the State Medical College, a large orphan asylum, &c. C. was founded in 1672, receiving from France, about 1685, a considerable influx of Protestant refugees, It was prominent for zeal and gallantry in the revolutionary war. Up to the time of the civil war, the city was remarkable for its suburban character and verdant surroundings, and its inhabitants were mainly opulent planters, distinguished for hospitality and refinement. It was in C., however, that the first open movement was made in favor of secession; and the city and its inhabitants have changed since then. In 1860 and 1861, the harbor was the scene of several conflicts; and in 1863 Fort Sumter was reduced to ruins. The harbor was blockaded in 1861, and several dismantled hulks of vessels were filled with stones and sunk, in order to prevent passage. In spite of these precautions, however, more British blockade-runners, entered this than any other southern port. In August 1863, the city was bombarded, and in February 1865 was occupied by the United States troops.

CHA'RLESTOWN, a seaport of Massachusetts, in lat. 42° 2′ N., and long., 71° 3′W. It occupies a peninsula about 2 miles long, immediately to the north of Boston, the capital of the state; of which, connected as the two are by bridges, it is virtually a suburb. Pop. in 1850, 17,126; in 1860, 25,063; and in 1870, 28,323. In common with the rest of the neighborhood, the peninsula displays an unevenness of surface which renders the streets, otherwise handsome, somewhat irregular. Its most prominent height is Bunker's Hill, celebrated as the first battle-field in the revolutionary war, and surmounted, in 1825—1843, by a granite monument of 220 feet in height. Besides a state-prison on a large scale, the city possesses one of the principal navy-yards of the general government. This establishment, covering 60 acres, contains a magnificent rope-walk 1300 feet long, and a dry-dock of chiselled granite measuring 80 feet in breadth by 30 in depth. C. was incorporated with Boston in 1874.

CHARLET, NICOLAS TOUSSAINT, a French painter and engraver, born in Paris 1792, was for some years employed as a clerk in a government office, but lost his place at the restoration, 1815, on account of his Bonapartism, and in consequence betook himself to art. After studying awhile under Gros, he gradually formed for himself a style in which he had no rival. C. is the Béranger of caricature, but without the political bitterness and sarcasm sometimes found in the poet. His genial sketches of French life and manners were studied with equal admiration in the salons of the aristocracy and in the ateliers, barracks, taverns, &c., of the lower classes. C. was especially successful in his sketches of soldiers and children. His designs are free from exaggeration, while full of spirit, interest, and naïveté; and his titles or mottoes were often so witty and suggestive, that dramatic writers have founded pieces upon them. His sketches and lithographs are very numerous, and are widely distributed. Among his paintings, the most remarkable are—'An Episode in the Russian Campaign' (in the Museum at Versailles); 'Moreau's Crossing of the Rhine' (at Lyon); and a 'Procession of the Wounded' (at Bordeaux). C. died in 1845.

CHARLEVILLE, a town of France, in the department of Ardennes, about a mile from Mezières, with which it communicates by a suspension-bridge over the Meuse. It is a thriving place, well-built, with clean spacious streets. It has manufactures of hardware, leather, and beer, and the Meuse affords facilities for considerable trade in coal, iron, slate, wine and nails. Pop. (1876) 12,881.

CHA'RLOCK. See MUSTARD.

CHARLOIS, a village of the Netherlands, situated on the Maas, about two miles south-south-west of Rotterdam. It is memorable on account of a terrible accident which occurred here in 1512, when a religious procession crossing the ice in defiance of magisterial prohibition, 8000 of them were precipitated into the Maas. Pop. 2000.

CHARLOTTE AMALIE, chief, or rather only, town of St. Thomas, one of the Virgin group of the Antilles, in lat. 18° 20′ N., long. 64° 55′ W. It contains 11,400 inhabitants, nearly three-fourths of the entire population of the colony. It has a spacious harbor, which, besides being largely visited by European ships in general, is a principal station for the mail-packets between Southampton and the West Indies.

CHA'RLOTTE TOWN, the capital of Prince Edward Island, in the Gulf of St. Lawrence, in lat. 46° 15′ N., and long. 63° 7′ W. The census of May 1881 states the population at 11,485. The port is the best in a colony which, in proportion to its size, is remarkable for its navigable facilities. The town stands on the south-east coast at the bottom of Hillsborough Bay, and at the

confluence of three rivers, which each admit the largest vessels for several miles, so as to secure them from all weather. The harbor is rendered still more commodious through the strength of the tides, which enable ships to work out and in against the wind. C. T. has an iron foundry and a woollen factory, and is largely engaged in ship-building.

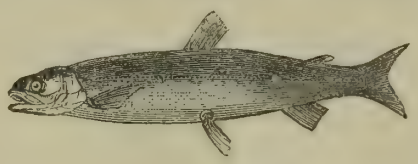
CHARLO'TTENBURG, a town of Prussia, in the province of Brandenburg, is situated on the Spree, 3 miles west of Berlin, with which it is connected by a road leading through the *Thiergarten*, and affording a favorite promenade to the Berliners. C. contains a royal palace, with a fine garden and splendid orangery, and an interesting collection of antiquities and works of art. In a beautiful part of the park a mausoleum, designed by Schinkel, contains the remains of Frederick William III. and his wife, the Queen Luise, with their statues by Rauch. C. has manufactures of cotton and hosiery. Pop. (1871) 19,518; (1880) 30,446.

CHARM (Lat. *carmen*, a song), properly, a form of words, generally in verse, supposed to possess some occult power of a hurtful, a healing, or a protective kind. Charms exert their influence either by being recited, or by being written and worn on the person; and, in this latter case, they may be classed with Amulets (q. v.). The nature of this superstition will be more fully considered under INCANTATION; see also MAGIC.

CHA'RNEL-HOUSE (Fr. *charnier;* Lat. *caro*, flesh), a chamber situated in a churchyard or other burying-place, in which the bones of the dead which were thrown up by grave-diggers were reverently deposited. The C. was generally vaulted in the roof, and was often a building complete in itself, having a chapel or chantry attached to it. In such cases, the charnel-vault was commonly a crypt under the chapel; and even in churches, it was not uncommon for the vault or crept to be employed as a charnel-house.

CHA'RON, in classical mythology, the son of Erebus and Nox, is first mentioned by the later writers of Greece. His duty was to ferry the shades of the buried dead across the rivers of the underworld. For this service, he exacted an *obolus* from each, and in consequence, a coin of this kind was placed in the mouth of the dead. If this rite was neglected, C. refused to convey the unhappy shade across, and it was doomed to wander restlessly along the shores of Acheron. C. is generally represented as a gloomy old man, with a rough beard and wretched clothes. In the Etruscan monuments, he holds a hammer.

CHARR (*Salmo umbla*), a fish of the same genus with the salmon, occurring in the lakes of Britain and of the continent of Europe. It is abundant in the lakes of Cumberland and Westmoreland, and in some of those of Ireland, of the north of Scotland, and of Orkney, but in the greater number of the Scottish lakes it is not found. It is the celebrated *ombre chevalier* of the Lake of Geneva. It is sometimes found weighing more than 2 lbs., but is generally



Charr (*Salmo umbla*).

under 1 lb. in weight. It has only the anterior part of the *vomer* (the middle line of the palate) furnished with the teeth, agreeing in this with the salmon and bull-trout, and differing from the common trout, salmon-trout, &c. The form is elongated, the greatest depth of the fish about one-fifth of the entire length; the fins are rather small; the tail deeply forked; the color of the back dark olive, the sides lighter and spotted with either red or white, according to the condition in which the fish is at the time, the belly also being sometimes deep orange, and sometimes of a pale color; these, and other accidental variations, causing the fish to receive different names, such as *Case C.*, *Red C.*, *Gilt C.*, *Silver C.*, and having led some naturalists to believe in the existence of different species. It is not yet quite certain whether the *Torgoch* or *Red-belly* of Wales (*Salmo salvelinus* of some authors) ought to be regarded as distinct or as a mere accidental variety.

Whilst it is the most delicious perhaps of the *Salmonidæ*, the C. is also the most beautiful; its rich purple, rosy, and crimson tints and white spots rendering it indeed a brilliant and striking object. During summer, the C. haunts chiefly deep cool water, and is seldom seen at the surface till late in autumn. It feeds on insects and minute crustaceans. In the end of autumn or beginning of winter, it ascends rivers to spawn, always choosing those which have a rocky bottom. Whether in lake or stream, it is only to be found in clear waters. Unfortunately, the C. of the English lakes is taken in great numbers, by nets, at the mouths of streams, when about to ascend them in order to spawn, and when not in the best condition for the table.

On some lakes, vast quantities are then caught for the table, particularly for the purpose of potting. A C. is now and then taken with fly when the angler may be whipping a lake, which perhaps abounds with them, for trout; but this occurs but seldom. The C. will, too, occasionally take a minnow, if sunk deep and trailed slowly; but the sport it affords is of the most precarious nature. C. are fast diminishing in those of our English lakes which they still inhabit, owing to the wholesale and indiscriminate slaughter which occurs at the spawning season. A large kind of C., sometimes reaching 4 lbs. in weight, is found in some of the more northern Swedish lakes.

CHART, a marine or hydrographical map, exhibiting a portion of a sea or other water, with the islands, coasts of contiguous land, soundings, currents, &c. See MAP. In the English service, when coasts have been surveyed by the Admiralty, charts are engraved, and are sold at various prices, from 3*s*. down to 6*d*. each. This price is below their cost, the object being to encourage their general use as much as possible. Men-of-war are supplied with copies of every available C. published, relating to the regions likely to be visited. There is a printed list for every station. At Gibraltar and the Cape of Good Hope, there are dépôts of charts to supply ships whose destination undergoes a change. All the charts are brought home again, and none are reissued until revised and corrected. The navigating charts, showing the dangers of coasts, with sufficient clearness to enable mariners to avoid them, are generally on the scale of half an inch to a mile; those of larger size show all the intricacies of the coast. The merchant-service is supplied with charts by agents, who receive a stock from the Admiralty, and keep them on sale. The preparation of charts is part of the duty of the hydrographical department at the Admiralty. In the financial year 1879—1880, a sum of no less than £11,000 was provided for this branch, quite irrespective of the surveying that preceded the engraving of the charts, which always costs a much larger sum. In the five years ending with 1875, the Admiralty sold 495,445 charts, besides supplying the Queen's ships.

CHARTA, MAGNA. See MAGNA CHARTA.

CHARTE (Fr. a charter; Lat. *charta*, paper). In the sense in which we have adopted this word from the French, and in which it may be now said to form part of our language, it signifies a system of constitutional law, embodied in a single document. Whether any system of positive public law existed in ancient France is, in that country, a subject of keen dispute amongst constitutional antiquaries. If any such there was, there seems little doubt that it was the mere embodiment of traditions, and not the result of any single act of the national will. Whilst France was divided into provinces and communes, local liberties and privileges unquestionably existed; but where the nation constituted no single body, a constitutional charter was impossible. The first traces of such a C. appear in the 14th c.; and it is known in the history of the public law, of France as at the *Grand Charter*, or the charter of King John. Up to this time, the kings had called together only partial assemblies, but in 1355 deputies from the whole kingdom were assembled in the hall of the Parliament of Paris. The nobility and clergy, secular and regular, were represented by 400 deputies, the commons or third estate by a like number. This body assumed to itself the initiative, and prepared a species of constitution, which was accepted by the king. The chief triumph of the third estate on this occasion consisted in carrying through the doctrine, that the decision of any two estates should be invalid without the concurrence of the third. The three orders, who seem to have composed but one assembly, then proceeded to impose a series of restrictions on the power of the monarch, which, confirmed by the dauphin two years later, formed the foundation for the liberties subsequently asserted at the Revolution.

But the constitution to which the term C. is most frequently applied by the French and by us, is that in which Louis XVIII. solemnly acknowledged the rights of the nation on his restoration in 1814. This C. has ever since been considered the fundamental law of constitutional monarchy when that form of government has existed in France. In some of its provisions, however, and still more in the mode of its acceptance by the monarch, as 'a voluntary and free act of our royal authority,' and as a 'concession made to,' not a contract entered into with, his subjects, it was open to the misconstructions which eventually led to the revolution of 1830. The 'charte' sworn to on the 29th August of that year by King Louis Philippe modified this and some of the other provisions of that of 1814. On that occasion, the king explicitly recognized the sovereignty of the people. This document, which, with some modifications, remained in force till the revolution of 1848, is of so much importance, not only from its bearing on the past history, and possibly on the future destiny of France, but from the analogies which it presents to our own constitution, that we shall endeavor to present a condensed view of its leading provisions.

It consisted of 67 articles, divided into 7 heads. Of these, the 1st head, containing 11 articles, treated of the public rights of the

French people. It provided for the equality of all Frenchmen—a doctrine which it inherited from the Revolution, and which it unfortunately left to be understood in a sense inconsistent with monarchy, and indeed with any other form of government than pure democracy (see EQUALITY)—for their equal admissibility to all employments, civil and military, and for their freedom from arrest, otherwise than by legal process. It guaranteed the enjoyment of religious liberty, and the payment of the ministers of all Christian denominations—a privilege which in 1831 was extended even to Jews. The liberty of printing and publishing was insured, the censorship of the press and conscription were abolished, an amnesty for all political offences was proclaimed, and the security of property guaranteed, except when its sacrifice should be requisite for the public good, in which case it was declared that the owner must be indemnified. The 2d head set forth the nature and limitations of the kingly power in 8 articles. The supreme executive power, the command of the army and navy, and the right of making war, and treaties of peace, alliance, and commerce, were reserved to the monarch. To him, also, it belonged to nominate to all offices of public administration, to make all necessary regulations for the execution of the laws, but in no case to suspend them or dispense with them. The high duties of legislation were shared between the king, the Chamber of Peers, and the Chamber of Deputies; it being provided that every law should be agreed to by a majority of each chamber, and sanctioned by the king. Any one of the three branches of the legislature might originate any bill, except a money-bill, which was reserved for the Chamber of Deputies, as for the House of Commons in England. The 3d head contained ten articles regarding the Chamber of Peers, the nomination of whom was vested in the king (the princes of the blood being peers by right of birth). No limit was set to their number; but by the law of 9th December 1831, incorporated in the C., it was declared that their dignity should be for life only. The Chancellor of France was president. The Chamber of Peers assembled simultaneously with that of the Deputies, and its sittings were public. The personal privileges of the peerage, as they exist in England, were introduced. The 4th head concerning the Chamber of Deputies contains 16 articles. It provides for the election of the deputies and the sittings of the chamber. The electoral qualification is declared to be the payment of 200 francs of direct taxes, whilst that of a deputy is the payment of 500. The voting is by ballot, both at elections and in the chambers.

The number of deputies, which at first was 430, was afterwards raised to 459. Each deputy was elected for five years, and one half of those for each department were required to have their political domicile within it. The C. became a nullity by the revolution of February 1848; and by the new constitution promulgated on the 4th of November of that year, the monarchy of France was converted into a democracy. By chapter 4 of that document, the legislative power was vested in a single assembly of 950 members, including the representatives of Algeria and the other colonies. The property electoral qualification was abolished, and the age reduced for electors to 21, and for delegates to 25. The period of three years was fixed for the continuance of the national assembly. By chapter 5, the executive power was intrusted to a citizen, who was to bear the title of President. He was not to be less than 30 years of age, his tenure of office was to be 4 years, and he was not to be re-eligible until after an interval of 4 years. For an account of the subsequent changes by which these and the other arrangements adopted at the revolution of 1848 have since been superseded, see FRANCE.

CHA'RTER (*charta;* Gr. *chartes*, paper, or anything written upon, from *charasso*, to scratch or write). In its most general signification, C. is nearly synonymous with *deed* and *instrument*, and is applied almost to any formal writing, in evidence of a grant, contract, or other transaction between man and man. In private law, its most important use is in the alienation of real estate, the writing given to the new proprietor by the old, in proof of the transference title, being usually called a charter. In public law, the name is given to those formal deeds by which sovereigns guarantee the rights and privileges of their subjects, or by which a sovereign state guarantees those of a colony or other dependency. See CHARTE, MAGNA CHARTA. There is another sense of the term, in which it is in a measure intermediate between the two we have mentioned—viz., where we speak of the C. of a bank or other company or association. In this latter sense it signifies an instrument by which powers and privileges are conferred by the state on a select body of persons for a special object. See BANK, CORPORATION, JOINT-STOCK COMPANY, &c. The requisites of a C., when used in the first of these significations, according to the law of England, will be pointed out under DEED.

ROYAL CHARTERS, generally written in Latin, are of two kinds: I. Grants of lands, houses, honors, or liberties to persons who did not previously possess them; II. Charters confirming grants previously made, and therefore called 'Charters of Confirmation.' Confirmation charters are of three kinds: 1. Charters confirming previous grants, without reciting them; 2. Charters of simple confirmation, without addition of anything new; 3. Charters reciting previous charters and confirming them, with addition of something new. These last two classes of charters are called charters of 'Inspeximus,' or 'Vidimus,' from the word used by the granter in saying that he has seen the C. which he confirms. Royal charters generally contain seven clauses: 1. The 'Premises,' i. e., the name and style of the granter, the persons to whom the C. is addressed, the name and style of the grantee, the reason why the grant is made, and the description of the thing granted; 2. The 'Tenendum and Habendum,' i. e., the way in which the thing granted was to be held and had; 3. The 'Reddendo,' the return of rent or service which was to be made to the granter by the grantee; 4. The 'Quare Volumus,' or order that the grantee should have the thing granted, under certain penalties; 5. The 'Sealing' or 'Signature' clause, setting forth the seal, signature, or subscription by which the C. was authenticated; 6. The 'Hiis Testibus,' or testing-clause, enumerating the persons who were present as witnesses when the C. was granted; 7. The 'Date,' setting forth the time when, and the place where, the C. was granted.

CHARTER, in the law of Scotland, is the written evidence of a grant of heritable property, under the conditions imposed by the feudal law—viz., that the grantee, or person obtaining, shall pay at stated periods a sum of money, or perform certain services to the granter, or person conferring the property. A C. must be in the form of a written deed. The granter of a C., in virtue of the power which he thus retains over the property and its proprietor, is called the superior; and the grantee, in consequence of the services which he undertakes to render, the vassal; whilst the stipulated sum to be paid, or service to be rendered, is called the duty.

Charters are either blench or feu, from the nature of the service stipulated—*a me* or *de me*, from the kind of holding or relation between the granter and grantee; and original or by progress, from being first, or renewed, grants of the subjects in question.

Blench and Feu Charters.—The duty which the superior required of his vassal in former times was almost always military service, and the vassal was then technically said 'to hold ward'—to hold on condition of warding or defending his superior. But subsequent to the rebellion of 1745, in which the dangerous tendencies of the feudal relation were experienced, this holding was abolished (20 Geo. III. c. 50), and the only duties which it has since been lawful to insert in C. are *blench* and *feu* duties. The former is a merely nominal payment—a penny Scots, a red rose, or the like, *si petatur tantum* (should it be asked); the latter is a consideration of some real value. Original blench C. having lost all object, and having no other effect but that of subjecting superiors to considerable expense in keeping up their titles, have become rare in modern practice. The forms of charters varying according to the circumstances in which they are granted, and the relations established between the granter and grantee, are of a highly technical nature.

CHARTER-HOUSE (a corruption of *Chartreuse*, i. e., Carthusian) is the name of a famous hospital, chapel, and schoolhouse. Till 1872, the buildings were close together in Charter-house Square, London; but in that year the school was transferred to Godalming in Surrey where it now thrives. The C. was instituted in 1611 by Sir Thomas Sutton, of Camps Castle, in the county of Cambridge. It had originally been a Carthusian monastery (founded in 1371), but on the dissolution of monastic establishments by Henry VIII., it was made a place of deposit for his nets and pavilions. After undergoing many alterations and passing into the possession of various distinguished persons, it was finally purchased from Lord Suffolk, for £13,000, by Sir Thomas Sutton, who endowed it with the revenues of upwards of 20 manors, lordships, and other estates in various parts of England. This 'masterpiece of Protestant English charity,' as old Fuller calls it, serves three uses—it is an asylum for poor brethren, an educational and a religious institution; hence Bacon terms it a 'triple good.' The *poor brethren* are 80 in number. None are admitted under 50 years of age, and only those who have been housekeepers are eligible. Each brother has a separate apartment, a share of attendance from domestics, an ample, though plain diet, and an allowance of about £26 a year for clothes and other matters, and four weeks' holiday every autumn. The brethren must be bachelors and members of the Church of England. Among the poor brethren in bygone years were Elkanah Settle, the antagonist of Dryden; John Bagford, the antiquary; Isaac de Groot, a descendant of Grotius; and Alexander Macbean, who assisted Johnson in the preparation of his Dictionary.

The *scholars* are 60 in number, admissible between the ages of 11 and 15. They are understood to be 'the sons of poor gentlemen to whom the charge of education is too onerous;' but, as in the case of the *poor brethern*, it is not always the proper parties

who are chosen. There are exhibitions, scholarships, and medals competed for at certain times by the scholars. In addition to the scholars properly so called, i. e., such as receive a free board and education, a large number of youths are sent to the C. school because of its reputation. These either board with the masters, or simply attend during the day. The number of extra boarders is nearly double that of the scholars. The institution is under the direction of the Queen, fifteen governors, selected from the great offices of state, and the master himself, whose salary from the foundation is £800 per annum. Among the eminent individuals educated in this establishment, are Dr. Barrow, Judge Blackstone, Addison, Steele, John Wesley, Bishop Thirwall, George Grote, W. M. Thackeray, and Sir Charles Eastlake.

In 1872, when the C. school removed to Godalming, the school premises were sold to the Merchant Taylors' School, which is now installed here in handsome new school buildings, erected 1875. The quaint old C. hospital and chapel still remain on the old site. The chapel contains Sutton's tomb, which was opened and examined in 1842.

CHA'RTER-PARTY (Fr. *chartre-partie*, so called from such documents being at one time divided—in Fr. *parti*—and one half given to each party concerned), the title given to a contract in which the owner, or master of a ship, with consent of the owner, lets the vessel, or a portion of her, to a second party, for the conveyance of goods from one port to another port; hence the vessel is said to be *chartered*. The document must be stamped. It must specify the voyage to be performed, and the terms on which the cargo is to be carried. On the part of the ship, it is covenanted that she shall be sea-worthy; well-found in rigging, furniture, and provisions; and that the crew be suitable in number and competency; that she shall be ready to receive the cargo on a given day, wait its complete delivery for a certain period; and sail for the stipulated port when laden, if the weather for the time permits. The freighter's portion of the contract obliges him to load and unload at suitable periods, under specified penalties, and to pay the freight as agreed on. The master must not take on board any contraband goods, or otherwise render the vessel liable to seizure. The owner is not responsible for losses caused by war, fire, or shipwreck, unless arising from negligence of the master or crew.

CHA'RTISM, a movement in Great Britain for the extension of political power to the great body of the people, arising in a great measure out of wide-spread national distress and popular disappointment at the results of the Reform Bill. Prior to 1831, the middle classes had sought popular aid towards obtaining their own enfranchisement. The assistance was given, the people expecting to receive help in their turn. After the passing of the Reform Bill, agitation ceased for a time, and the members returned to parliament were indifferent, or opposed, to any further change in the political arrangements of the country. The middle classes were satisfied with their own success, and generally looked with small favor on projects for the further extension of political influence among the masses. A season of commercial depression set in about 1835, and failing harvests for several years terribly increased the sufferings of the people. Food became dear, wages fell, manufactories were closed, work became scarce. The people associated their sufferings with their want of direct influence upon the government, and agitation for an extended franchise began. In 1838, a committee of 6 members of parliament and 6 working-men prepared a bill, embodying their views as to what were just demands on the part of the people. This was the 'People's Charter.' It claimed—1. The extension of the right of voting to every (male) native of the United Kingdom, and every naturalized foreigner resident in the kingdom for more than two years, who should be 21 years of age, of sound mind, and unconvicted of crime; 2. Equal electoral districts; 3. Vote by ballot; 4. Annual parliaments; 5. No property qualification for members; and 6. Payment of members of parliament for their services. This programme was received with enthusiasm. Immense meetings were held all over the country, many of them being attended by two or three hundred thousand people. Fiery orators fanned the popular excitement, and under the guidance of the extreme party, among their leaders, physical force was soon spoken of as the only means of obtaining justice. The more moderate and thoughtful of the Chartists were overruled by the fanatical and turbulent spirits, and the people, already aroused by suffering, were easily wrought into frenzy by those who assumed the direction of their movements. In the autumn of 1838, torchlight meetings began to be held. The danger of these meetings was obvious, and they were at once proclaimed illegal. Some of the more prominent leaders were arrested, amid intense popular excitement, and subjected to various terms of imprisonment. A body calling itself the National Convention, elected by the Chartists throughout the kingdom, commenced sitting in Birmingham in May 1839.

It proposed to the people various means of coercing the legislature into submission, recommending, among other things, a run on the savings-banks for gold, abstinence from excisable articles, exclusive dealing, and in the last resort, universal cessation from labor. During its sittings, a collision took place with the military in Birmingham. Public meetings were forbidden, and alarming excesses were committed by the irritated mob. In June 1839, a petition in favor of the Charter was presented to the House of Commons, signed by 1,280,000 persons. The House refused to name a day for its consideration, and the National Convention retaliated by advising the people to cease from work throughout the country. Fortunately, this advice was not followed, but the disturbance in the public mind increased, and in November, an outbreak at Newport took place, which resulted in the death of 10 persons and the wounding of great numbers. For taking part in this wild insurrection, three of its leaders were sentenced to death, but their punishment was afterwards commuted to transportation. In 1842, great riots took place in the northern and midland districts, not directly caused by the Chartists, but encouraged and aided by them after the disturbances began. In the same year an attempt was made by Joseph Sturge to unite all friends of popular enfranchisement in a Complete Suffrage Union, but he only succeeded in dividing their ranks. In 1848, the turmoil in France created great excitement in England, and much anxiety was felt lest an armed attempt should be made to subvert the institutions of the country. Two hundred thousand special constables were enrolled in London alone. There were several local outbreaks, and much real danger, but the attempts at disorder were efficiently met, and, as usual, the only result was the punishment of the more prominent men, and the postponment of the desired reforms.

Since 1848, C. has gradually died out. Its principles were not new. The Duke of Richmond, in 1780, introduced a bill into the House of Lords to give universal suffrage and annual parliaments. In the same year, Charles James Fox declared himself in favor of the identical six points which were afterwards included in the Charter. And nearer our own time, Earl Gray, Mr. Erskine, Sir James Mackintosh, and many others, formed a 'Society of Friends of the People,' which aimed at obtaining a very large extension of the suffrage.

The great body of Chartists were, however, not so much actuated by the weight of precedent or argument, as impelled by the pressure of actual want, and an indefinite feeling that the laws were somehow to blame for not providing them with the means of comfortable subsistence. But there were many among them who had studied the principles involved in their demands, and maintained them from an intelligent conviction of their truth. These men declared that all persons had an equal natural right to share in determining the laws under which they lived; and further, that as they were required to contribute to the taxation of the country, they were justly entitled to be heard as to the application of the public funds. Taxation and obedience being universal, representation ought to be so. This view being conceded, all the other points of the Charter naturally followed, they being merely arrangements for securing the free action of the right contended for. Some of the Chartist advocates went far beyond this. There were those among them whose aims included little less than the reorganization of society. One of the ablest advocates of the cause wrote in favor of nationalizing the land, and remodelling the currency; he also proposed a system of state loans for the assistance of laborers who desired to become capitalists, and national marts for the exchange of wealth on terms of equity and justice. Pressed a little further, these views would have developed into Communism; but so far as we are aware, most Chartists held so strongly the doctrine of *individual* rights, that they were not likely to subordinate *man* to *society*. See COMMUNISM, SOCIALISM. The object aimed at by the majority, was merely the extension of the franchise to the masses, in the belief that they would use it wisely and honestly, and put an end to what they considered the selfish and interested rule of classes who had long monopolized the control of the state. The opponents of C. answered, that if the question was argued as one of right, it would go far beyond the conclusions which the Chartists had reached. The *right* appertained to women as well as to men, and there was no just reason why sane persons under 21 should be deprived of it. It would also, they maintained, give all power to the most ignorant classes of the community, and thus subject intelligence to brute force. Government existed for the benefit of society, and ought, as far as possible, to depend on the wisdom, and not on the mere number of the people. Then if representation depended upon taxation, it should vary in proportion to the taxes paid. Finally, they denied that men *as such* had a right to vote; their right was to be well governed, and universal suffrage was more likely to destroy society than to confer happiness or insure justice.

The cause which put an end to C. as an organization was undoubtedly the improvement in the circumstances of the people which followed the repeal of the Corn Laws. Since then, the

chief points of the Charter have actually become law. A property qualification is no longer necessary in a representative; the reform acts of 1867—1868 have virtually established manhood suffrage; and the act of 1872 gave vote by ballot. The efforts of the majority of those who live by manual labor are now directed towards securing, by trades-unions and other means, a larger share than formerly in the profits of industry.

CHARTRES, a city of France, in the department of Eure-et-Loir, 47 miles south-west of Paris, is built partly at the base and partly on the declivity of a hill overlooking the river Eure, which is here divided into two channels, one flowing within, and the other without the ramparts, which are converted into agreeable promenades. C. consists of an upper and lower town, connected by streets almost inaccessible to carriages. The upper town has some good streets, but the lower is ill built. The houses are old, and many of them composed of wood, with their gables to the street. The cathedral, one of the largest and most imposing ecclesiastical structures in Europe, with its lofty spires, one of them towering to a height of more than 400 feet, crowns the top of the hill. It has no less than 130 painted-glass windows, the workmanship of which is unsurpassed, if indeed equaled elsewhere in France. The church of St. Pierre, and the obelisk to the memory of General Marceau, are also objects of interest. The weekly corn-market of C. is one of the largest in France, and is remarkable as being under a corporation of women, who contrive to get through all the business most satisfactorily in less than an hour. It has manufactures of woollen, hosiery, and leather. Pop. (1876) 20,067.

C. is a very ancient city. Under the Roman rule it was called *Autricum*, and remains of Roman antiquity are still fouud.

CHARTREUSE, La Grande, a celebrated monastery in France, in the department of Isère, situated 13 miles north-north-east of Grenoble, in the wild and romantic valley of the Guiers, nearly 4000 feet above the sea. It is surro mded by the mountain-forests of the Alps; and the route to it, through a mountain-gorge, down which a rapid river dashes far below the traveler, while above him rise precipitous and foliage-lined rocks, some hundreds of feet in height, is one of the most picturesque. The convent is a huge ungainly structure, dating mostly from the 17th c., earlier buildings having been destroyed several times by fire. The convent owes its origin to St. Bruno, who settled a little higher up the mountain in 1084, giving the name of the place, C., to his order. The monks had at one time considerable property, but they were despoiled at the revolution of 1789.

CHA'RTULARY (Lat. *chartularia*, *chartologia*), is, as its name implies, a collection of charters. So soon as any body, ecclesiastical or secular, came to be possessed of a considerable number of charters, obvious considerations of convenience and safety would suggest the advantage of having them classified and copied into a book or roll. Such book or roll has generally received the name of a Chartulary. Mabillon traces chartularies in France as far back as the 10th c., and some antiquaries think that chartularies were compiled even still earlier. But it was not until the 12th and 13th centuries that chartularies became common. They were kept not only by all kinds of religious and civil corporations, but even by private families. Many of them have been printed, and their contents generally are of the greatest value in all historical, archæological, and genealogical inquiries.

CHARY'BDIS. See Scylla and Charybdis.

CHA'SCHISH. See Hemp, Indian.

CHASE. When one vessel is pursuing another at sea, the pursued vessel is called the *chase*, and the pursuer the *chaser*. The manœuvre also gives name to certain guns on board ship: a *bow-chaser* being a gun pointing ahead, and a *stern-chaser* pointing astern.

CHASE, in a gun, is the name given to the greater portion of the length between the muzzle and the trunnions.

CHASIDIM ('Pietists') this name anciently denoted a whole class of Jewish sects. After the Babylonish captivity, the Jews, with regard to their observance of the law of Moses, were divided into two classes—*Chasidim* and *Zadikim*. When the so-called Great Synagogue was commissioned by the Persian government to draw up a code of civil and religious laws for the emigrant Jews returning to settle in their native land, several innovations were made on the Mosaic law. Those who accepted these innovations were styled the C.; while those who rejected them were styled, or styled themselves, the Zadikim, or 'upright,' because they adhered strictly to the law given by Moses, without observing any of the additions made to it. The C. branched forth into several sects, all holding traditions in connection with the written law, which they believe to possess a divine sanction equally with that law. The Pharisees, so often mentioned in the New Testament, formed an early sect among the C., while from the Zadikim sprang forth the Hellenistic Samaritans, Essenes, Sadducees, &c. Afterwards, the C., or Pharisees, split into Talmudists, Rabbinists and Cabbalists, some of whom underwent still further subdivision.—The modern C. are not, like those in the times of the Maccabees, marked by any peculiar spiritualistic tendency in religion, but rather by a strict observance of certain traditional forms, and a blind subservience to their teachers. Their doctrine was promulgated in the middle of the 18th c. by Israel of Podolia, called *Baal-Shem* ('Lord of the Name,' so called because he professed to perform miracles by using the great cabalistic name of the Supreme Being). Though condemned by the orthodox rabbis, this new teacher had great success in Galicia, and when he died (1760) left 40,000 converts. They are now broken into several petty sects; their religion is utterly formal, and its ceremonies are coarse and noisy.

CHASING, the art of working raised or half-raised figures in gold, silver, bronze, or other metal. It was called *cœlatura* by the Romans; and the term is expressly limited by Quintilian to working in metal. The same art when exercised on wood, ivory, marble, precious stones, or glass, was called *sculptura*. See Carving. Iron was sometimes, though rarely used, silver having been always the favorite metal for this purpose. Closely connected with, but still distinguished from C., is the art of stamping with the punch, which the Romans designated by *excudere*. The Greek *toreutike* is usually supposed to correspond to C., but the point is by no means free from dispute. The art was known at a very early period, as may be inferred from the shield of Achilles, the ark of Cypselus, and other productions of the kind. Such portions of the colossal statues made by Phidias and Polycletus, as were not of ivory, were produced by the toreutic art. The statue of Minerva was richly adorned in this manner. Besides Phidias and Polycletus, Myron, Mys, and Mentor were celebrated toreutic artists in antiquity, and amongst many moderns the most famous is Benvenuto Cellini (q. v.).

CHASSE, music composed in imitation of the chase, and performed chiefly by horns, occasionally combined with other wind-instruments. Its movement is in $\frac{6}{8}$ time. The best specimens of this kind of music are an overture by Mehul, and a C. for the pianoforte by Kreutzer.

CHASSÉ, David Hendrik, Baron, was born in Tiel, March 18, 1765, began his military career when but ten years of age, became a lieutenant in 1781, and captain in 1787. After the revolution of that year, C., as siding with the humbled Dutch patriots, took French service; was appointed lieutenant-colonel in 1793; and, two years later, found himself marching towards the Netherlands under the command of Pichegru. He afterwards fought with the French in Germany and Spain, gaining great distinction and the appellation of *Général Bayonnette*. As lieutenant-general of the Dutch forces in 1815, C. added to his laurels on the field of Waterloo. After the peace he was made governor of Antwerp in 1830, and bravely defended it against the united Belgians and French from November 29 till December 23, 1832, when he was forced to surrender. He died in May 1849.

CHASSEURS (Fr., hunters) is a name used for two important forces in the French army. The mounted C. (*C.-à-cheval*) are a body of light cavalry, designed for service in advance or on the flanks of the army, and correspond most nearly to the light horse of the British service. The name is first used in this sense in 1741, and has been retained while the force it denotes has undergone many alterations in organization and equipment. In 1831 a body of cavalry was raised for service in Africa, mounted on Arab horses, and with a distinct uniform. These have since become famous as the *C. d'Afrique*. After the reorganization of the French army in 1873, the effective army contained 14 regiments (subsequently increased to 20) of C.-à-cheval, besides 4 regiments of C. d'Afrique.—The infantry C. (*C.-à-pied*) are a light infantry force in many respects corresponding with the cavalry C., and like them intended for detached service (like the Rifle Corps in the English army). The French are believed to have adopted the idea of such a force of sharpshooters from the *Jäger* (the German word corresponding to C. or *hunters*) in the German armies. First used in the Thirty Years' War, the Jäger derived their name from the fact that they were chiefly drafted from amongst mountaineers and inhabitants of forest regions. They have always been regarded as a valuable contingent in the Prussian and Austrian armies, or even constitute the entire force of light infantry. In the German army there are 26 battalions (near 15,000 men) of this force; in the Austrian service, upwards of 20,000 officers and men. In France the equipment of the C. differed little from that of the other infantry; it was not until the formation in 1838 of the *C. de Vincennes*, that the experiment of a specially armed force of sharpshooters was fairly tried. The fame of the C. de Vincennes for rapidity and precision of movement, as well as for the accuracy of their fire, soon vindicated the importance of this branch of the in-

fantry; and at present there are 30 battalions of C.-à-pied in the French army.

CHASTE TREE. See VITEX.

Chasuble.

CHASUBLE (Lat. *casula*, *casubula*, and *cassibula*), the uppermost garment worn by priests in the Roman Catholic Church, when robed for the celebration of the mass. It was called also 'the Vestment,' and under that name seems occasionally to have been used in the English Church after the Reformation. Originally it covered the priest from head to foot, like a little house, whence some writers think it had its name of *casula*. In more recent times, at least, it was made of velvet. It was of an eliptical shape, like a *vesica piscis*, with a hole in the middle for the head; it had no sleeves. When put on, it showed two peaks, one hanging down before; another, on which a cross was embroidered, hanging down behind. According to Hilderbert, the C. signified good works; according to Alcuin, charity; according to another writer, the unity of the faith. Durand makes one peak the symbol of love to God, the other peak the symbol of love to our neighbor. In France, the press or wardrobe in which chasubles were kept was called the *chasublier*.

CHAT (*Saxi'cola*), a genus of small birds of the very numerous family *Sylviadæ* (q. v.), distinguished by a bill slightly depressed, and widened at the base. They have rather longer legs than most of the family. They are lively birds, flitting about with incessant and rapid motion in pursuit of the insects on which they chiefly feed. They are found in Europe, Asia, Africa, and New Holland. Three species are British—the stonechat, whinchat, and wheatear.—The Yellow-breasted C. of the United States (*Icteria polyglotta*) is a larger bird, and belongs to the family *Turdidæ* or *Merulidæ*.

CHAT MOSS, a bog in Lancashire, the largest in England, about 7000 acres in extent, and celebrated as having been the scene of the first great and successful efforts for the reclaiming of bogs, by Mr. Roscoe of Liverpool, in the end of the 18th and beginning of the 19th c., and of one of the great engineering triumphs of George Stephenson in the construction of the Liverpool and Manchester Railway. It is situated between Liverpool and Manchester, at no great elevation above the sea. It is from 20 to 30 feet in depth, and of such consistence that when an attempt was first made to survey it for the Liverpool and Manchester Railway, the attempt was relinquished because of the impossibility of obtaining a sufficiently solid stand for the theodolite. Drains are filled up almost as fast as they are cut by a pulpy stuff flowing into them, and affect only a few feet on either side. Great danger is experienced by any person stepping unwarily on the surface of the bog; and when he begins to sink, his struggles to extricate himself only cause him to sink faster and deeper. Mr. Roscoe's agricultural improvements were effected by numerous parallel drains in the parts on which he operated. The use of *pattens* by his workmen, and the adaptation of them to the feet of the horses employed, have been mentioned in the article BOG. The enlargement of the circle upon which a horse's foot rests from 5 inches diameter to 7, nearly doubles it, and consequently diminishes nearly by one-half the pressure on each unit of surface. Mr. Stephenson, when he could find no one to countenance him in his views, calculated with confidence on the application of this principle to the railway, so that even the pondorous locomotive and train might be supported by a sufficient extension of the bearing surface; and this he accomplished by spreading branches of trees and hedge-cuttings, and in the softest places rude hurdles interwoven with heather, on the natural surface of the ground, containing intertwined roots of heather and long grass; a thin layer of gravel being spread above all, on which the sleepers, chairs, and rails were laid in the usual manner. Drains were at the same time cut on both sides of the line, and in the central part of the moss a conduit was formed beneath the line of railway, of old tar-barrels placed end to end. Notwithstanding difficulties which every one but himself deemed insuperable, Mr. Stephenson constructed the portion of the line through C. M. at a smaller expense than any other part of the railway. There still is 'a sort of springiness in the road over the moss, such as is felt when passing along a suspension bridge;' and 'those who looked along the moss as a train passed over it, said they could observe a waviness, such as precedes and follows a skater upon ice.'

The complete reclaiming of C. M. for agricultural purposes can be only a question of time and expense. It seems capable of becoming one of the most productive tracts of land in England.

CHATEAU, CHATEL, or CASTEL, from the Lat. *castellum*, a fort, enters as a component part into many names of places in France.

CHATEAUBRIAND, FRANÇOIS AUGUSTE, VICOMTE DE, one of the most distinguished of French authors, was born September 4, 1769, at St. Malo, in Bretagne, and received his early education in the college at Rennes. While traveling in North America in 1790, he accidentally read in an English newspaper the account of the flight and arrest of Louis XVI. He immediately returned to France, intending to fight against the republic; but being seriously wounded at the siege of Thionville, in September 1792, he escaped to England, where he lived in such poverty that he was compelled to make translations for the booksellers, and to give lessons in French. In 1797, he published his first political essay, *Sur les Révolutions Anciennes et Modernes, considérées dans leurs Rapports avec la Révolution Française* (2 vols., London), a republican and sceptical work, the outcome of hardship, poverty, and sorrow. His scepticism soon vanished, but republican impulses continued to flash out at intervals during the whole of his strangely checkered, inexplicable, and inconsistent career. In 1800, C. returned to Paris, and wrote for the *Mercure de France*. In this journal, he first printed his tale of *Atala* (1801), with a preface lauding the First Consul, Bonaparte. Its success was remarkable, but nothing to the miraculous enthusiam excited by his *Génie du Christianisme* (1802), a work exactly suited to the jaded scepticism of the age, and also in accordance with the policy of the First Consul, who was then concluding the concordat with the pope, and wished to make the Roman Catholic priesthood subservient to his measures. Bonaparte, therefore, appointed C. secretary to the embassy in Rome, and, in 1803, sent him as ambassador to the little republic of Valais. On the execution of the Duke d'Enghien, March 21, 1804, C. resigned in disgust. In 1806, he commenced his pilgrimage to the Holy Land, visited Greece, Palestine, Alexandria, and Carthage, and returned through Spain to France in May 1807. From this period to the fall of Napoleon, he lived privately, publishing only two works of any value—*Les Martyrs*, and the *Itinéraire de Paris à Jérusalem*. In 1814, his eloquent brochure, *De Bonaparte et des Bourbons*, excited such attention, that Louis XVIII. declared it was worth an army of 100,000 men in favor of legitimacy.

After the battle of Waterloo, C. returned to Paris, where he was made peer and minister of state. Gradually his monarchical zeal subsided, and, in his address, *De la Monarchie selon la Charte*, delivered in the Chamber of Peers, he gave expression to such liberal tendencies as offended the king, who erased his name from the list of his counsellors. Soon, however, he appeared again as an ultra-royalist; and at the baptism of the infant Duke de Bordeaux, C. presented to the Duchess of Berry a flask filled with water from the Jordan. In 1822, he was appointed ambassador-extraordinary to the British court, but was rather rudely dismissed from office in 1824.

In 1826, C. prepared the first edition of his collected works, for the copyright of which the publisher gave the large sum of 600,000 francs, of which C. returned 100,000. During the days of July 1830, he was staying with his friend Madame Récamier at Dieppe; but as soon as he heard tidings of the revolution, he hastened to Paris. He refused to take the oath of fealty to Louis Philippe. This political crotchetiness, which always rendered it impossible to know beforehand what course of conduct C. would adopt, is perhaps best explained by the following passage from his *De la Restauration et de la Monarchie Elective* (Paris, 1831): 'I am a Bourbonist in honor, a Monarchist on grounds of rational conviction; but in natural character and disposition, I am still a Republican.' In 1832, he revised a new edition of his works, and, after visiting the court of the expelled Bourbons, devoted his attention to the preparation of his memoirs, intended to be published posthumously (*Mémoires d'outre Tombe*), though considerable extracts were printed during his lifetime. He also found leisure to write several other works. He died July 4, 1848.

C. wrote with warmth, energy, and a rich supply of imagery. Many of his descriptive passages are excellent, but his ideas want depth and coherency.—Marin, *Histoire de la Vie et des Ouvrages de M. de Chateaubriand* (2 vols., Paris, 1832).

CHATEAUDUN, a town of France, in the department of Eure-et-Loir, is situated on the Loir, a tributary of the Loire, about 26 miles south-south-west of Chartres. The streets are straight and well built, and an old castle, with an enormous tower, overlooks the town. C. has manufactures of blankets and leather. Pop. (1876) 6061.

CHATEAU-GONTIER, a town of France, in the department of Mayenne, situated on the river of that name, here crossed by a stone bridge, 18 miles south-south-east of Laval. C. has some good houses, but the streets are not well laid out. It has linen and woollen manufactures. Pop. (1876) 7218.

CHATEAUNEUF DE RANDON, a village of France in the department of Lozère, 12 miles north-east of Mende. A pretty

historical incident connected with the place, which was formerly fortified, makes it interesting. In 1380, the fortress, then held by the English, was besieged by the troops of Charles V., under the command of the gallent Du Guesclin. The English governor, sore pressed, promised to yield in fifteen days if no succor arrived. In the meantime, Du Guesclin died, and his successor was appointed, who, at the expiry of the fifteen days, summoned the governor to surrender. He refused to yield up the keys to any but Du Guesclin; and when informed of his death, marched out, and on bended knee laid the keys and his sword on the dead hero's bier. Pop. (1872) 393.

CHATEAUROUX, a town of France in the department of Indre, situated on a rising ground in the midst of an extensive plain, on the left bank of the river Indre, 166 miles south of Paris by railway. The town, which was formerly dirty and ill built, has been greatly improved within the last quarter of a century. C. does not possess much interest for the traveler. It is a busy place, with extensive woollen factories, besides manufactures of cotton, hosiery, yarn, hats, paper, parchment, hardware, leather, &c. Some of the best iron in France is found in the vicinity. The town owes its origin to a castle built here in the 10th century. Pop. (1876) 16,980.

CHATELET-LOMONT, Gabrielle Emilie, Marquise du, a very learned French woman, notorious for her intimacy with Voltaire, was born at Paris, 17th December 1706. At an early period she displayed a great aptitude for the acquisition of knowledge. She studied Latin and Italian with her father the Baron de Breteuil, and subsequently betook herself with zeal to mathematics and the physical sciences. Distinguished alike for her beauty and talent, she soon found a host of suitors for her hand. Her choice fell on the Marquis du Châtelet-Lomont, but her marriage did not hinder her from forming a *tendresse* for Voltaire, who came to reside with her at Cirey, a château on the borders of Champagne and Lorraine, belonging to her husband. Here they studied, loved, quarrelled, and loved again, for several years. In 1747, however, poor Madame C. became 'not insensible to the brilliant qualities' of a certain M. Saint-Lambert, a captain of the Lorraine Guards; and the result was, that the philosopher had to make room for the soldier, and content himself for the future with being the 'devoted and indulgent friend' of his former mistress. This new intimacy became fatal to Madame Châtelet. She died at Luneville, 10th September 1749, a few days after having given birth to a child. Her first writing was a treatise on the philosophy of Leibnitz. She also translated the *principia* of Newton into French, accompanying it with algebraic elucidations. It did not, however, appear till 1756, some years after her death. Her correspondence with Voltaire is interesting; but the fact that a woman so highly gifted as Madame C., and possessing so many amiable qualities, should never have dreamed that there was anything wrong in her *liaisons*, proves with terrible conclusiveness how corrupt was that philosophic society which, in the 18th c., professed to explode superstition and enlighten France and the world.

CHATELLERAULT, a town of France, in the department of Vienne, situated on the river of that name, 18 miles north-north-east of Poitiers. A handsome stone bridge, with a massive castellated gateway, built by Sully, at one end, connects it with a suburb on the other side of the river. C., which is an ill-built, mean-looking town, is one of the chief seats of the manufacture of cutlery in France, and since 1820 has had a national manufactory of swords and bayonets. Its river-port makes it the entrepôt for the produce of an extensive district. The Duke of Hamilton derives his title of Duke of Châtelherault from this place. Pop. (1876) 15,244.

CHA'THAM (Saxon, *Ceteham* or *Cættham*, understood to signify the 'village of cottages,') a parliamentary borough, river-port, fortified town, and naval arsenal, in the county of Kent, situated on the right bank of the Medway, at the upper part of its estuary, 30 miles east-south-east of London. Much of C. is ill built and irregular. The High Street is 1¼ mile long, parallel to the river, and swarms with soldiers and Jews. The refuse timber of the dock-yard is much used in building the house-walls. C. owes its importance to its naval and military establishments situated at Brompton village (on a height half a mile north of C.), and on the Medway estuary. The C. fortified lines are the frequent scenes of field-operations, imitation battles, and reviews. Pop. (1871) 45,792; (1881) 46,806. The borough, which sends one member to parliament, is governed by a head-constable under the magistrates of Rochester; The Romans seem to have once had a cemetery here. Traces of Roman villas have been found, with Roman bricks, tiles, coins, and weapons. The dock-yard was founded by Elizabeth before the threatened invasion of the Spanish Armada. In 1662, it was removed to its present site. In 1667, the Dutch, under De Ruyter, sailed up the estuary of the Medway, and, in spite of the fire from the castle, destroyed much shipping and stores.

In a military point of view, the lines of detached forts connected with C. constitute a fortification of great strength; and the whole is regarded as a flank defence for London in the event of an invader seeking to march on the capital from the south coast. The place is also defended by some strong forts on the Medway. In and near C. are Fort Pitt, a military hospital and strong fort; barracks for infantry, marines, artillery, and engineers; a park of artillery; and magazines, store-houses, and depôts on a large scale.

In a naval sense, C. is one of the principal royal ship-building establishments in the kingdom, and a visit to it never fails to impress the stranger with a sense of the naval power of England. The dock-yard is nearly two miles in length, containing several building-slips, and wet docks sufficiently capacious for the largest ships; and the whole is traversed in every direction by a tramway for locomotives, with a gauge of 18 inches. One peculiar establishment in this dock-yard is a metal mill, which supplies all the royal dock-yards with copper sheets, copper-bolts, and other articles in copper and mixed metal. The saw-mills at C. are so extensive, that it is said that, if fully employed, they could cut up timber enough for all the dock-yards. A duplicate of Brunel's block-making machinery is kept at C., ready to supplement the operations of that at Portsmouth. The dock-yard is under the control of a captain-superintendent, and other officers whose annual salaries vary from £700 to £200 each. Under them are clerks receiving from £450 to £80 each. The actual workmen, artizans and laborers, vary in number according to the amount of ship-building and repairing going on. In the navy estimates provision is made for about 3500 ship-wrights, calkers, joiners, sawyers, mill-wrights, smiths, block-makers, sail-makers, rope-makers, riggers, laborers, &c. The total outlay on the C. establisbment in 1879–80 was £685,253.

CHATHAM ISLANDS, a small group in the Pacific, lying about 450 miles due east of the South Island of New Zealand, to which they politically belong. They are the antipodes of Toulouse in France. There are three islands—of which the largest, Chatham Island, is 25 miles long—and some rocky islets. Total area, 628 sq. m.; pop. about 200, mostly Maories and Europeans, with a few aborigines. The C. I. were discovered in 1791 by Lieutenant Broughton, of the ship *Chatham*. A large salt or brackish lake occupies the Interior of Chatham Island. The soil and climate of the Archipelago, in general, are said to be good. Wheat yields abundantly; and the horses, cattle, and pigs which have been introduced thrive well. Timber of any size is unknown, so that the native canoe, instead of being cut out of a single tree, is merely wicker-work bound together by cordage of indigenous flax. The aborigines have two missions among them—one from Germany, and the other from New Zealand.

CHATHAM, William Pitt, Earl of, sometimes styled Pitt the Elder, one of the greatest English orators and statesmen of the 18th c., was the son of a country gentleman, Robert Pitt of Boconnoc, in Cornwall; and was born November 15, 1708. After an education at Eton and Oxford, he traveled on the continent, and on his return obtained a cornetcy in the Blues. In 1735, he entered parliament for Old Sarum—that synonym for electoral corruption—a borough then belonging to his family. He espoused the side of Frederick Prince of Wales, then at deadly feud with the king, and offered a determined opposition to Walpole, who was at the head of affairs. He was deprived of his commission in consequence—an insult and injury which only increased the vehemence of his denunciations of the court and the government. His influence, both in and out of the House of Commons, increased rapidly; and Walpole being driven from power, the king, notwithstanding his hatred of Pitt, found it necessary to allow of his admission to a subordinate place in the Broad Bottom administration; subsequently he was appointed to the lucrative office of paymaster-general. The Duchess of Marlborough, pleased with his patriotism and powers of oratory, left him £10,000; and later, Sir William Pynsent, struck with similar admiration, left him his whole property. In 1755, when Henry Fox (afterwards Lord Holland) was made secretary of state, finding himself opposed to the foreign policy of the new minister, Pitt resigned office as paymaster. In the following year, when the king, unwillingly acceding to popular demands, had to dismiss Fox, Pitt became nominally secretary of state, but was virtually premier. He immediately began to put into execution his own plan of carrying on the war with France. He raised the militia, and strengthened the naval power; but the king's old enmity, and German predilections, led him to oppose Pitt's policy, who thereupon resigned office in April 1757, but was recalled in June, in obedience to the loud demands of the people.

Now firmly established in power, Pitt's war policy was characterized by unusual vigor and sagacity. Success returned to the British arms. French armies were beaten everywhere by Britain and her allies—in India, in Africa, in Canada, on the Rhine—and British fleets drove the few French ships they did not capture or

destroy from almost every sea. But the prime mover of all these brilliant victories found himself compelled to resign (1761), when on the accession of George III., and owing to the influence of Lord Bute, it was attempted to introduce a vacillating policy into the government; his immediate cause of resignation being the refusal of the majority of the cabinet to declare war with Spain, which Pitt foreseeing as imminent, wished to commence before the Spaniards were thoroughly prepared.

As some recompense for his important services, Pitt received a pension of £3000 a year; and his wife, sister of George Grenville, was created Baroness Chatham. Until 1766, Pitt remained out of office, not offering a factious opposition to government, but employing all his eloquence to defeat some of its most obnoxious measures. In that year he received the royal commands to form a ministry. He undertook the task, choosing for himself—to the astonishment of the public, and the sacrifice, to a considerable extent, of his popularity—the almost sinecure office of Privy Seal, with a seat in the House of Lords as Viscount Pitt and Earl of Chatham. Ill health prevented C. from taking any active part in this ministry, of which he was nominally the head, and which was weak and embarrassed throughout, and he resigned in 1768, to hold office no more. He did not, however, cease to take an interest in public affairs. He spoke strongly against the arbitrary and harsh policy of government towards the American colonies, and warmly urged an amicable settlement of the differences. But when, America having entered into treaty with France, it was proposed by the Duke of Richmond to remove the ministers, and make peace on any terms, C., though much debilitated, came down to the House of Lords, and in a powerful address protested against the implied prostration of Britain before the throne of the Bourbons, and declared war, with whatever issue, preferable to the proposed terms of peace. This address secured a majority against the motion, and the war was continued. But it was the orator's last effort; for, exhausted by speaking, on rising again to reply to a query addressed to him by the Duke of Richmond, his physical powers suddenly failed, he fell back into the arms of his friends, and was carried from the House. He died May 11, 1778. He was honored with a public funeral in Westminster Abbey, where a statue was also erected to his memory at the public expense; and in addition, government voted £20,000, to pay his debts, and conferred a pension of £4000 a year on his descendants. C.'s personal appearance was dignified and imposing, and added greatly to the attractions of his oratory, which was of the most powerful kind. His upright and irreproachable character demanded the admiration of his enemies; but his affectedness and haughtiness not unfrequently disgusted his friends, and pride rather than principle seems to have actuated his course at some important conjunctures of his life. He had, however, an intense love of country; the grand object of his ambition being to make his native land safe against all contingencies and powerful among nations.

CHATILLON, a town of France in the department of Cote d'Or, on the Seine, about 45 miles N.N.W. of Dijon. Pop. (1876) 4894. C. is chiefly famous on account of the congress of allied sovereigns held here in 1814, from February 5 to March 19, for the purpose of negotiation with Napoleon respecting conditions of peace. Several of the conditions proposed by the allies Napoleon could not bring himself to submit to, and the negotiations broke up, March 19. On the 25th, when their armies were, in fact, marching on Paris, the allies from Vitry issued their declaration justifying a continuation of the war.

CHATSK, or SCHAZK, a town of European Russia, government of Tambov, 175 miles south-east of Moscow, on a small river of the same name. It is situated in the midst of a vast fertile plain, contains a number of churches, and has a trade in hardware, grain, and cattle. Pop. 7260.

CHA'TSWORTH, the magnificent mansion of the Duke of Devonshire, and one of the most splendid private seats in England, is situated in Derbyshire, on the Derwent, 12 miles north-by-west of Matlock. William the Conqueror gave the domain to his natural son William Peveril. It was purchased by Sir W. Cavendish in Queen Elizabeth's time. Sir W., in 1570, began the old mansion, which was finished by his widow, afterwards Countess of Shrewsbury. In this building Mary Queen of Scots was imprisoned for 13 years. The present edifice, called a palace from its grandeur, includes the old Ionic pile, 183 by 172 feet, built 1687—1706, by the first Duke of Devonshire, after designs by Talman and Wren. The great stables were built about 1706, and the north wing since 1720. The façade is 720 feet long, or with the terraces, 1200 feet. The building is nearly a square, with an interior court. C. is famed for its pictures, sculptures, hangings, carvings, and bas-reliefs. There are some exquisite sculptures by Canova, Thorwaldsen, Chantrey, &c. The grounds around are 9 miles in circuit, including hill and dale, and fine prospects. They were laid out by Loudon and Paxton, and are celebrated for their trees, shrubs, rock-work, deer, and water-works—only surpassed by those at Versailles. The conservatory, unrivalled in Europe, covers nearly an acre, measures 300 by 145 feet, and 65 feet high, has 70,000 square feet of glass, and a carriage-road through it. Hobbes, the philosopher, lived long at Chatsworth.

CHATTAHOO'CHEE, a river of the United States, rises on the eastern declivity of the Blue Ridge of the Alleghanies, in the north of Georgia; traverses that state in a south-west direction; becomes the boundary between it and Alabama; and finally, after receiving the Flint from the left, crosses Florida, under the name of Appalachicola, into the Gulf of Mexico. With an entire course of 550 miles, it is navigable upwards as far as Columbus, at a distance of 350 miles from the sea. It forms the principal outlet for the cotton crops of its basin.

CHA'TTEL (Fr. *chatel*, Old Fr. *chaptel*, from Lat. *capitale*, corrupted into *captale* and *catallum*, meaning the capital or principal sum in a loan; hence goods in general, especially cattle, as distinguished from land), in the law of England, is a term used to designate any kind of property which, with reference either to the nature of the subject or the character of the interest possessed in it, is *not freehold*. Regarded from a positive point of view, C. included not only all movable property, but all property which, though immovable, was not held on a feudal tenure. Any estate, then, or interest in lands and tenements not amounting to freehold, is a chattel. But as, between property thus 'savoring of reality' and mere personal movables—money, plate, cattle, and the like—there was a manifest distinction, chattels were, consequently, distinguished into *chattels-real* and *chattels-personal*.

Both descriptions of C., in the eye of the ancient law of England, were regarded as inferior to freehold, and formed a subordinate class of property. As distinguished from estates of inheritance, or for life in things immovable, such estate is called *personal*, the others being *real* estate. Till the passing of 8 and 9 Vict. c. 106, livery of seizin was required to pass an estate of inheritance, or for life in corporal hereditaments of feu tenure, but such was no more required for the transfer of a C. real than of a C. personal. A C. *real* is also transmitted on the owner's death to his executor or administrator, like a C. personal, and does not descend to his heir like a freehold of inheritance. There is an exception to this rule, however, in the case of chattels which, owing to their intimate connection with property of a freehold nature, cannot be separated from it without injury. Such, for instance, are the muniments of title to an estate, growing grass, deer in a park, and actual fixtures, all of which go to the heir, and not the executor. The tenant of a C. real, like the tenant of a C. personal, is, moreover, said not to be *seized*, like the tenant of a freehold, but to be *possessed*. Lastly, there can be no estate tail in a C. real more than in a C. personal, except in the case in which either of them can be regarded as an heir-loom. Formerly, C. might be disposed of by will at an earlier age than real estates, but this was altered by 1 Vict. c. 26.

CHA'TTERER, a significant popular name, often applied to the birds of the family *Ampelidæ*, a family of the order *Insessores* and tribe *Dentirostres*, having a depressed bill like that of the Fly-catchers (*Muscicapidæ*), but somewhat shorter and broader in proportion, and slightly arched. To this family belong the cotingas, wax-wings, piauhaus, caterpillar-hunters, &c. They are found chiefly in the warmer parts of the old world, although America also produces some. They inhabit low grounds or forests, feeding chiefly on insects and their larvæ. Some of them possess powers of song almost equal to those of the nightingale. Many of them are birds of gorgeous plumage.—Only one species is British, sometimes called simply the C., sometimes the Bohemian C. or Wax-wing (q. v.).

CHA'TTERTON, THOMAS, an English poet, whose youth, genius, and tragical death have made him one of the wonders of English literature, was born at Bristol, November 20, 1752. His father, who had once been a chanter in the Bristol cathedral, and also master of a kind of free-school, died two or three months before the poet's birth. C. was educated at a parish-school, was considered a dull child, but making acquaintance with a black-letter Bible which his mother often used, the dormant spirit flashed up. From early years, he was fond of all kinds of antiquities; he clung around old walls like the ivy, and haunted twilight ruins like the bat. At the age of 14, he was apprenticed to Mr. Lambert, an attorney.

His situation here was uncomfortable, he took his meals in the kitchen with the footboy, and when refractory, was chastised with a ruler. In October 1768, the new bridge at Bristol was opened, and C. sent to a newspaper an account, in antique phraseology and spelling, of the ceremonies attending the opening of the old one several centuries before—the whole purporting to be taken from an ancient MS. To a certain Bristol pewterer, Burgum by name, he presented himself, and astonished the craftsman by the sight of a parchment, in which his pedigree was traced back to the Norman Conquest, adorned by many a splendid marriage, and many a knightly name. He also exhibited to his

friends copies of old poems, which he said were composed by one Thomas Rowley, a monk of the 15th century. These matters made some stir in his native city, but not enough to satisfy C., who resolved to fly at higher game. Accordingly, Horace Walpole, at that time collecting additional materials for his *Anecdotes of Painting in England*, received from C. several pages of antique writing, accompanied by a short note. The pretended MS. gave biographical sketches of celebrated painters who had flourished in England several centuries ago, and of whose existence Walpole had never dreamed. Walpole, put off his guard, answered his unknown correspondent at once; expressed his delight at receiving the MS.; and desired, as a personal favor, that all the other antique writings, poems included, mentioned in the note, should be forwarded. C., highly elated, immediately sent accounts of a great many more painters and poets, and also gave some slight sketch of his personal history. On receipt of this second communication. Walpole suspected a trick. The poems he showed to Mason and Gray, who at once pronounced them forgeries; he then wrote C., expressing his suspicions as to the genuineness of the MS., and administering at the same time a great deal of excellent advice. C. replied, desiring that the MS. should be returned at once; but by the time the letter reached London, Walpole was about to start for Paris, and it was allowed to remain unanswered. On Walpole's return some six weeks thereafter, a fierce note from C. waited him, the contents of which must have brought the blood to his polished brow; indignant, he bundled up the MS., and returned it without a word of explanation.

From his earliest youth, C. had a ghastly familiarity with the idea of suicide. Among his papers preserved in the British Museum, is a last will and testament 'executed in the presence of Omniscience, the 14th of April 1770,' full of the wildest wit and profanity. Another document of similar purport, falling into the hands of his friends, led to his dismissal from Mr. Lambert's office. Released from what he considered the slavery of law, C.'s eyes turned to London, and in that city he arrived, carrying with him all his Rowley MS. and several modern poems, on Tuesday the 24th April 1770, and took up his abode with one Walmsley, a plasterer, in Shoreditch. No sooner had he settled there, than he began to work as with a hundred hands.

During the last few months of his life, he poured forth squibs, satiric poems, political essays, burlettas, letters in the style of Junius, and meditated writing a history of England, to appear in parts. For a time, his prospects seemed golden enough. He obtained an introduction to Lord Mayor Beckford; he sent glowing letters home, accompanied by presents to his mother and sisters. Ultimately, he left the plasterer's in Shoreditch, and took lodgings in Brooke Street, adjoining Holborn. Unhappily for C., editors of opposition papers were willing enough to insert and praise his articles, but were disinclined or unable to render an equivalent in cash. Possibly they conceived that a patriotism so ardent must be its own reward. The means of life were now fast failing. In desperation, he attempted to procure an appointment of surgeon's mate in a vessel going to Africa, but failed. This was the last drop that made the cup overflow. On Saturday the 25th August, his landlady, alarmed that her lodger did not make his appearance, had the door of his room broken open; saw the floor littered with small pieces of paper, and C. 'lying on the bed with his legs hanging over, quite dead.' Just at this time, Dr. Fry of Oxford, who had seen or heard something of the Rowley poems, was on the eve of starting for Bristol to make inquiry into the matter. Sad enough to think on now: a little promptitude on the one hand, a little patience on the other, and the catastrophe might have been averted.

C. died before he reached his 18th year, and takes his place as the greatest prodigy in literature. Indeed, in our judgment of him, age cannot be taken into account. He never seems to have been young. His intellect was born fully matured. He was equally precocious in other respects. In his letters, he speaks of the relation of the sexes in the tone of a sated *roué*. He never seems to have felt the delicious shame and ingenuousness of youth; over his heart never was outspread 'the bloom of young desire and purple light of love.' The *Kew Gardens* is written in the style of Churchill, and it possesses all that master's vigor, and every now and then we come on a couplet turned with the felicity of Pope. His genius, however, is in its greatest perfection in the ancient poems. No poet, before or since, has written a tenderer strain than the lament in *Ælla*, or conceived a bolder image than the personification of Freedom in the ode to Liberty in his *Tragedy of Godwin*. C.'s life has been written by many hands, but the best and most sympathetic sketch of it is that given by Professor D. Masson of Edinburgh University in his collected essays.—See *The Poetical Works of Thomas Chatterton*, by the Rev. Walter Skeat, M.A. (1875).

CHAU'CER, GEOFFREY, the father of English poetry, was born most probably about 1340, though the traditional date is 1328. Recent researches have made it clear that C. was the son of John Chaucer, a London vintner. It has been said that he studied at Cambridge, and afterwards removed to Oxford. While at the university, he wrote *The Court of Love*, and *The Book of Troilus and Cresseide*. At one period he seems to have turned his attention to law, and to have become a member of the Inner Temple. About these matters his biographers, knowing little, have conjectured much. The only particular of C.'s youth of which an anxious posterity can be certified is, that he one day thrashed a Franciscan friar in Fleet Street, and was fined two shillings for the exploit on the next. History has preserved this for us, but has forgotten all the rest of his early life, and the chronology of all his poems.

In 1359, C. assures us, on his own authority, that he served under Edward III. in his French campaign, and was therein made prisoner. The date of his return from captivity, and of his subsequent marriage, cannot now be ascertained. He espoused Philippa, youngest daughter of Sir Payne Roet, whose estates lay in Hainault. His wife's sister, Katherine, ultimately became the wife of John of Gaunt, Duke of Lancaster; and it may be presumed that the high connection thus established aided, in no inconsiderable degree, the poet's advancement in life. After his marriage, he began to mix in public affairs. He was sent on an embassy to Genoa in 1372, and, on that occasion, has been supposed by some to have had an interview with Petrarch, then residing at Padua, and to have heard from his lips the story of *Griselda*. On his return, he was appointed comptroller of the customs for wools, and in the same year the king granted him a pitcher of wine daily for life. In 1377, C. proceeded to Flanders in the retinue of Sir Thomas Percy, afterwards Earl of Worcester; and for several years thereafter he was employed assiduously in embassies and other business connected with the public service. In 1386, a commission was issued to inquire into alleged abuses in the department of the customs, and C. was dismissed from his comptrollership in the December of that year. On meeting this fact, one cannot help remembering that Edward made the writing out of the accounts in C.'s own hand the condition of his holding office. Had the great poet neglected his duties? It has been conjectured by some, that after his disgrace C. became embarrassed in circumstances, and apparently with reason, for about this time he cancelled both his pensions, and consigned them to one John Scalby, 'to whom they were probably sold under pressure of distress,' says his latest biographer. In 1387, C. lost his wife. Where he spent his closing years, cannot now be ascertained. Godwin surmises that in his distress he retired to Woodstock, and composed there *The Canterbury Tales*. It seems, however, to be tolerably certain that during the last years of his life he was resident in London. There he died on the 25th October 1400, aged 74, and was buried in Westminster Abbey, the first of the long line of poets whose ashes make that pile so venerable.

C. was a worthy representative of the splendid 14th century. He was a master of the science, the theology, and the literature of his time. He had seen many men and cities. His poems are numerous, and of various poetical excellence. Many scholars deny, on grounds of rhyme, that C. was author of *The Court of Love*, *The Flower and the Leaf*, and *The Romaunt of the Rose*, long unhesitatingly regarded as his. These are chiefly on French models and are gorgeous allegories full of queens and kings, bowers, bevies of beautiful ladies, brave knights, and pious nigtingales that sing the praises of God. They appeal potently enough to the eye, but they do not in the slightest degree touch the heart, or relate themselves to human concerns. Quite different *The Canterbury Tales*, so full of humor, pathos, and shrewd observation. In these Tales, English life, as it then existed, is wonderfully reflected —when the king tilted in tournament, when the knight and the lady rode over the down with falcon on wrist, when pilgrimages bound for the tomb of St. Thomas passed on from village to village, when friars sitting in tavern over wine sang songs that formed a remarkable contrast with the services they so piously and sweetly intoned. All that stirring and gaily appareled time—so different from our own—is seen in C.'s work, as in some magic mirror; and in his case, as in every other, when the superficial tumults and noises that so stun the contemporary ear have faded away, leaving behind that which is elemental and eternal, the poet is found to be the truest historian. Among C.'s other writings may be mentioned, *The Book of the Duchess*, *The House of Fame*, and *The Legend of Good Women*. The genuineness of *The Court of Love* and of *The Flower and the Leaf* is denied by Mr. Furnivalle, and by Mr. Skeat in his new edition of C. (4 vols., 1878).

CHAUDES-AIGUES, a town of France, in the department of Cantal, about 12 miles south-south-west of St. Flour. It is celebrated on account of its hot mineral springs, which have the property of discharging grease from sheep's wool, and vast numbers of fleeces are sent hither annually to be washed. The waters are also taken for rheumatism and cutaneous diseases. Pop. (1872) 1100.

CHAUDFONTAINE, a village charmingly situated in the valley of the Vesdre, a few miles from Liége, in Belgium, and cele-

brated for a hot spring which supplies water for hot-baths. There are hotels and lodging-houses for the accommodation of visitors. The place is a favorite resort of the Liégois. There is here a station on the railway from Liége to Aix-la-Chapelle. Pop. (1873) 1393.

CHAUDIÈRE, the name of a river and of a lake of Canada. The river joins the St. Lawrence from the south, about 7 miles above Quebec forming the celebrated falls of its own name, about 2½ miles from its mouth. The lake—merely one of the many expansions of the Ottawa—has on its right the city of that name, the metropolis of the united colony.

CHAUMETTE, Pierre Gaspard, one of the most extravagant characters of the French Revolution, was born, 1763, at Nevers, and made his first public appearance at the Cordeliers Club, where he was introduced by Camille Desmoulins. His 'sans-culottism' gained for him such popularity, that he was appointed procurator of the community of Paris, in the place of Manuel. C. was very enthusiastic in favor of the 'worship of reason.' In his zeal, he rejected his own Christian name, Pierre, as having been sullied by saintly associations, and styled himself 'Anaxagoras.' The institution of the tribunal of the revolution, the decree for a revolutionary army, and the law against suspected aristocrats, were carried into effect by C. along with others. He also proposed that the whole French nation should be made to wear wooden shoes, and to subsist on potatoes; but this was too much even for the chimerical enthusiasm of his compatriots. His antics, however, in connection with the 'worship of reason' excited the disgust of Robespierre, who devised measures for bringing the whole company of actors under Hébert to the scaffold. C. was arrested and imprisoned on a charge of having been implicated in a plot against the Convention, and was executed, April 13, 1794.

CHAUMONT, a town of France, in the department of Haute-Marne, on an elevation between the rivers Marne and Suize, about 140 miles south-east of Paris. It is generally well built, with clean, spacious streets, and fine promenades round the upper part of the town. There are considerable manufactures, including hosiery, cotton yarn, gloves, &c. On the 1st of March 1814, the allied powers here bound themselves by treaty against Napoleon, in the event of the negotiations at Châtillon ending unsatisfactorily. Pop. (1876) 8791.

CHAUNY, a town of France, in the department of Aisne, about 18 miles west-north-west of Laon. It is built partly on the right bank of, and partly on an island in the river Oise, which is here navigable. It is an old, rather uninteresting place, with manufactures of sacking, hosiery, chemicals and leather, and an active trade. Pop. (1876) 8982.

CHAUSSES, in the armor of the middle ages, were defence-pieces for the legs. Some were made of padded and quilted cloth, with metal studs; some of chain-mail; some of riveted plates; and some of banded mail. It was not unusual to fasten them by lacing behind the leg.

CHAUVINISME. Chauvin was the name of the principal character in a French comedy, which was played with immense success at the time of the Restoration. He represented a bragging veteran of the empire, who was continually talking of his achievements at Austerlitz and Jena, and his determination to take a brilliant revenge for Waterloo. Since then, a *chauviniste* has come to mean a man who has extravagant and narrow-minded notions of patriotism, and corresponding enmity towards foreign peoples.

CHAUX DE FONDS, a town of Switzerland, in the canton of Neuchâtel, 9 miles north-west of the city of that name. It is situated in a bleak valley, at an elevation of 3070 feet above the sea, and is scattered over a large area, almost every cottage being surrounded by a garden or croft. It is one of the chief seats of the manufacture of clocks and watches in the canton. The mechanists work chiefly at home, each devoting himself to a particular portion of machinery. This industry employs 12,000 hands. Population (1880) 22,456.

CHAY ROOT, CHOYA, or SAYAN (*Oldenlandia umbellata*), a perennial herbaceous plant of the natural order *Cinchonecæ*, said to be a native both of India and of Mexico. It is cultivated on the coast of Coromandel for the sake of its long, orange-colored roots, the bark of which affords a beautiful red dye. The quality of the bark is said to be improved by keeping it for some years. It is the coloring matter obtained from C. R. which is used to paint the red figures on chintz. C. R. is the Indian madder, and in it some tribes in Ceylon formerly paid their tribute.

CHAYENPU'R, a fortified town of Nepaul, in the north of India, about 120 miles to the east of Khatmandu, the capital of the state, being in lat. 27° 20′ N., and long. 87° 3′ E. It is the chief town of a district which yields rice, wheat, cotton, ghee or butter, timber, spices, sugar, tobacco, and pearls.

CHEA'DLE, a small but neat market-town of England, in the moorland district of the north part of the county of Stafford, 14 miles north-north-east of the town of Stafford, 3 miles from the Froghall station on the Churnet Valley branch of the North Staffordshire Railway, and 4 miles from the Blyth Bridge station on the main line from Derby to Crewe. The town is seated in a pleasant vale, surrounded by hills mostly planted with fir and other trees. The parish church (St. Giles) was a very ancient structure, but was rebuilt in 1837—1838. A magnificent Roman Catholic church, erected at the sole expense of John, Earl of Shrewsbury, was opened in 1846. There are several dissenting chapels, various schools, a mechanics' institute, a large tape manufactory, and also one for silk. There are copper and brass works a short distance from the town, and coal and limestone abound in the vicinity. Pop. (1871) 2929.

CHEATING. In the technical language of the English law, C. means the offence of fraudulently obtaining the property of another by any deceitful or illegal practice short of felony, but in such a way as that the public interest may possibly be affected. In order to constitute C., the fraud must be of such a kind as that it could not be guarded against by common prudence. C., in this sense, is an offence at common law and indictable, which is not the case with imposition in a private transaction. The law of Scotland has no such distinction. See Weights and Measures, False Pretences, Character to Servant.

CHECK, a variegated cloth, the pattern of which consists of rectangular spaces like a chess-board (Fr. *échec*, chess), in black and white, or of various colors.

CHE'CKY (Fr. *échiqueté*). In Heraldry, when the field or any charge is composed of small squares of different tinctures, generally metal and color, it is said to be checky.

CHE'DDAR, a village in Somersetshire, on the south side of the Mendip Hills, 2 miles south-east of Axbridge, with a level country to the south. It lies at the entrance of a deep rocky gorge, nearly 1 mile long, overhung by stupendous mural limestone precipices, containing caverns—one being 300 feet long—filled with fantastic stalactites and stalagmites. The celebrated C. cheeses are produced on the rich grass-farms around. The church is supposed to have been built about 1400, and has a sculptured stone pulpit. Population of parish (1871) 2200.

CHEDU'BA, an island off Aracan, in the Bay of Bengal, stretching from lat. 18° 40′ to 18° 56′ N., and from long. 93° 31′ to 93° 50′ E. Its area is about 250 square miles, and its population 9000. Along with the adjacent mainland, it was ceded to the British at the close of the first Burmese war. The soil is fertile, yielding rice, tobacco, sugar, indigo, cotton, hemp, and large quantities of vegetable oil, equally fitted for burning and for varnishing. The principal mineral is petroleum. The coast presents earthy cones, which emit mud and gas, and about 100 years ago a severe earthquake is believed to have extended the limits of the island.

CHEESE is the common form in which the Caseine (q. v.) of milk is used in a separate state as an article of food. In new milk, the C. is present in a condition soluble in water, and is generally separated therefrom in a coagulated or clotted form, on the addition of a little rennet (q. v.) In the preparation of C., the milk is gently heated to a temperature of 110°—112° F., and placed in a large wooden tub, where the rennet is added, and the operation of *earning* goes on. In about half an hour, the curd is sufficiently formed. The liquid whey being pressed out, the curd is chopped into small pieces of the size of a walnut by a knife, called a curd-cutter, salt is added, and the fragments of curd introduced into a cloth placed in a cheese-vat or chessart, which is a wooden tub of varying size and shape, perforated at the sides and bottom. The whole is then put under a cheese-press (q. v.), and subjected to great pressure, which consolidates the curd or caseine, and at the same time squeezes out the remaining portions of whey. After two or three hours, the half-formed C. is turned and re-turned, each time being subjected to renewed pressure, till in about two days it is sufficiently compacted. It is then removed from the cheese-vat, and placed on a shelf in a dry airy room, where, being repeatedly turned, it gradually dries, and gets aged or seasoned sufficiently for market in about six months.

There are many varieties of C., which partly owe their difference to the food of the cows, but in greater part to differences in the mode of treating the milk. *Skimmed-milk C.* is prepared from milk from which the cream has been removed, and a rich color is communicated by adding a little Arnotto (q. v.) to the milk before coagulation. *Sweet-milk C.* is procured in a similar manner from the whole milk, and contains much of the butter along with the caseine. *Stilton C.* is made in Leicestershire, by adding the cream of the evening's milk to the new milk of next morning; and as there is always more trouble in expelling the whey from curd containing butter, there is a difficulty in preparing this variety of C., from its liability to fermentation and bursting. *Cheddar C.* is

made in Somersetshire, from the whole milk, and the whey is several times skimmed off, heated, and added to the curd to scald it. *Cheshire* and *Double Gloucester* are made from the whole milk; *Single Gloucester*, from half new milk and half skimmed milk. *Gouda C.* is prepared in Holland from skimmed milk curdled by muriatic acid instead of rennet, and for this reason it is not infested with mites. Holland exports annually about thirty millions of pounds of cheese, the greater portion coming to England. *Suffolk C.* is made from skimmed milk. *Parmesan C.*, obtained from Parma in Italy, is also made from skimmed milk, and owes its fine rich flavor to the superior herbage on the banks of the river Po.

The cows are kept in the house nearly all the year round, and fed in summer with cut grass. Some of the cheeses are so large as to contain 180 pounds; and the milk of 100 cows is required to produce one of this size. *Swiss C.* is flavored with herbs, and especially that of Gruyère, which is very pleasant to the taste. Gruyère cheeses weigh from forty to sixty pounds each, and are exported in large quantities. *Cream C.* is prepared from cream curd which has been placed in a cloth, and allowed to drain without the assistance of pressure. Bath and York supply C. of this description. In the fabrication of C., minium or red-lead has occasionally been employed as a cheap coloring substance, and cases of poisoning have resulted therefrom. Carrots, saffron, and marigold flowers have also been used for imparting color as well as flavor.

Dunlop C., though nowhere so well made as in the parish in Ayrshire from which it derives its name, is now manufactured in the dairy districts of Scotland generally. The cheeses are made of various sizes—from a quarter to a half hundredweight. Sometimes the entire milk is used, but generally the cream is removed from the evening's milking. Of late years, great improvement has taken place in the manufacture of cheese in the Scottish dairy districts, Ayrshire, Lanarkshire, Wigton, and Kirkcudbright. Much of what is sold as Cheddar (q. v.) cheese is really made in Scotland. The annual Kilmarnock 'Cheese Show' is one of the largest in the world, the value of the cheese exhibited being often more than £20,000.

When sufficiently dry for use, C. stills retains from 35 to 44 per cent. water, and besides the caseine contains a greater or less proportion of oil or fat and saline matter—the latter mainly consisting of common salt, originally present in the milk, and added during the manufacture of the cheese. As an article of diet, C. is highly nutritious; but from its costive properties, it is mainly used as a condiment in small quantity after an ordinary meal, and is then serviceable in giving an impetus to the process of digestion. To serve the purpose of a digester, C. must be old and partially decayed or mouldy. It then acts as leaven, and causes chemical changes gradually to commence among the particles of the food which has previously been eaten, and thus facilitates the dissolution which necessarily precedes digestion.

CHEESE PRESS.—The old method of compressing curd and expelling the whey from it is still employed in many places, the mere piling of weights on the cheese-vat. Sometimes the action of a screw is employed. Among improved dairy implements are now reckoned, however, many ingenious and elegant forms of cheese press, generally depending on the action of a lever. They are much more convenient than the clumsy contrivance which they have superseded. Factories for the manufacture of cheese have been established in the United States and Canada, by which cheese is produced in immense quantities, and factories on a similar principle have been established in Derbyshire and elsewhere. The cheese made in the United States and Canada is now imported into Great Britain in immense quantities. See OLEO-MARGARINE.

CHEE'SE-HOPPER, the larva of *Piophila casei* or *Tyrophaga casei*, a small *dipterous* (two-winged) fly, of the large family *Muscides*, the same to which the house-fly, blow-fly, &c., belong. The perfect insect is about a line and a half in length, mostly of a shining black color; antennæ, forehead, and some parts of the legs rufous. It is a pest of dairies and store-closets, laying its eggs in cracks or crevices of cheese, the destined food of its larvæ. To preserve cheeses from this pest, it is of advantage to brush or rub them frequently, and to remove all cracked or injured cheeses from large stores, besides keeping them dry and in a well-aired place. The same rules are applicable to their preservation from the other insect larvæ by which they are sometimes infested, of which the most notable are those of the Bacon Beetle (see DERMESTES), and of another species of dipterous fly, *Musca corvina*.

Cheese-hopper:
a, larva, natural size; *b*, larva, magnified, preparing to spring; *c*, perfect insect, natural size; *d*, magnified.

CHEE'TAH, CHI'TTAH, or HUNTING LEOPARD (*Felis jubata* or *Cynailurus jubatus*), an animal of the feline family, but differing from all the rest of that family in its longer and narrower feet and less retractile claws, which are also more blunt and less

Cheetah.

curved. With these peculiarities are associated a greater length of limbs than is usual in feline animals, adapting it to take its prey by running rather than by leaping, and an intelligent and tractable disposition, constituting an additional point of resemblance to dogs; with which, however, the form of the head and the internal anatomy have nothing in common, but are entirely feline.

The C. is in size about equal to a leopard, but the body and limbs are longer. It is very widely distributed, being found in Senegal, South Africa, Persia, India, Sumatra, &c. Its geographic range extends as far north as the Caspian Sea, and the steppes of the Kirghiz Tartars. The Asiatic species described as *Felis venatica* appears to have been fully identified with *F. jubata;* and differences in the quantity of mane, and other unimportant particulars, may probably sometimes have resulted from domestication; for this animal has been long domesticated and employed in the chase, both in Persia, where it is called *Youze*, and in India. Deer and antelopes are the game principally hunted with the C., and packs are kept by Indian princes. The head of the C. is kept covered with a leather-hood till the game is discovered, when the hunting party, advancing cautiously to within 200 yards of it, the hood is taken off, and the C. stealthily creeps towards the herd, taking advantage of every bush and inequality for concealment, till, on their showing alarm, he is amongst them at a few bounds, and striking down his victim with a blow of his paw, instantly tears open its throat, and begins to suck the blood. It is then somewhat difficult to withdraw him from his prey, which is generally done by offering him meat. If unsuccessful, the C. does not attempt to follow the herd by running—nor does this animal seem to possess the power of maintaining speed through a lengthened chase—but slowly, and as if ashamed, creeps back to the hunters. The C. is not unfrequently to be seen in menageries in Britain. In a domesticated state, it is extremely fond of attention, and seems to repay kindness with affection. The skin is frequently imported from Africa.

CHEIRA'NTHUS. See WALLFLOWER.

CHEIRO'LEPIS, a genus of fossil ganoid fish, peculiar to the Devonian measures, in which eight species have been found. They had large heads, the spine continued in a rudimentary condition, and the body was completely covered with small lozenge-shaped ganoid scales. The first ray of each fin was converted into a strong spine, whose base was loosely imbedded in the flesh. The pectorals and ventrals were largely developed, while the dorsal was small, and situated behind the anal fin. The generic name, meaning 'scaly-hand,' was given in allusion to the large scaly pectorals.

CHEI'ROMANCY (Gr. *cheir*, the hand; *manteia*, prophecy), or PALMISTRY, a form of divination that professes to read the destiny of an individual by the lineaments of the hand. In the middle ages, C. occupied the attention of Cardan, Paracelsus, and other eminent men, who elaborated it into a system. It is now, however, the exclusive property of the gipsies, who still find among maid-servants sufficient credulity to make its practice profitable.

CHEI'ROMYS. See AYE-AYE.

CHEIRONE'CTES, a genus of marsupial quadrupeds, differing from the opossums chiefly in having webbed-feet and aquatic habits. *C. palmatus* or *C. Yapock*, sometimes called the Yapock Opossum, or simply the Yapock, from the South American river of that name, is common in many rivers of Brazil and Guiana. It has a soft woolly fur, the color of the upper parts of the body in gray, with large transverse patches of black, connected with a dorsal

black line, the breast and belly white; the tail is long, very thick at the base, tapering to the tip, and, except at the base, covered with scales. The cheek-pouches are very large. Crustaceans are said to form the chief food of this animal, which is interesting as a sort of marsupial representative of the otter.

CHEIRO'PTERA. See BAT.

CHEIROTHE'RIUM, the name given by Dr. Kaup to the animal which produced the peculiar hand-like impressions (hence the name, 'hand-beast') on the Triassic rocks of this country and Germany. The remains of the animal having been found, and its structure made out, this name has given place to the more characteristic one of *Labyrinthodon* (q. v.)

CHEKE, SIR JOHN, who deserves to be remembered as one of the revivers of classical literature in England during the 16th c., was born at Cambridge, June 16, 1514. Entering the university of Cambridge, he devoted himself assiduously to the study of Latin and Greek, particularly the latter language, then much neglected in England. He labored earnestly to advance the study of the Greek language and literature; and when the first professorship of Greek was founded in Cambridge by King Henry VIII., about 1540, C. was appointed professor. A new mode of pronouncing Greek which he introduced was assailed by Bishop Gardiner, the chancellor of the university; but notwithstanding, C.'s system prevailed. C. was for a time preceptor of the Prince, afterwards Edward VI., whose elevation to the throne secured him rank, wealth, and honor. But being a Protestant, he was stripped of everything when Mary came to the throne, although other lands were given to him on his returning to the Roman Catholic Church, which he did to escape burning, the only alternative offered him by Cardinal Pole. His recantation preyed on his mind so much, that he died in the course of the following year, September 1557. He left several works in Latin, and a pamphlet in English; and among his MSS. was a translation of the Gospel by Matthew, exemplifying a plan for reformingthe English language by eradicating all words save those derived from Saxon roots.

CHE-KEANG, one of the eastern and maritime provinces of China, the smallest of the eighteen. Situated in the southern portion of the great plain, it is possessed of great fertility, and produces silk, tea, and rice in abundance. Its capital, Hang-chow (q. v.), an important and populous city, is the metropolis of the silk districts. 'Above is Paradise,' say the Chinese; 'below are Soo-chow and Hang-chow.' Both these places were taken by the Tae-ping rebels in 1860. Ning-po (q. v.) is the principal port of the province. Pop., according to the Chinese census of 1812, 26,256,784. Area, 39,150 sq. m.

CHELI'CERÆ, or antennal claws, modified antennæ, which, in some of the Crustaceans, and in most of the Arachnida, serve a purpose corresponding with that of the mandibles of insects in the cutting, tearing, or bruising of food. They move, however, up and down, in a direction contrary to that of the mandibles of insects.

CHE'LIFER, a genus of *Arachnida* (q.v.) of the order *Trachearia*, and of the family to which, from their resemblance to scorpions without tails, the name *Pseudo-scorpions*, or False Scorpions, has been given, the true scorpions belonging to the order *Pulmonaria*. The genus C. consists of minute species in which this resemblance is very strong. The palpi are elongated and armed with pincers. The species live under the loose bark of trees, in chinks of old furniture, &c. One species, *C. cancroides*, about a line and a half in length, is frequently to be seen in old books, herbaria, &c., and is called the *Book Scorpion;* it is said to be useful as feeding on the insects which are most destructive to books and collections in natural history.

CHELM, or CHOLM, a town of Russian Poland, in the government of the same name, 126 miles south-east of Warsaw. It is the seat of a United Greek bishop, and has a theological seminary. The Poles were defeated here by the Russians, June 4, 1794. Pop. (1880) 5600.

CHE'LMSFORD, the county town of Essex, near the center of the county, at the confluence of the Chelmer and the Cann, 29 miles north-east of London. The industry of C. is chiefly agricultural. The town is the seat of assizes and local courts, and has a grammar-school founded by Edward VI. Pop. (1871) 9318; (1881) 10,093. On a small island in the Chelmer, there has long been a ludicrous mock-election of a member of parliament during the county elections.

CHELO'NIA (Gr. *chelone*, a tortoise), an order of Reptiles, corresponding in extent with the genus *Testudo* of Linnæus, and of which the most obvious distinguishing character is the enclosure of the whole body in a protective covering connected with the skeleton, so that only the head, the tail, and the limbs are protruded; the limbs, four in number, and all formed on the same plan, are used by some as feet for walking on dry ground, by others as paddles for swimming. The bony covering consists of two principal parts, called the *carapace* and the *plastron;* the carapace serving as a buckler for the upper parts, and the plastron for the under parts of the body. The carapace is formed from the ribs, of which there are eight pair, and from the annular parts of the dorsal vertebræ, expanded into plates, which are joined to each other by dentelated sutures, so that the whole acquires great firmness, and the dorsal vertebræ are rendered immovable. The plastron is formed of pieces which represent the sternum or breast-bone, and which are ordinarily nine in number. So compact and strong is the case of some of the tortoises, that it will bear immense pressure without injury, the arched form of the carapace adding to its strength; whilst the creature, destitute of other means of defence, and incapable of flight, finds safety, at least in its mature state, from all enemies but man, by drawing its head, tail, and limbs within the protecting case, which in some, called Box-tortoises, has certain plates movable, so as more completely to enclose them. The turtles and other aquatic chelonians cannot thus withdraw their head, tail, and limbs from danger, but the greater activity of their movements compensates for this.

The firmly fixed ribs not admitting of the movements by which respiration ordinarily takes place in other vertebrate animals, the C. gulp down air, which they inhale entirely through the nostrils; first filling the cavity of the mouth by elevating the hyoid bone, and then, by depressing it, forcing the air into the lungs, whilst the inner aperture of the nostrils is closed by the tongue. In other respects, as to aëration and circulation of blood, they resemble other reptiles.

The jaws are not furnished with teeth, but act in a manner more resembling that of the mandibles of birds, being like them hard, sharp, and horny. The food of the C. is various. Some of them, among which are all the land-tortoises, subsist exclusively on vegetable food; some of the aquatic C. pursue and eat other aquatic animals.

All the C. are strictly oviparous. Their eggs are hatched by the heat of the sun alone; they lay a great number at a time, which are covered with a calcareous shell, like those of birds. The eggs of fresh-water tortoises are in some places a lucrative article of commerce, from the quantity of oil which is obtained from them.

The C. are found only in the warmer parts of the world, but their numbers in some places are astonishingly great. None of them can properly be reckoned British, although stray turtles have, in a few instances, been found on the British shores. A few species occur in the southern parts of Europe, and some are found in the temperate parts of North America.

All the species are extremely tenacious of life; they are capable of extraordinary abstinence, and of living long after having sustained injuries which would have been immediately destructive to almost any other animal. They are also remarkable for their longevity.

The flesh of some kinds of turtle is well known as an excellent article of food. The eggs of some are equally an esteemed delicacy. Tortoise-shell (q. v.), and the oil already mentioned, are the only other valuable products of the order.

Further information concerning the C. will be found in particular articles devoted to some of the different genera and species. See also REPTILES.

Fossil Chelonia.—Foot-tracks on the Triassic sandstone of Dumfriesshire were referred by their discoverer, Dr. Duncan, to tortoises. Similar tracks have been noticed in Devonian and Oolite strata. Their vagueness, however, does not indicate with any certainty the animals which produced them. The first indisputable evidence of chelonian life occurs in the Upper Oolite, where the remains of several pond-tortoises and two or three turtles have been observed. In the newer deposits, they increase in number, so that between 70 and 80 species have been described from the Tertiary strata. In the Eocene deposits of the London Clay, at the mouth of the Thames, there occur the remains of more species of true turtles than are now known to exist in the whole world. Some of these fossil C. were of size proportioned to their colossal companions; as, for instance, the gigantic Land Tortoise (*Colossochelys*) of the Sewalik Hills, whose carapace was as much as 20 feet in length.

CHE'LSEA, a suburb of London, in Middlesex, on the left bank of the Thames, 4½ miles west south-west of St. Paul's. The river is here crossed by a fine iron bridge. Pop. (1871) 258,050; (1881) 366,516. Many of the nobility and gentry formerly resided at C., and some of its coffee-houses were much resorted to by pleasure-parties in the 17th and 18th centuries. C. has waterworks to supply London, a chain-pier, and floor-cloth factories, besides a training-college for male, and another for female teachers, and the Cremorne House Gardens, now a place of public amusement.

CHELSEA HOSPITAL is an asylum for disabled or superannuated soldiers. The building was commenced in 1609, as a Prot-

estant theological seminary, by Dr. Matthew Sutcliffe, Dean of Exeter; and James I. gave it a charter in 1610, as *King James's College*. When Sutcliffe died, in 1629, the building was less than half finished, and the students were only 15 in number. Shortly after this, the scheme was abandoned, and the building used for various purposes. It was then rebuilt, and made into an hospital for disabled soldiers by Charles II. By a warrant issued in 1684, one day's pay per year, and two in leap-years, was deducted from soldiers' pay, for supporting Chelsea Hospital. This deduction has long ceased: the hospital being maintained by parliamentary grant. The hospital has accommodation for about 600 persons besides officers. Attached to it are about 40 acres of land, used as public gardens and exercise ground. It is governed by a Board of Commissioners, comprising *ex officio* the Lord President of the Council, the First Lord of the Treasury, and the Secretaries of State; but the more immediate management is in the hands of about 120 persons, of whom 20 are military officers, 20 civil officers, and the rest subordinates.

The establishment is maintained for the *in-pensioners* of the British army, who, in the Army estimates for 1880—1881 are set down at 538. These in-pensioners, besides board, lodging, clothing, washing, medical aid, &c., receive a small sum in money, varying from 5*s*. 3*d*. per week for a color-sergeant, down to 7*d*. per week for a private soldier. They are all dressed in uniform—red, with blue facings—and are treated as a garrison, in respect to guards, sentinels, &c. There is a certain degree of choice open to the men, as to whether they will be *in* or *out* pensioners. The out-pensioners, who are more than a hundredfold as numerous as the others, receive sums of money varying from 1½*d*. to 3*s*. 10*d*. per day for life, as a reward for past services. Vacancies in the hospital are filled up once a quarter; and every person admitted must give up his out-pension before he can become an in-pensioner. The cost of the hospital for 1880—1881 was estimated at £28,289. This is exclusive of *out*-pension charges. Doubts have frequently been expressed as to the usefulness of this expenditure; it is exceptional in its character, and the arrangement to which it refers is not in much favor among the soldiery.

CHE'LTENHAM, a town, parliamentary borough, and fashionable watering-prace, in the county of Gloucester, eight miles north-east of Gloucester. It lies in a picturesque and healthy valley on the Chelt, a small stream which rises in the adjacent hills, and flows into the Severn. It is sheltered on the east and south-east by a semicircle of the Cotswolds. It owes its celebrity and rapid increase to its mineral springs, of which there are several varieties. The chief street is upwards of a mile long, right and left of which are spacious and elegant squares and crescents, and innumerable villas lately erected for the accommodation of the numerous visitors. Attached to the spas are handsome pump-rooms—with tasteful grounds, avenues, saloons—lodging-houses, and public promenades among the finest in England, besides many fine mansions in and around the town. It has ten churches and a number of dissenting chapels. Of late years, C. has become famous for its public schools, the oldest of which is its endowed grammar-school, capable of educating 300 scholars; but the largest, and now the most celebrated, is its Proprietory College, for the sons of gentlemen, a noble institution, educating, upon an average, 600 pupils. There are also a Ladies' College, a Junior Proprietary School, and a number of private scholastic establishments. There are public assembly-rooms in the town; which is also much resorted to in winter for its hunting. It has two clubs, and several weekly newspapers. Pop. (1871) 44,519; (1881) 46,844. C. returns one member to parliament, and it has been a municipal borough since 1876. It has no manufactures of any importance. C. was only a village in 1716, when the first spring was discovered. It gradually increased till 1788, when the benefit received by George III. from its waters suddenly made it a resort of fashion.

CHE'MIC is the name given to BLEACHING POWDER by those engaged in chemical works.

CHEMICAL NOMENCLA'TURE AND NOTA'TION. (During the progress of the *Encyclopædia*, the nomenclature and notation of chemistry were greatly changed.) In early times, chemical substances were named according to the fanciful theories of Alchemy (q. v.). Thus the name *flowers of sulphur* was applied to the sublimed sulphur, which grew or sprang like a flower from sulphur when heated; *spirit of salt*, to hydrochloric acid, the corrossive acid or spirit obtained from common salt; and a multitude of other names had a like fanciful origin. In 1787, Lavoisier founded the system of nomenclature which is followed still by chemists.

At first, it was intended that the names of simple as well as compound substances should be regulated by system. Hence such terms as oxygen (from *oxus*, acid, and *gennao*, to produce), *the acid-producer*, given from the notion then held that no acid was without oxygen; and hydrogen (from *hydor*, water, and *gennao*), *the water-producer*, from the supposition that hydrogen had more to do with the formation of water than any other element. The advance of chemistry, however, has so completely changed the opinion of chemists regarding the simpler bodies, that such names are now found to mislead; and thereafter, though such as had been given on this system were retained, their meaning has been discarded, and the systematized nomenclature restricted to compound substances. A remnant of the system, however, still subsists at the present time, in making the scientific names of all the metals end in *um*. In the non-metallic elements, a close analogy exists between chlorine, bromine, iodine, and fluorine; and to indicate this, the common termination *ine* has been given; and for a similar reason, carbon, silicon, and boron, end in *on*. As a general rule, however, the chemical name of an elementary substance does not convey any scientific meaning, and must be regarded as a simple mark or designation, analogous to the names of persons, which give no notion regarding their moral character or physical development. The ancient and more common metals retain their popular titles, such as gold, silver, and copper; but the more recently discovered metals have names given which end in *um*. The symbol of an element is obtained from the first letter of its Latin name, as O for oxygen; Pl for lead (Lat. *plumbum*). When the names of two or more elements commence with the same letter, a smaller letter or satellite is attached to one or more of these; such as S for sulphur, Se for selenium, and Si for silicon. For a complete table of the symbols of the elementary substances, see ATOMIC WEIGHTS.

The name of a compound substance generally indicates the elements of which it is composed. Thus the name oxide of iron indicates that the red powder (rust) is made up of oxygen and iron; the sulphuret of lead (galena), that it is composed of sulphur and lead. In all similar combinations—

Oxygen	forms	Oxides.
Chlorine	"	Chlorides.
Bromine	"	Bromides.
Iodine	"	Iodides.
Fluorine	"	Fluorides.
Nitrogen	"	Nitrides.
Carbon	"	Carbides or Carburets.
Sulphur	"	Sulphides or Sulphurets.
Selenium	"	Selenides or Seleniurets.
Phosphorus	"	Phosphides or Phosphurets.

When two elements combine with each other in more than one proportion or equivalent (see ATOMIC THEORY and ATOMIC WEIGHTS), the names of the compound bodies are contrived so as to express this. The term *prot*oxide is applied to a compound of one equivalent of oxygen with one equivalent of another element; *deut*oxide to a compound containing a larger proportion of oxygen than the protoxide; and *trit*oxide when the oxygen is still further increased. The term *bin*oxide is used when oxygen is present in the proportion of two equivalents to one equivalent of the other element; and *ter*oxide when the proportion is as three to one. A *sub*oxide contains less than one equivalent of oxygen; and a *per*-oxide is the highest oxide not possessing acid properties. The same prefixes are applied to the compounds of chlorine, sulphur, &c.

When one element combines with another to produce several compounds possessing acid properties, various terminations are employed to distinguish the compounds. Thus, oxygen combines with a number of the elements to produce with each a series of acid compounds, the more *highly* oxidized of which receive the termination *ic*, whilst those containing *less* oxygen end in *ous*. Thus, sulphur*ic* acid contains three equivalents of oxygen to one equivalent of sulphur; and sulphur*ous* acid, two equivalents of oxygen with one equivalent of sulphur. These terminations are qualified by the use of the prefixes *hypo* (under) and *hyper* (over). Thus *hypo*sulphur*ic* acid is applied to a compound containing less oxygen than the sulphur*ic* acid, and *hypo*sulphur*ous* to one with less oxygen than sulphur*ous* acid.

When acids combine with bases or metallic oxides to form salts, they produce compounds, the names of which are influenced by the terminations of the acids. Thus, sulphur*ic* acid and soda form the sulph*ate* of soda; sulphur*ous* acid and soda, the sulph*ite* of soda; and *hypo*sulphur*ous* acid and soda, the *hypo*sulph*ite* of soda. In the same manner, nitr*ic* acid with potash forms the nitr*ate* of potash, whilst nitr*ous* acid and potash produce the nitr*ite* of potash.

If a symbol be employed alone, it represents one equivalent of the element. Thus, O signifies one equivalent, or eight parts by weight, of oxygen; C, one equivalent, or six parts by weight, of carbon; H, one equivalent, or one part by weight, of hydrogen. The combination of two elements is represented by placing the symbols for those elements side by side; thus, HO signifies one equivalent of hydrogen and one equivalent of oxygen in a state of chemical combination (viz., water); and NaCl is one equivalent of sodium (Lat. *natron*) united with one equivalent of chlorine (viz., common salt).

When two or more equivalents of one element unite with one or more equivalents of another element, the number of such equivalents is signified by a small figure being placed immediately after the symbol of the element so multiplied. Thus, HO_2 represents one equivalent of hydrogen in combination with two equivalents of oxygen (peroxide of hydrogen); MnO_2 is one equivalent of manganese with two of oxygen (black oxide of manganese); Fe_2O_3 is two equivalents of iron with three equivalents of oxygen (rust); and Pb_3O_4 is three equivalents of lead with four equivalents of oxygen (red lead).

In expressing the formula of a compound substance, the symbol of the metal or its analogue is placed first in order, and is succeeded by the oxygen, chlorine, or similar element. Thus, the symbol for the chloride of mercury is always written HgCl, never ClHg. The same order is carried out in the construction of the formula of more complex substances; the metallic half is placed first. Thus, sulphate of iron—containing sulphuric acid and the oxide of iron—is always expressed as FeO,SO_3, never SO_3FeO. In other words, the symbols are written in the order in which the substances would be named in Latin.

In the construction of the formulas of complex substances, the comma (,) and *plus* sign (+) are often introduced; the former to separate the symbols of substances which are closely united together, and the latter to form a line of demarcation where the components are less intimately combined. Thus, FeO,SO_3+KO,SO_3 represents the compound of the sulphate of iron with the sulphate of potash; $KCl+PtCl_2$ is the double chloride of potassium and platinum.

Large figures placed at the left hand of a formula multiply all the symbols till a comma or plus sign appears. Thus, $3SO_3$ represents three equivalents of sulphuric acid; $3PbO,\overline{A}$ is three equivalents of oxide of lead, and one equivalent of acetic acid; and $KO,SO_3+Al_2O_3,3SO_3+24HO$ (alum) is one equivalent of the sulphate of potash, with one equivalent of the sulphate of alumina, and 24 equivalents of water. When a compound substance requires to be multiplied, it is enclosed within parentheses, and a large figure placed immediately before it; thus, $3(KO,C_2O_3)+Fe_2O_3,3C_2O_3+6HO$ represents three equivalents of oxalate of potash, one equivalent of oxalate of iron, and six equivalents of water.

In expressing the formulas of organic compounds, the symbols are written in the following order: CHNO. Thus, turpentine is C_5H_4, alcohol is $C_4H_6O_2$, and morphia is $C_{34}H_{19}NO_6$.

Arbitrary symbols are occasionally used to represent important complex substances. Cyanogen is known as Cy; the organic acids are recognized by their inititial letter with the sign (—) drawn above, as $\overline{T}$ for tartaric acid, $C_8H_4O_{10}$; $\overline{A}$ for acetic acid, $C_4H_3O_3$; and $\overline{O}$ for oxalic acid, C_2O_3; while the alkaloids are represented by their initial letter or letters with the sign (+) above; thus, $\overset{+}{S}r$ for strychnine, $C_{42}H_{22}N_2O_4$; $\overset{+}{M}o$ for morphia, $C_{34}H_{19}NO_6$; and $\overset{+}{Q}$ for quinine, $C_{40}H_{24}N_2O_2$.

Occasionally, in treatises on mineralogical chemistry, arbitrary modes of expressing the composition of minerals are resorted to, which it is not necessary here to explain. See CHEMISTRY.

CHEMICAL TOYS, which in the course of recent years have been brought prominently before the public, deserve a brief notice. 'Pharaoh's Serpents,' which have been already described in the article SULPHOCYANOGEN, are highly poisonous, and during combustion evolve dangerous vapors. *Larmes du Diable* or 'Crocodiles' Tears,' are formed of metallic sodium, burn with extreme violence if thrown into water, or even if moistened with water, or heated, and scatter particles of caustic alkali, which may inflict serious burns. 'Sunshine in Winter Evenings,' 'Fiery Swords,' &c. are formed of magnesium, and, like the preceding, may cause serious burns. Pyroxylin, which is identical with gun-cotton, is the active agent in the various toys known as 'Will-o'-the-wisp Paper,' 'Parlor Lightning,' 'Fireflies,' &c. The use of these toys in teaching rudimentary chemistry to children and young persons is quite incommensurate with their danger.

CHE'MISTRY is that branch of natural science which takes cognizance of the changes that bodies undergo when they are influenced by affinity (q. v.). Changes that do not alter the nature and properties of substances—such as the falling of a body by gravity, or its expansion by heat—belongs to Physics or Natural Philosophy. In chemical changes, again, the properties of the substances are permanently altered. Thus, when a piece of iron is left exposed to damp air, it is after a while converted into a reddish brittle substance (rust), owing to the union with it of the oxygen of the air. Chemistry, then, may be most simply defined as that branch of natural science which considers (1.) The combination of two or more substances to form a third body, with properties unlike either of its components; and (2.) The separation from a compound substance of the more simple bodies present in it: and considering that the steps of the combination and decomposition of substances can never be correctly understood without an intimate knowledge of the properties of substances, it follows that the science of C. must likewise take into notice the description of all the simplest as well as the most complex bodies.

When the science of C. is considered as a whole, including the properties of all the elements or substances, and the combinations and changes which they can under all circumstances undergo, it is distinguished by the title of *Pure Theoretical*, or *Philosophical C.* Particular departments of C., where the science is confined to the examination of special objects, receive distinctive names; as *Physical C.*, or *Chemical Physics*, which considers phenomena bordering on natural philosophy and C.; *Mineralogical C.*, which takes cognizance of the composition of minerals; *Physiological C.*, which includes the changes which food undergoes in its transit through the animal economy, and the transformations that take place in organic substances generally; *Medical C.*, which considers the composition and compounding of medicines; *Agricultural C.*, which relates to the composition of soils and manures, the ingredients in plants, and the best modes of supplying the food they require, &c. *Inorganic C.* takes cognizance of dead matter, and the changes it undergoes, whilst *Organic C.* considers the substance obtained from plants and animals.

C. ranks as one of the arts as well as one of the sciences, and the division of *Practical C.* comprehends the rules and processes which must be followed, and the mechanical means which must be resorted to, for the successful prosecution of the art. Practical C. is subdivided into *Analytical C.* (q. v.), which is occupied with the separation of simple substances from more complex—as chlorine (Cl) and sodium (Na) from the chloride of sodium or common salt (NaCl)—and to the estimation of the quantities of the several ingredients; and *Synthetical C.*, which has for its object the union of simpler bodies to form more complex—as hydrogen (H) and oxygen (O) to form water (HO). The art of *Assaying* (q. v.) is a department of analytical chemistry. *Applied C.* includes the art of manufacturing the various substances employed in commerce and in domestic life, so far as chemical processes and application are required. It is subdivided into *Technical C.*, which relates to everything connected with the arts and manufactures; and *Pharmaceutical C.*, which takes cognizance of the substances used in medicine.

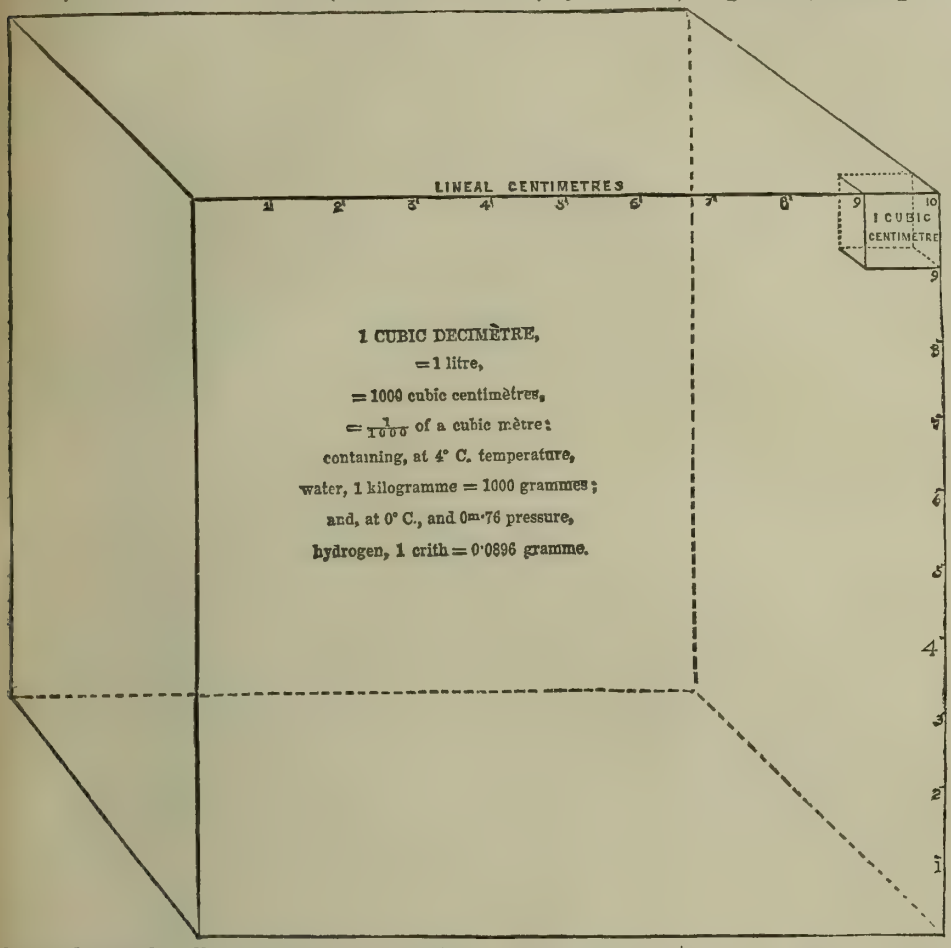
History.—The Egyptians appear to have possessed the greatest amount of chemical knowledge of all the nations of antiquity. They preserved dead bodies from decay (see MUMMY), fixed colors in silk by means of mordants, prepared many medicines and pigments, as also soap, beer, vinegar, metals and metallic alloys, common salt, vitrol, soda, sal-ammoniac, glass, enamel, tiles, and painted earthenware. The Chinese were very early acquainted with the process for dyeing, and the preparation of metallic alloys, the fabrication of nitre, sulphur, gunpowder, borax, alum, porcelain, verdigris, paper, &c. From the Egyptians, the Greeks and Romans derived what chemical knowledge they possessed; but they added little or nothing; and when the migration of the northern tribes, and overthrow of the Roman empire, took place, a stop was put for a time to the advancement of all science in Europe. The prosecution of chemical knowledge was taken up by the Arabs before the 8th c., and was carried on by them and by their European scholars the alchemists with the result described under ALCHEMY. The first germs of a real science of C. seem to appear about the end of the 17th and beginning of the 18th c., in the speculations of Becher (q. v.) and the Phlogistic theory of Stahl (q. v.). After this, C. rapidly advanced. In 1718, Geoffrey brought out the first table of *Affinities;* in 1732, Boerhaave published many original experiments on the chemical relations of heat and light; in 1724 Hales, and in 1756 Black, published researches on the air and aëriform bodies, showing that the carbonic acid evolved during fermentation, respiration, and by the action of acids on chalk, was different from atmospheric air. In 1754—1759, Margraff added to the then known earths—lime and silica—two others, alumina and magnesia; he also extracted sugar from plants. In 1770, Priestley began to announce his discoveries of oxygen, ammoniacal, hydrochloric, and sulphurous acid gases, &c. In 1773—1786, Scheele contributed chlorine, hydrofluoric, prussic, tartaric, and gallic acids; also baryta, phosphoric acid from bones, &c., and gave the first hints regarding a new doctrine of combustion. About the same time Bergman and Cavendish enlarged our knowledge of the gases. Lavoisier, between 1770 and 1794, re-organized much of the then known C., and founded a system of C. which still remains as the skeleton of the science. Barthollet, in 1787, contributed much to the doctrine of affinity, and made researches in chlorine, &c. Fourcroy and Vauquelin advanced organic C.; Klaproth gave many contributions to mineral C. Richter devoted himself to the doctrine of combining proportion, which was afterwards perfected by Dalton, as noticed under ATOMIC THEORY (q. v.). The discovery of galvanic electricity by Galvani, and its advancement by Volta, led Sir Humphry Davy and others, to important researches in the

metals and gases. Gay Lussac and Thenard advanced our knowledge regarding organic substances and the chemical relations of heat. Berzelius made laborious researches in mineral C., and gave an exactness to this department which is matter of astonishment to the chemists of the present day. He was also the author of the electro-chemical theory, which has been almost perfected by the labors of Faraday, De la Rive, Becquerel, &c. Organic C. has latterly advanced most rapidly under the researches of Liebig, Wohler, Mitscherlich, Mulder, Laurent, and others. See ATOM, ATOMIC THEORY, ATOMIC VOLUME, ATOMIC WEIGHTS, AFFINITY.

It is impossible in this article to do more than briefly describe some of the most important of the numerous changes which have been introduced into the science of chemistry within the last few years.

1. The system of measuring temperatures, lengths, weights, and volumes has been altered. The centigrade has completely superseded the Fahrenheit thermometric scale in all recent chemical works, and the French metric (which is a decimal) system has been adopted for all measurements and weights, inches and their fractions being replaced by 10ths or 100ths of a mètre, and grains by grammes. It has this advantage over all other systems, of possessing one fundamental linear unit, from which all the ramifications of linear, superficial, or solid dimensions, and of weight are derived. See MÈTRE, LITRE, GRAMME, FRANC. This unit is the 10-millionth part of a quadrant of the meridian, or of the distance from the pole to the equator. It is only to measures of weight and capacity or volume that we need here to refer. '*Multiply*,' says Dr. Hofmann in his energetic appeal in favor of the metric system, 'the cubic mètre by one million, and you have a fit measure in terms of which to express the *capacity* of the Atlantic, or its *cubical contents* of brine; *divide* the cubic mètre by one million, and you arrive at the petty volume of the gambler's ordinary die.'—*Modern Chemistry*, p. 124. This last-named volume, the millionth of a cubic mètre, taken as so much distilled water at a temperature of 4° C. (its point of greatest density), furnishes the metrical *unit of weight* called the *gramme*, which thus forms a link connecting weight with measure. Again, dividing the edge of a *mètre cube*, which is a linear mètre, into 10 parts, called *decimètres*, and cubing one of these parts, we obtain a unit of volume or capacity to which the term *litre* is applied. The various weights in use are all multiples or divisions by tens. Thus, 10 mètres form a decamètre, 100 a hectomètre, and 1000 a kilomètre; while $\frac{1}{10}$th of a mètre is called a decimètre, $\frac{1}{100}$th a centimètre, and $\frac{1}{1000}$th a millimètre, the Greek prefixes in all cases denoting multiplication, and the Latin division. The reader will do well to recollect the following rough comparisons between the chief French and English measures chiefly used in chemistry, as otherwise he can form no conception of the length, size, or weight of the substances treated of: A mètre = nearly 1·1 linear yard = 39·37 inches; a millimètre = 0·039, or nearly $\frac{1}{25}$th of an inch; a centimètre = 0·39, or nearly $\frac{2}{5}$ths of an inch; and a decimètre = 3·94, or nearly 4 inches; a gramme = 15·43 grains; and a litre = rather more than 61 cubic inches, or a pint and three-quarters.

The accompanying figure represents a cubic decimètre. Two of the edges of the front side are divided, as may be seen, into 10 linear centimètres; and the space occupied by a cubic centimètre is shown on the upper right-hand corner of the cube. Now, a cubic centimètre is employed as a unit for measures both of weight and of volume, for in the former capacity it contains, at 4° C., 1 kilogramme, or 1000 grammes of distilled water, and in the latter it loses its name of kilogramme, and receives the appellation of *litre*, which corresponds to 1000 cubic centimètres, or $\frac{1}{1000}$th of a cubic mètre. Chemists long felt the want of an appropriate *volume*, with its corresponding weight, to serve as standard units of measurement, and Professor Hofmann has selected 1 cubic decimèter=1 litre, as the most appropriate unit of volume, and the weight of this measure of pure hydrogen as the unite of weight, hydrogen being taken at 0°C. temperature, and 0m76* pressure. To this standard *weight-unit*, which = 0·0896 of a gramme, he assigns the name of *crith*, from the Greek *krithé*, a barley-corn, signifying figuratively a small weight, and the weight is now in universal acceptation amongst modern British chemists. There is no figure in chemical science more important (00·896 of a gramme) to be remembered and kept ready for calculation; for it is the standard multiple or co-efficient by means of which the weight of 1 litre of any other gas, simple or compound, is computed. 'For example, the relative volume weight of chlorine being 35·5, that of oxygen 16, and that of nitrogen 14, the actual weights of 1 litre of each of these elementary gases at 0° C. and 0m76 pressure, may be called respectively 35·5 *criths*, 16 *criths*, and 14 *criths*. So again with reference to the compound gases, the relative volume-weight of each is equal to half the weight of its product-volume. Hydrochloric acid (HCl), for example, consists of one volume of hydrogen + 1 volume of chlorine = 2 volumes, or by weight, 1 + 35·5 = 36·5 units; whence it follows that the relative value-weight of hydrochloric acid gas is $\frac{36{\cdot}5}{2}$ = 18·25 units; which last figure therefore expresses the number of *criths* which 1 litre of hydrochloric acid gas weighs at 0° C. and 0m76 pressure, 18·25 × 0·0896 = 1·6352 as the actual weight in grammes of hydrochloric acid gas. Again, as the product-volume of water-gas (H_2O),† taken at the above temperature and pressure, contains 2 volumes of hydrogen + 1 volume of oxygen, and therefore weighs 2 + 16 = 18 units, the single volume of water-gas weighs $\frac{18}{2}$ = 9 units, or substituting as before the concrete for the abstract value, 1 litre of water-gas weighs 9 *criths;* that is to say, 9 × 0·0896 gramme = 0·8064 gramme.'—*Op. cit.* p. 131. In concluding this subject we will only further remark, that when a closely approximative result suffices, the crith may be estimated at 0·09 gramme.


LINEAL CENTIMETRES
1 2 3 4 5 6 7 8 9 10
1 CUBIC CENTIMETRE
1 CUBIC DECIMÈTRE,
= 1 litre,
= 1000 cubic centimètres,
= $\frac{1}{1000}$ of a cubic mètre:
containing, at 4° C. temperature,
water, 1 kilogramme = 1000 grammes;
and, at 0° C., and 0m·76 pressure,
hydrogen, 1 crith = 0·0896 gramme.

2. Such terms as *atomic weight*, *atom*, and *molecule* are now employed in a stricter sense than formerly. Every element has been held from the time of Dalton to have a number called its atomic

* It is almost unnecessary to notice that 0m.76 signifies 0·76 of a metre, or nearly 30 inches—the ordinary atmospheric pressure at the level of the sea, and at lat. 51½°.

† The reason why the formula H_2O, instead of HO, for water is used will be presently explained.

weight. This number, according to Dr. Frankland, one of our most distinguished modern chemists, is made to represent, as far as possible : '1*st*, The smallest proportion by weight in which the element enters into or is expelled from a chemical compound—the smallest weight of hydrogen so entering or leaving a chemical compound being taken as unity. 2*d*, The weight of the element in the solid condition at any given temperature contains the same amount of heat as seven parts by weight of solid lithium at the same temperature. 3*d*, The weight of the element which, in the form of gas, or vapor, occupies, under like conditions of temperature and pressure, the same volume as one part by weight hydrogen.'—*Lectures Notes for Chemical Students*, 1866, p. 2. Recent investigations have led chemists to assign to many of the elements double the atomic weights that were previously assigned to them.* Thus, taking as formerly the atomic weight of hydrogen as the unit, the atomic weight, or as it is now often styled, the *atomic number* of oxygen is changed from 8 to 16, that of carbon from 6 to 12, that of sulphur from 16 to 32; and this doubling is by the latest writers extended to most of the elements except the halogens, nitrogen, phosphorus, boron, the metals of the alkalies, gold, and silver. The old atomic weights are still recognized as *combining* or equivalent numbers. The reason why this doubling of the number has been adopted will be presently given. The distinction between an *atom* and a *molecule* must be clearly recognized. 'We may define an *atom* of an elementary body to be the smallest proportional weight thereof which is capable of existing in *chemical combination;* and we may define the *molecule* of an elementary body to be the smallest proportional weight thereof which is capable of existing in the *free or uncombined state.*' This, which is Hofmann's definition (*Modern Chemistry*, p. 157), is now generally accepted. Thus, a molecule (or *elementary molecule*, as it is often termed) may consist either of an isolated atom, or of a group of atoms.

The bulk of a molecule, or the *molecular volume* of an element in the gaseous or vaporous state, is the same as the molecule volume of hydrogen at the same temperature and pressure, and in a large number of cases the *molecular weight* of an element is twice its atomic weight. Dr. Frankland gives the following list of the elements whose molecular volumes have as yet been determined : The molecules of mercury, cadmium and zinc contain *one* atom, and are termed *monatomic molecules;* those of hydrogen, oxygen, chlorine, bromine, iodine, fluorine, nitrogen, sulphur, and selenium contain *two* atoms, and are termed *diatomic molecules;* the molecules of oxygen, as ozone, contain three atoms, or are *triatomic;* while those of phosphorus and arsenic are *tetratomic*, and those of sulphur under certain conditions are *hexatomic*. Thus an element, as in the cases of oxygen and sulphur, may, under different conditions, have two distinct molecular weights.

3. We shall now proceed to explain the reasons why many of the atomic weights have been doubled. 'It is obvious,' says Dr. Odling, in his elaborate article on 'Atomic Weights' in Watts's *Dictionary of Chemistry*, vol. i. p. 456, 'that the atomic weights of an element and of its combinations should be selected so as to express the entire series of combinations by the simplest series of formulæ; so as best to accord with the chemical properties and metamorphoses of the bodies; so as best to illustrate their analogies with other bodies; and so as to be in relation with their physical properties, such as their specific volumes, specific heats, isomorphism, &c.' We shall endeavor to show how he applies these views to prove that, in the case of oxygen, 16 parts of that element, or the quantity thereof which unites with 2 atoms of hydrogen, is the smallest proportion of oxygen that can enter into a combination. 'We find, in the first place,' says Dr. Odling, that the quantity of oxygen contained in the great majority of definite oxidized compounds must necessarily be represented by 16, or some multiple of 16 parts. Thus, the molecules of all hydrates, double oxides, acids, oxisalts, aldehides, ketones, alcohols, oxacid-ethers, and a great number and variety of other compounds, doubtless forming together 99 per cent. of all known compounds of oxygen, cannot be represented save with 16 parts, or some multiple of 16 parts of oxygen. For example, the molecules of *hydrate of potassium*,† *benzoic aldehyde acetone*, *chloral*, *hypochlorite of sodium*,† &c., each contain 16 parts of oxygen. The molecules of *spinelle*, *brown hæmatite*, *camphor*, *benzile*, *acetate of sodium*,† *benzoic acid*, &c., each contain twice 16 parts of oxygen. The molecules of *nitric acid*, *glycerin*, *chlorate of potassium*,† *salicylic acid*, *augite*, &c., each contain three times 16 parts of oxygen.' We need not carry the quotation further, it being sufficient to remark that Dr. Odling gives similar lists of substances whose molecules each contain 4, 5, 6, 7, &c. times 16 parts of oxygen. Hence it follows that, when two bodies only differ in composition by the different proportions of oxygen which they contain, that difference amounts to 16 parts, or some multiple of 16 parts of oxygen. This is well shown in the two following series of bodies given by Odling, in the former of which the symbols are arranged according to modern views :

* The article 'Atomic Theory' in the body of the work has been rewritten in accordance with the new views.

† In these cases, one of the new forms of nomenclature is introduced.

KCl, Chloride of potassium.	C_4H_4, Ethylene.
$KClO_2$, Hypochlorite of potash.	$C_4H_4O_2$, Aldehyde.
$KClO_4$, Chlorite of potash.	$C_4H_4O_4$, Acetic acid.
$KClO_6$, Chlorate of potash.	$C_4H_4O_6$, Glycolic acid.
$KClO_8$, Perchlorate of potash.	$C_4H_4O_8$, Glyoxylic acid.

It is obvious that in both these series each term differs from the preceding one simply by O_2, or 16 parts of oxygen. Again, the quantity of oxygen which can be liberated by any reaction, and which, either alone or in the form of water, can be added to or separated from a compound, must be 16, or some multiple of 16 parts. Thus, each molecule of nitrate of soda (NaO,NO_5), when decomposed by heat, yields nitrite of soda (NaO,NO_3) and O_2 (or 16 parts of oxygen); similarly, each molecule of permanganate of potash, when decomposed by sulphuric acid, yields manganese—alum, and O_4 (or twice 16 parts of oxygen); and each molecule of chlorate of potash (KO,ClO_5) is decomposed by heat into chloride of potassium (KCl) and O_6 (or three times 16 parts of oxygen). Again, water (and consequently its main constituent, oxygen) is always eliminated in double or some higher even atoms. Thus, formic acid ($C_2H_2O_4$) yields carbonic oxide (C_2O_2) and two atoms of water (H_2O_2); alcohol ($C_4H_6O_2$) yields olefiant gas (C_4H_4) and two atoms of water (H_2O_2); oxalate of ammonia (NH_3,C_2HO_4) yields cyanogen (C_2N) and four atoms of water (H_4O_4); and innumerable additional examples might be given. On these grounds (and many additional ones might be adduced if space permitted) it becomes obvious that if the vast majority of oxidized bodies were correctly formulated, they would be represented more simply by the formulæ in which O = 16 than by formulæ in which O = 8. Reasons of a similar nature have led to the duplication of the atomic weight of carbon, sulphur, and many of the other elements. There must obviously be some means of distinguishing when O indicates 8 or 16 parts of oxygen, C indicates 6 or 12 parts of carbon, &c. Various modes of distinction have been adopted by different chemists. In Watts's *Dictionary of Chemistry* (published between 1863 and 1868), the new atomic weights are represented by the same symbols which have hitherto been adopted for the old weights; while the latter (when they are occasionally introduced) are printed in italic capitals; thus, water is represented by H_2O in the new and by *HO* in the old system, acetic by $C_2H_4O_2$ in the new and by $C_4H_4O_4$ in the old system, &c. A more common means of indicating when the value of the symbol of an element is doubled in value is by drawing a horizontal bar through it, a notation due to Berzelius; thus, $\bar{C},\bar{O},\bar{S}$, represent respectively an atom of carbon, of oxygen, and of sulphur in the new system. This system is useful in forming, as it were, a bridge to facilitate the passage from the old to the new system, and will gradually disappear when all chemists recognize the doubled atomic weights. Naquet, Miller (in the 3d edition of his *Chemistry*, 1864, and others, adopt this *barred* system, and the latter frequently gives the formulæ pertaining to both systems; for example, $FeO,SO_3.HO,6HO$, or $\bar{Fe}\bar{S}\bar{O}_4.H_2\bar{O},6H\bar{2}\bar{O}$, represents the composition of the crystallized sulphate of protoxide of iron often described as protosulphate of iron.—*Inorganic Chemistry*, 3d ed., p. 6. Some writers, as Frankland, in his *Lecture Notes for Chemical Students*, 1866, following the plan of Watts and the contributors to his Dictionary, unreservedly adopt the doubled atomic weights, and represent them by the old formulæ; thus, O, C, and S represent in these works precisely double the weight of oxygen, carbon, and sulphur that these capitals represent in the 1st and 2d editions of Miller's *Chemistry*, Fownes's *Manual of Chemistry*, and other standard works published a few years ago. It is now customary for the writers of chemical papers who object to the barred symbols as being unseemly, to insert at the commencement C = 6, O = 8, or C = 12, O = 16, in order that the reader may be able to recognize which system is adopted.

Chemical Nomenclature is still in an unsettled state. The chemists of all countries are, with one notable exception, agreed as to the names and symbols which should represent the different elements. The French chemists persist in designating nitrogen by the name of *azote*, and of using Az instead of N for its symbol; and in Italy the term *azoto* is still employed, but as it is often coupled with the symbol N, it will probably soon be exchanged for the more general term nitrogen. When the elementary bodies unite together, they form a *binary compound*. The nomenclature of the binary compounds is in a transitional state. The compounds of sulphur with metals used to form *sulphurets*, latterly they have been termed *sulphides*, and now they are denominated after a third fashion; sulphuret of potassium (for example), after having been for some years sulphide of potassium, now being termed *potassic sulphide*. In order to obtain uniformity, the following rule is adopted by the representatives of the modern school. The names of binary compounds are formed from those of their constituents, the English or Latin name of the positive constituent with the terminal *ic* preceding that of the negative constituent, which is made to end in *ide*. Thus: potassium and sulphur form potassic sulphide; sodium and oxygen form sodic oxide (formerly soda or oxide

of sodium); silver and chlorine form argentic chloride (formerly chloride of silver); lead and iodide form plumbic iodide (formerly iodide of lead); calcium and chlorine form calcic chloride (formerly chloride of calcium), &c. When the same elements form two compounds, the one which contains the smallest proportion of the negative element is distinguished by changing the terminal syllable of the name of its positive constituent into *ous*, while the terminal *ic* is retained or the compound containing the larger proportion of the negative element. Thus, 1 atom of iron and 1 atom of oxygen form *Ferrous oxide* (the old protoxide of iron); 2 atoms of iron and 3 atoms of oxygen form *Ferric oxide* (the old peroxide of iron). Sometimes the same elements form more than two compounds with one another, and then the prefixes *hypo* and *per* are employed. When a binary compound contains oxygen, and becomes an acid when made to unite with water, or becomes a salt when united to a base, it is termed an *Anhydride* (q. v.) or *anhydrous acid*. Thus 1 atom of carbon and 2 atoms of oxygen form *carbonic anhydride*, formerly known as carbonic acid gas; 1 atom of sulphur and 3 atoms of oxygen form *sulphuric anhydride*, &c. In a considerable number of cases, the trivial or common name has not been displaced by the new systematic name; thus water ammonia, hydrochloric acid, phosphuretted hydrogen, sulphuretted hydrogen, &c., are not as yet replaced by hydric oxide, hydric nitride, hydric chloride, hydric phosphide, hydric sulphide, &c.; and soda and potash are still preferred by some chemists to sodic and potassic hydrates.

The term *acid* was originally applied only to substances which, like vinegar possessed an acid taste; it is now made to include a large number of compounds which do not possess this property. The most general definition of acids is that of Gerhardt, which is adopted in Watts's *Dictionary of Chemistry*—namely, that 'acids are salts of hydrogen.' A more intelligible definition to ordinary readers is that which is adopted by Frankland, in which an acid is described 'as a compound containing one or more atoms of hydrogen, which become displaced by a metal when the latter is presented to the compound in the form of a hydrate.' Thus, using the new nomenclature and atomic weights, nitric acid and sodic hydrate yield sodic nitrate and water—

	Nitric Acid.		Sodic Hydrate.		Sodic Nitrate.		Water.
or,	NO_3H	+	NaOH	=	NO_3Na	+	H_2O,

in which reaction the hydrogen of the nitric acid is displaced by the sodium of the sodic hydrate (or soda), and as only *one* atom of hydrogen is displaced, nitric acid is said to be *monobasic*. When an acid admits of the displacement of two atoms of hydrogen, it is termed *dibasic*—as tartaric, oxalic, and, according to recent views, sulphuric acid; and when three atoms can be replaced—as in the case of common phosphoric acid, H_3PO_4, in which H_3 may be displaced by K_3 or Ag_3, the acid is termed *tribasic*. The nomenclature of the compounds of acids with bases is still unfixed. The names of the alkali-metals (potassium, sodium, and lithium) and alkaline-earth metals (barium, calcium, &c.) are now commonly substituted for those of their oxides in the nomenclature of the corresponding oxygen salts—as, for example, *carbonate of sodium* and *sulphate of caicium* for carbonate of soda and sulphate of lime. The names of these bodies are thus brought into uniformity with those of the salts of iron, copper, &c. In Watts's *Dictionary* and Frankland's *Lecture Notes* such compounds are denominated *sodic carbonate, calcic sulphate, sodic nitrate*, &c.; and these terms will doubtless soon be generally adopted for the metallic salts of the oxygen-acids generally. The nomenclature of complex inorganic bodies is founded, for the most part, on the theory of types, the names of particular compounds being obtained from the name of the type by prefixing to it adjectives which express the nature of the element by which the hydrogen of the type is replaced and the number of atoms of it contained in one molecule of the compound. By way of illustration, we give a simple and a complicated example:

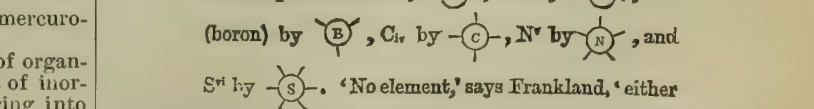
$Bi\begin{cases}Cl\\O\end{cases}$ = bismuthic oxychloride, while $\begin{matrix}Hg_4\\H_4\end{matrix}\begin{cases}Cl_2\\O_2\\N_2\end{cases}$ = tetramercuro-tetrahydric dioxi-dichloro-dinitride. The nomenclature of organic compounds is founded on the same principles as that of inorganic bodies; but our limited space prevents our entering into this subject.

Chemical Notation has been considerably altered by certain members of the recent chemical school; but on the whole, the modifications, since the time when the system of Berzelius was introduced into England in the third edition of Turner's *Elements of Chemistry*, are not numerous. The most important are the introduction of 'general formulæ' by Gerhardt, in which letters of variable value are used as coefficients instead of numbers, and Odling's method of denoting the atomicity of polyatomic elements and radicals by means of accents placed above the symbols, which are then called dashed symbols. See TRIADS. Chemists are still at variance as to whether, when two or more atoms are represented in a compound, the figure indicating the repetition should be above or below the symbol; whether, for example, water should be represented by H^2O or H_2O, and alcohol by C^2H^6O or C_2H_6O. The *ordinary* or *dualistic* system, according to which the elements combine in couples to form compounds, which similarly unite by twos, led to the division of salts into two classes—viz., into salts composed of an oxygen acid and an oxygen base, which were hence called oxygen salts, as NaO,SO_3, and KO,NO_5, which in the old notation represent sulphate of soda and nitrate of potash; and binary or haloid salts, of which chloride of sodium, NaCl, is the type, which are formed by the union of the radical in hydrogen acids with some metal. Davy considered that the former class might be made similar to the latter by regarding them as composed of a metal and a compound radical having the same electro-negative chemical relations as the radicals in the hydrogen acids. According to this view, a radical, SO_4, not yet isolated, combines with hydrogen to form sulphuric acid, and with a metal to form sulphates, sulphuric acid being represented by H,SO_4, and sulphate of lime by Ca,SO_4. In like manner, nitric acid and the nitrates were supposed to contain a radical, NO_5. Against this view Gerhardt urges that we know nothing of the proximate constitution, but are merely acquainted with the ultimate composition of compounds. Hence we now no longer use a formula for sulphuric acid indicating its supposed constitution (HO,SO_3) but regarding it as a dibasic acid, express it, either as Miller does, by H_2SO_4, or by H_2SO_4 (where S = 32 and O = 16), or by $\begin{matrix}SO_2\\H_2\end{matrix}\Big\}O_2$, if we adopt the type-notation; and we must not omit that Frankland, who may be regarded as the leading representative of the English school of modern chemistry, represents it by the formula SO_2Ho_2, when Ho is the abbreviated formula for HO, and represents a compound radical, to which he gives the name of hydroxyle, and which is commonly known as binoxide of hydrogen, being expressed, according to the old system, by HO_2. The following examples may enable the reader to pass from one system to another:

	Old System.	Barred System.
Sulphate of potassium	KO,SO_3	$K_2\overline{SO}_4$
Sulphate of zinc	$ZnO,SO_3.7HO$	$\overline{Zn}\overline{SO}_4.7H_2O$
Nitric acid	HO,NO_5	$HN\overline{O}_3$
Nitrate of sodium	NaO,NO_5	$NaN\overline{O}_3$

	New Atomic Weights.	Frankland's Notation.
Sulphate of potassium	K_2SO_4	$SO_2Ko.$
Sulphate of zinc	$ZnSO_4.7H_2O$	$SOHo_2Zno''.6OH.$
Nitric acid	HNO_3	$NO_2Ho.$
Nitrate of sodium	$NaNO_3$	$NO_2Nao.$

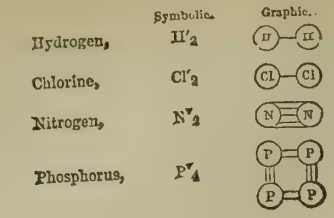
The Ko, Zno", and Nao in Frankland's notation represent compound radicals, to which he has given the names potassoxyl, zincoxyl, and sodoxyl, and which are represented in the ordinary new notation by KO,ZnO_2 and NaO. These new names will probably soon get into general use in consequence of Frankland's great influence as the teacher of chemistry in the government School of Mines, and at the Royal institution.* We must refer to the article TRIADS for a description of what is meant by *atomicity*, or, as Hofmann terms it, *quantivalence*, and the reader will do well to study Lectures 10 and 11 of his *Modern Chemistry*. In the article just mentioned, we have stated that the degree of atomicity of an element is indicated by the number of dashes with which it is furnished. In the so-called *Graphic Notation*, which, in the hands of Kekulé, Crum Brown, Naquet, Frankland, and others, has proved a most valuable aid in explanation of the constitution of chemical compounds, the degree of atomicity of an atem is



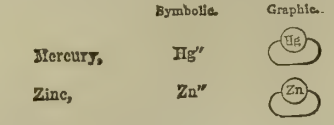
alone or in combination, can exist with any of its bonds disconnected; hence the molecules of all elements with an odd number of bonds are generally diatomic, and always polyatomic—i. e.,

* Another peculiarity of Frankland's notation is the introduction of thick letters (Egyptian capitals). His formulæ are so written as to denote that the element represented by the first symbol of a formula, and printed in this type, is directly united by points of attachment or *bonds* with the other elements or compound radicals following the first symbol. Thus, to use his own illustration and notation, the formula $SO2Ho2$ (sulphuric acid) signifies that the hexad atom of sulphur is combined with the four bonds of the two atoms of oxygen, and also with the two bonds of the two atoms of hydroxyl. (By hexad we mean an atom with six bonds, one of which is subsequently figured in the text.)

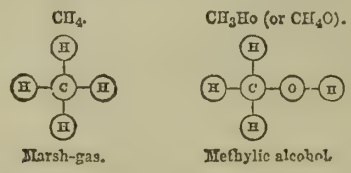
they contain two or more atoms of the element united together. Thus:



An element with an even number of bonds can exist as a monatomic molecule, its own bonds satisfying each other. Thus:



This graphic notation is most useful in fixing upon the mind the true meaning of symbolic formulæ, and in elucidating the internal arrangement of the very complex molecules which often occur in both mineral and organic compounds. It also affords an easy means of showing the causes of isomerism in organic bodies. The following example will suffice to illustrate our meaning. The simplest of the alcohol family, methylic alcohol, is derived from marsh-gas by the substitution of one atom of Frankland's hydroxyl, Ho or HO (O = 16), for one of hydrogen.



The Classification of Organic Compounds has, during the last few years, been much improved. Until a comparatively few years ago, organic compounds were arranged, according to the most obvious properties, into acids, bases, fatty bodies, &c. Now the great majority of these compounds are arranged in series, of which each group differs from the preceding one by a fixed additional number of certain atoms. Thus (see Armstrong's *Organic Chemistry*, pp. 143, 144) twelve alcohols are represented by the general formula $C_nH_{2n+2}O$ (new notation), the first being represented by CH_4O, and the others differing from it by an additional number of multiples of CH_2. Bodies of analogous properties thus united are termed *homologous*. Again, every compound in a homologous series yields other compounds differing in composition from that from which they are derived, but yet bearing a different relation to it. Thus, alcohol yields ether, aldehyde, and acetic acid, and these so-called *heterologous* bodies form collateral series.

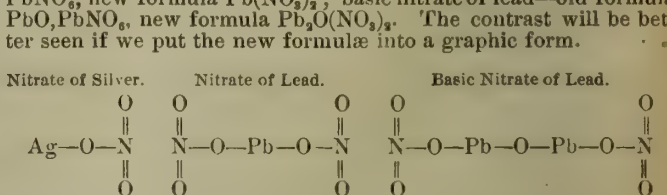
This mode of classification is daily extending. It includes *the organic radicals*, such as methyl, ethyl, allyl, phenyl, cyanogen, &c.; the *hydrides of the compound radicals*, such as methylic hydride or marsh-gas, benzol, cyanic hydride or hydrocyanic acid, &c.; the *alcohols*, which form one of the most important of the families of organic compounds; the *aldehydes* and *ethers*, both of which are specially described; the *acids*, of which the monobasic acids alone include six series, amongst which are the acetic or fatty series, represented by the general formula $C_nH_{2n}O_2$, and containing 19 or 20 distinct acids, the oleic series, the lactic series, the benzoic or aromatic series, &c.—while the dibasic acids may be divided into four series, in which occur the succinic series, containing nine acids, most of which present several modifications, and the tartaric series; the *Anhydrides* (q. v.), of which those belonging to the acetic acid group may be arranged in series; the *ketones* or *acetones*; the compounds of nitrogen containing the *amines*, *amides*, *imides*, &c.; and, in short, excepting the natural alkaloids, the protein-compounds, and their derivatives, the uric acid group, pigments, &c., there are comparatively few organic compounds which have not found a definite place in a series.

In this article we have strictly confined our remarks to the subjects, bearing on general, and for the most part on theoretical chemistry. We may, however, allude, in conclusion, to two subjects, which have undergone a great development during the last few years—viz., *Volumetric Analysis* and the *Synthesis of Organic Bodies*, both of which are discussed in special articles.

The general tenor of this article shows that chemistry is at present in altogether a transitional state. As Professor Anderson of Glasgow observes in his address to the Chemical Section of the British Association in September 1867, the atomic theory, which, at the commencement of the present century, sufficed to explain all the facts of chemistry that were then known, is now quite inadequate to that end. At that time, chemists were acquainted with comparatively few compounds, and in these, oxygen was of such preponderating importance, that the science might have been almost termed 'the chemistry of oxygen.' Oxygen is now deposed from its high place, and is supplanted by carbon to such a degree, that one of the first living chemists has actually proposed for organic chemistry the name of 'the science of the carbon-compounds.' Facts gradually accumulated in the course of time which did not admit of explanation on the Daltonian theory; and as their number increased, such terms as catalysis, allotropy, &c., were invented, under which such facts were grouped together as were supposed to depend on similar causes. Such grouping may have certain temporary advantages, provided it is understood that, to use Professor Anderson's words, it is 'the grouping of ignorance.'

It is indeed obvious that a true theory of chemistry must be a part of a general theory of dynamics, and that until we obtain some more distinct idea of how the atoms are grouped in the molecules of substances (see ATOMIC THEORY) than we at present possess, the link connecting theoretical chemistry and theoretical dynamics is wanting. The doctrine of *Atomicity* evidently points to some general truth; it has been of great use in grouping together numerous facts, and in leading to investigations which have resulted in the discovery of many new facts and new generalizations, but we now want an explanation of this doctrine, and this chemistry does not appear to be able to give us. The want of a theoretical explanation does not, however, render a generalization valueless, and much progress has been made of late years in ascertaining the 'chemical structure' of substances—that is, in obtaining graphic formulæ, which consistently represent all the reactions by which the substances are formed or transformed. Before discussing the subject of chemical structure, it will be well to consider somewhat more fully than has been done above, the reasons why certain numbers have been selected for the atomic weights of the elements rather than any multiples or submultiples of them (see ATOMIC WEIGHTS). It was pointed out by Dulong and Petit that a close relation exists between the specific heat of a solid elementary substance and its atomic weight. Thus, if we take the old system of *Atomic Weights* (q. v.), and multiply the specific heat of each solid element by its atomic weight, we find that the elements form three groups. In the first, the product of specific heat into atomic weight, or *atomic heat*, varies from 6 to 6·6. In the second it varies from 3 to 3·3. In the third group, containing the allied elements, carbon, boron, and silicon, no regularity was traced. By far the greater number of solid elements belong to the first or second group. Now it is plain that the atomic heat of a member of the first group is approximately double that of a member of the second group. But as the atomic weights are to a certain extent arbitrary, we can make the atomic heats of the two groups agree by doubling the atomic weights of the members of the second group. This was first proposed by the eminent Italian chemist, Cannizzaro, and has now been accepted by most chemists. These new atomic weights not only greatly simplify Dulong and Petit's law, but are also in harmony with many other facts, most of which were observed after the change had been made. Thus the formulæ of corrosive sublimate, bichloride of tin, and zinc methyl are, according to the old system, HgCl; $SnCl_2$; and ZnC_2H_3 and H = 1. According to the new system they are $HgCl_2$; $SnCl_4$; and ZnC_2H_6.

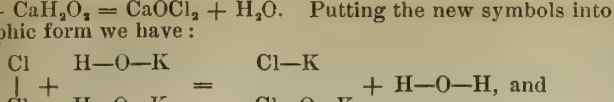
It will be at once observed that the second set of formulæ represent just twice the quantity represented by the first; now the second formulæ express the *molecular weights* of the substances according to Avogadro's law (see ATOMIC THEORY). Further, if we adopt the old atomic weights, we see no reason why oxide of lead should readily form basic salts, while oxide of silver does not. This peculiarity is to some extent explained by the new atomic weights; thus we have nitrate of silver—old formula $AgNO_6$, new formula $AgNO_3$; nitrate of lead—old formula $PbNO_6$, new formula $Pb(NO_3)_2$; basic nitrate of lead—old formula $PbO,PbNO_6$, new formula $Pb_2O(NO_3)_2$. The contrast will be better seen if we put the new formulæ into a graphic form.

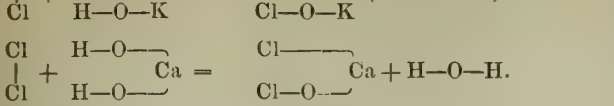


We at once see the connection between the dyad character of lead (—Pb—), and the occurrence of basic salts.

Similarly we know that if we pass a current of chlorine gas into a cold solution of caustic potash, we obtain a *mixture* of chloride of potassium and hypochlorite of potash—$Cl_2 + 2KHO = KCl + KClO + H_2O$. But that if, instead of caustic potash, we take slaked lime, we obtain, not a *mixture*, but a single substance:

$Cl_2 + CaH_2O_2 = CaOCl_2 + H_2O$. Putting the new symbols into a graphic form we have:





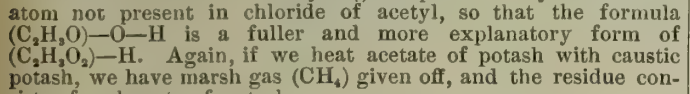
Where we see why we have a mixture in the first case, and a single substance in the second, the reason being that calcium being a dyad, one atom of it represents two atoms of potassium. Many other examples might be given, but these may suffice as an indication of the reasons which have induced chemists to prefer the atomic weights given in the second column in the table in the article ATOMIC WEIGHTS.

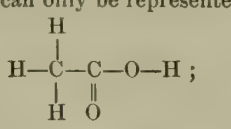
Assuming, then, these atomic weights, let us return to the subject of *Chemical Structure*. This may be defined in various ways, but most conveniently as the indication by a graphic formula, or something equivalent to it, of all the chemical changes by which the substance can be formed or decomposed. This will best be illustrated by means of a few examples, and we shall select these from among organic compounds—that is, compounds of carbon, because the structure of these compounds has been most fully investigated.

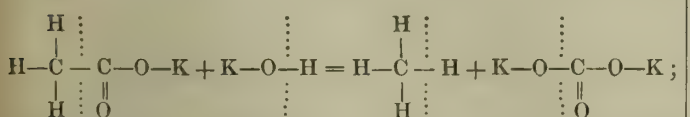
Acetic acid has (on the new system, which will be exclusively used in the remainder of this article) the formula $C_2H_4O_2$. If it is treated with caustic potash, it yields acetate of potash according to the equation $C_2H_4O_2 + KHO = C_2H_3KO_2 + H_2O$. Here one atom of hydrogen has been replaced by one atom of potassium, and we find that further treatment with caustic potash does not cause any further replacement of hydrogen by potassium. We may therefore write the formula of acetic acid thus: $H—(C_2H_3O_2)$, and this formula indicates the replaceability of one atom of hydrogen by metal, and explains (as far as such formulæ can *explain* anything) the occurrence of such compounds as acetate of lead $(C_2H_3O_2)—Pb—(C_2H_3O_2)$, and all the other acetates. The question now remains, what is the structure of the group $(C_2H_3O_2)$, which is united in acetic acid to hydrogen, and in the acetates to metal?

To answer it we must examine some other reactions of acetic acid. When treated with pentachloride of phosphorus, it loses an atom of oxygen, the place of which is taken by two atoms of chlorine—the pentachloride of phosphorus taking the oxygen in exchange for the chlorine; but instead of obtaining a compound $(C_2H_4OCl_2)$, we find that the result is expressed by the equation: $C_2H_4O_2 + PCl_5 = C_2H_3OCl + HCl + POCl_3$. We thence conclude that in acetic acid the atom of dyad oxygen removed in the action given above was united to an atom of hydrogen, and to the group (C_2H_3O), and represent the change thus:

the replacement of the dyad oxygen by two atoms of the monad chlorine necessitating the falling asunder of the compound. The reactions of chloride of acetyl (C_2H_3OCl) lead us to the further conclusion that the atom of hydrogen replaceable by metal is the atom not present in chloride of acetyl, so that the formula $(C_2H_3O)—O—H$ is a fuller and more explanatory form of $(C_2H_3O_2)—H$. Again, if we heat acetate of potash with caustic potash, we have marsh gas (CH_4) given off, and the residue consists of carbonate of potash

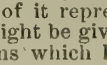


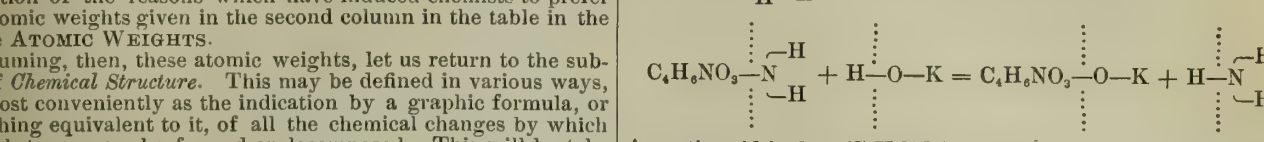
and this decomposition can only be represented if we give acetic acid the formula  ; when we have

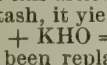


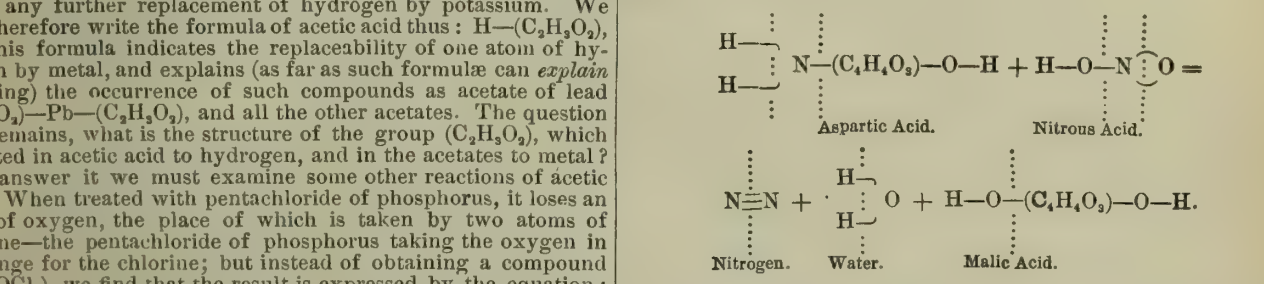
the dotted lines separating in the diagram the symbols of the parts of the molecules which change places.

We have considered only a few of the reactions of acetic acid, but the formula just given is equally consistent with all the others. It is therefore said to exhibit the *structure* of acetic acid. This word 'structure' is perhaps a little misleading—we must recollect the precise sense in which it is used, as a concise representation of many reactions. It is conceivable that it may have some relation to the actual relative position of the atoms in a molecule of acetic acid, but we have not as yet any means of ascertaining whether this is so or not.

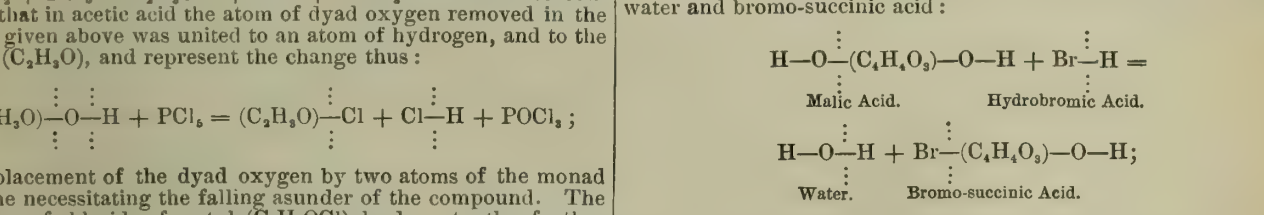
We may illustrate the meaning of chemical structure further by a somewhat more complex case. Asparagine, a colorless crystalline substance extracted from asparagus, and also from the blanched shoots of other plants, has the composition expressed by the formula $C_4H_8N_2O_3$. When treated with caustic potash it yields ammonia and a body called aspartate of potash—the potash salt of aspartic acid. The change is obviously an exchange of  and may be thus indicated:



Aspartic acid is then $(C_4H_6NO_3)—O—H$, and we have to study its decompositions in order to discover the structure of the group $(C_4H_4NO_3)$. Now, aspartic acid is attacked by nitrous acid, and the products are nitrogen gas, water, and malic acid, thus: $C_4H_7NO_4 + HNO_2 = C_4H_6O_5 + N_2 + H_2O$. Here we have the triad nitrogen of the aspartic acid replaced by the dyad O, and the monad group —O—H of the nitrous acid, and this leads to the formula  for aspartic acid. The equation above thus becomes:

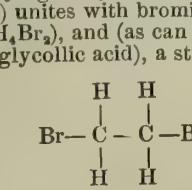


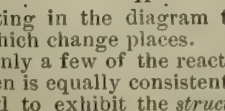
When malic acid is treated with hydrobromic acid, we obtain water and bromo-succinic acid:



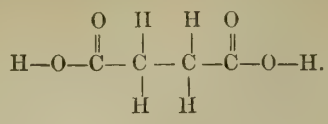
and we can prove that the group H—O—, here replaced by Br, is that one which in aspartic acid is represented by . Bromo-succinic acid, when treated with nascent hydrogen, has its bromine removed and hydrogen put in its place, thus yielding succinic acid $(C_4H_6O_4)$. We shall most easily arrive at the structure of succinic acid by studying its synthesis.

Olefiant gas (C_2H_4) unites with bromine to form a liquid having the composition $(C_2H_4Br_2)$, and (as can easily be proved by its relation to glycol and glycollic acid), a structure represented thus:

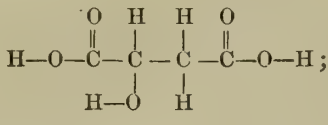


This bromide of ethylene, as it is called, when treated with cyanide of potassium, gives bromide of potassium, and a substance which may be called cyanide of ethylene—bromine and cyanogen changing places $(C_2H_4Br_2) + 2KCN = C_2H_4(CN)_2 + 2KBr$. As cyanide of potassium is $K—C\equiv N$, it follows that cyanide of ethylene is  ; when this product is boiled with caustic potash and water ammonia, is given off, and succinate of

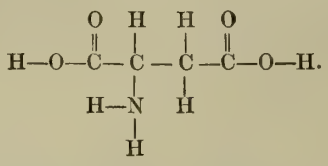
potash remains in solution. Here we have nitrogen uniting with hydrogen, while the place of the nitrogen is taken by that with which the hydrogen was united—viz., the dyad O, and the monad —O—K. We thus obtain the structural formula of succinic acid.



Here are obviously two hydrogen atoms having a different function from the rest—those, namely, which are replaceable by metal, and which, in the above formula, are represented as directly united to oxygen. That it is not one of these that is replaced by bromine follows from the fact that bromo-succinic acid has also two atoms of hydrogen replaceable by metals in exactly the same way as in succinic acid itself, and as the other four atoms of hydrogen do not differ in position in the diagram from one another, we have only one possible formula for bromo-succinic acid; and therefore, for malic acid:



and for aspartic acid:



We have, however, two possible structural formulæ for asparagine, as it is plain that the two groups H—O— in aspartic acid are not similar to one another, and we have not as yet any means of deciding between them. The reader will see that they are different, and from the way in which structure has been proved, will also see that reactions may be obtained which would decide between the two.

It is not necessary to give any further examples of chemical structure—the two we have treated in some detail may suffice to show how the principle is applied, and what is the nature of the evidence in favor of particular structural formulæ.

CHE'MISTS AND DRU'GGISTS, LAWS RELATING TO. Under the head APOTHECARY (q. v.) will be found the distinction between that profession and the kindred one of Pharmaceutical Chemist. The Pharmaceutical Society of Great Britain, founded in 1841 for raising the standard of efficiency in the practice of dispensing and compounding drugs, was incorporated by royal charter in 1843. An act was passed in 1852 defining the qualifications of pharmaceutical chemists, and the society's powers for examining and granting qualifying certificates. The Pharmacy Act of 1868, referred to below, still further defines its duties and privileges. As in the case of medical practitioners, there is no penalty for mere practice; but the assumption of the specific title named in the act is punishable by fine. The legislature presumes that certificates obtained by examination are evidence of efficient education, but that the freedom of engaging in business ought not to be interfered with; and that the right of the subject to consult whom he chooses, or to buy drugs from whom he will, must be respected. This seems a sound view. Serious mistakes, such as the substitution of one medicine for another, to the injury of the purchaser, are punishable by law, both in the unqualified and in the case of those qualified under the act. The public also derives great and increasing security in this and in all other departments of human enterprise, from the improving effect of free competition. The operation of the act was simply that of indicating to the public, by a name or title, a class of druggist possessing a higher education. In 1868, it was deemed necessary, owing to the frequent evils arising from the facility of obtaining poisons, to enact that no person should sell, or keep open shop for selling poisons, or assume or use the title of chemist or druggist or pharmacist, unless he be registered under the Act 31 and 32 Vict. c. 121, amended by 32 and 33 Vict. c. 117, and conform to the regulations as to sale of poisons. All persons who in 1868, carried on the business of chemists and druggists, and their apprentices and assistants, were entitled to be registered. The register of chemists and druggists under this act now contains the names of all qualified persons in Great Britain.

CHE'MITYPE is the name given by its inventor, C. Pül, a Dane, to the art of producing on a metal plate, by a chemical process, an engraving in relief. The outline of the process is this: On a polished plate of zinc an etching or an engraving is made in the usual way. The depressions of this design are then filled up with a melted metal—the nature of which is not revealed—and this super-added metal is then reduced to the exact level of the zinc, so that the design now appears as if inlaid.

An acid is next applied to the surface, which attacks the zinc, without affecting the inlaid metal; and thus there results an exact copy in relief of the original intaglio engraving. In competition with wood-cuts, relief-lithographs, and copperplates, C. does not seem as yet to evince any great superiority; it fails especially in that character of strength and softness which wood-cuts express so well. The prints produced by this art look more like engravings than like wood-cuts. They have this advantage, however, that they give an exact copy of the original design made by the artists on the metal; whereas in wood-cutting the drawing made on the block may be impaired in its effect by the engraver. C. is particularly adapted for producing maps by the common printing-press. Pül practised his invention at first on a small scale in Copenhagen, from 1843 to 1846, and then extensively in Leipsic. In 1850, he went to Vienna, where he was employed in the imperial printing-establishment.

CHE'MNITZ, a town of Saxony, is situated at the base of the Erzgebirge, and at the confluence of the river Chemnitz with three other rivers, in lat. 50° 50′ N., and long. 17° 55′ E. It is the principal manufacturing town of Saxony—its industry consisting in weaving cottons, woollens, and silks, and in printing calicoes, chiefly for German consumption. Cotton stockings are a most extensive manufacture, and rival the British in quality and cheapness. The American markets are chiefly supplied from this place. It has several extensive machine-factories, producing machinery for flax and wool spinning, weaving, and mining industry. Amongst the numerous educational institutes of C. are schools of weaving, mining, and tailoring. For four centuries, C. was a free imperial city. Traces of its antiquity are seen in many of the buildings. Pop. (1880) 95,123.

CHEMNITZ, MARTIN, next to Luther and Melancthon the most distinguished German Protestant theologian of the 16th c., was born at Treuenbrietzen, in Brandenburg, 9th November 1522; studied at Frankfurt and Wittenberg; and, in 1548, became rector of the cathedral-school of Königsberg. About 1550, he began to devote himself seriously to theology, and in 1553 went back to Wittenberg, where he delivered prelections on Melancthon's *Loci Communes*, from which sprang his own *Loci Theologici*, which, for method and learning, excels all similar books of the same age. In 1554, he was made a preacher in Brunswick, where he wrote his *Repetitio Sanæ Doctrinæ de Vera Presentia Corporis et Sanguinis Domini in Cœna Sacra* (Leip. 1561), in which he defended Luther's view of the Lord's Supper against that of the Swiss reformers; the *Theologiæ Jesuitorum Præcipua Capita* (Leip. 1562); and the *Examen Concilii Tridentini* (Leip. 1565), a work in which he has argued with remarkable acuteness and learning against the dogmas of the Church of Rome. His *Corpus Doctrinæ Prutenicæ* (1566), written in conjunction with Mörlin, became a standard work of divinity among the Prusian Protestants. But his greatest ecclesiastical achievements was inducing the Saxon and Swabian churches to adopt as their confession of faith the *Concordienformel*, and thus extending and consolidating the creed of Luther. He died at Brunswick, 8th April 1586.

CHEMNI'TZIA, a genus of gasteropodous-mollusca. It has a slender, elongated, many-whorled shell; the whorls striated; a simple semi-oval aperture; and a horny operculum. There are many recent species scattered all over the world. The discriminating characters of the fossil species being taken from the form of the shell, it is more than probable that the remains of very different animals are classed under this generic name. No less than 180 species have been described, occurring throughout all the divisions of the fossiliferous strata from the Lower Silurian upwards.

CHENA'B, the largest, according to general opinion, of the five rivers which give name to the Punjab. Like most of the principal streams of India, it rises to the north of the Himalayas, making its way through the Ritanka Pass at the height of 13,000 feet above the sea, and having its source about lat. 32° 48′ N., and long. 77° 27′ E. After a descent of 300 miles, the C. reaches the level country. At the close of a course of the same length, it receives, on its right, the Jhelum in lat. 31° 12′ N., and long. 72° 12′ E.; 50 miles further down, it is joined, on its left, by the Ravee; and 110 miles lower, it absorbs, through the Ghara on its left, the mingled waters of the Beas and the Sutlej. Lastly, at a distance of 60 miles, the accumulated floods, under the designation of Punjnud, lose themselves in the Indus in lat. 28° 55′ N., and long. 70° 28′ E.—being still 470 miles from the ocean.

CHENOPODIA'CEÆ, or SALSOLA'CEÆ, a natural order of exogenous plants, consisting of herbaceous and half-shrubby plants, with leaves entire or divided, and destitute of stipules. The flowers are inconspicuous, hermaphrodite, or unisexual; the perianth deeply divided, persistent; the stamens inserted into its base, opposite to its segments, and equal to them in number, or fewer; the ovary single, free, or occasionally adhering to the tube of the perianth, with a single ovule attached to the base of the cavity; the style generally with 2—4 divisions. The fruit is membranous, enclosed in the perianth, which sometimes becomes fleshy. The seed has a curved or spiral embryo.—There are about 360 known species, most of which have a weed-like appearance, and grow in waste places. They are widely diffused over the world, but are particularly abundant in the northern parts of Europe and Asia. Beet and spinage are among the best known and most useful plants of the order. Many are occasionally used as pot-herbs, as some species of *Chenopodium* and of orache. The fruit of Strawberry Blite (*Blitum capitatum* and *B. virgatum*), a common weed in the south of Europe, has some resemblance in appearance to a strawberry, from the coherence of the fleshy perianths of a whole spike or head of flowers, and a sweetish, insipid taste. The seed of Quinoa (q. v.) is used for food as a kind of grain. Some of the C. are aromatic (see CHENOPODIUM). Some inhabit salt-marshes, and abound in soda, as the Saltworts (q. v.).

Blitum Capitatum.
a, whole plant, reduced; *b*, a single flower; *c*, the same, after flowering.

CHENOPO'DIUM, a genus of plants of the natural order *Chenopodiaceæ*, of which some of the native British species are well known by the name of GOOSEFOOT, as weeds growing in gardens, on heaps of rubbish, and in waste places. The species are mostly annuals, with entire or toothed leaves, which, in some of them, have a sort of mealy hoariness. They are mostly natives of Europe, and of the temperate parts of Asia; but some are natives of America, into which, however, some of the common European species have found their way, and are naturalized as weeds. The genus has hermaphrodite flowers, with perianth of five small green scales, five stamens, and solitary flat seeds. The leaves of many species are used as a substitute for spinage, particularly those of the GOOD HENRY, WILD SPINAGE, or ENGLISH MERCURY (*C. Bonus Henricus*), a perennial plant, native of Britain and other parts of Europe, often found growing by waysides, with stem more than a foot high, powdered with minute transparent globules, and large, alternate, triangular, arrow-shaped, entire leaves. It is cultivated in some places, particularly in Lincolnshire, chiefly for the leaves, but the young shoots are also used as asparagus. *C. intermedium*, *C. album*, &c., annuals, common in waste places, are also excellent substitutes for spinage. *C. olidum* or *vulvaria* (STINKING GOOSEFOOT), an annual with an extremely nauseous odor, growing in waste places in Britain, &c., especially near the sea, is a popular medicine, in much repute as an antispasmodic and emmenagogue. *C. Botrys*, a native of the south of Europe, with pinnatifid leaves resembling those of the oak, and hence called JERUSALEM OAK, is in use as an expectorant and anthelmintic. It is not fetid like the species last named, but agreeably fragrant. *C. Ambrosioides* has a strong aromatic odor, is used in Mexico instead of tea, and is much cultivated in France, an infusion of it being deemed useful in nervous disorders. *C. anthelminticum*, the WORM-SEED of the United States, has a strong and somewhat aromatic odor, and a high reputation as a vermifuge. Its seeds are chiefly used, or the essential oil extracted from them, called *Oil of Worm-seed*. More important than any of these species, as affording a principal article of food in the countries of which it is a native, is QUINOA (q. v.).

Chenopodium Bonus Henricus:
a, upper part of stem, with flowers, reduced; *b*, *c*, *d*, separate flowers, with two, three, and four stamens.

CHE'PSTOW, a river-port in the south-east of Monmouthshire, on the right bank of the Wye, 2½ miles from its junction with the estuary of the Severn, and 14½ miles east-north-east of Newport. It lies between bold cliffs, on a slope rising from the river, in the midst of beautiful and grand scenery. There is a fine view from a rock called Windcliff, 970 feet high, three miles and a half up the river. The streets are broad. Here occurs the highest tide in Europe, rising suddenly, with a fierce current, often 50, and on rare occasions even 70 feet. Large vessels reach the town. One of the wells of the town ebbs and flows with the tide. Over the Wye is a railway bridge combining the suspension and tubular principles of construction. C. has a magnificent castle, built in the 11th c., and a fine Benedictine priory recently restored. It has few manufactures, but exports corn, cider, bark, iron, millstones, timber, and salmon. Pop. (1871) 3347; (1881) 3585. In 1880, 918 vessels, of 25,071 tons, entered and cleared the port.

CHEQUE, is a money order on a banker or other party having funds of the drawer. It must bear a penny stamp, and is payable to bearer on demand. If not presented within a reasonable time the holder shall have no claim against the drawer should the banker fail. The banker bears the risk of forgery, unless facilitated by carelessness in drawing. A C. is held as payment of a debt until dishonored on presentation; it is not payable after the drawer's death.

CROSSED CHEQUE is an ordinary C. with two transverse lines drawn across it, which has the effect of making it payable only through a banker. When a particular banker's name is written between the lines the C. is said to be *specially* crossed, and is only payable by the banker whose name it bears. Wanting a particular name, it is said to be *generally* crossed, and is payable through any banker. An ordinary C. may be crossed either generally or specially by the holder. Obliteration of the crossing or any alteration of the cheque, except as provided for by the Crossed Cheques Act (1876) is felony.

CHER, a tributary on the left side of the river Loire, rising near Crocq, in the department of Creuse; flows first north by Auzances, Evaux, Montluçon, and St. Amand; then north-west through the department of Cher by Vierzon; then westward by Selles, Montrichard, and Bléré, to the Loire, which it joins below Tours. Its whole length is about 200 miles; and it is navigable for the last 47 of its course.—CHER, the central department of France, to which the above river gives its name, is situated in lat. 46° 25′—47° 39′ N., and in long. 1° 55′—3° 10′ E. The surface is mostly level, traversed by well-wooded elevations, and produces corn, fruits, wine, hemp, flax, &c. The climate is mild and pleasant. Agriculture and pasturage of cattle are both capable of improvement. Area, upwards of 2700 square miles. Pop. (1876) 345,613. C. is divided into the three arrondissements—Bourges, St. Amand, and Sancerre. Bourges is the chief town.

CHERA'SCO, a town in the province of Cuneo, N. Italy, situated on the Tanaro, 30 m. S.E. of Turin. It has manufactures of silk, and a pop. of (1871) 4694. A peace was concluded here between Louis XIII. of France and the Duke of Savoy in 1631. On April 26, 1796, the place was taken by the French; and here, three days after, the 'Armistice of Cherasco,' was concluded between the Sardinian commissioners and Napoleon, by which the latter obtained the right of free passage for his troops through the Sardinian States; and the treaty that followed gave to the French republic Savoy, Nice, and the possessions of Piedmont to the westward of the Alps' highest ridge.

CHERBOURG, a fortified seaport town and arsenal of France in the department of Manche, is situated at the head of a deep bay on the northern extremity of the peninsula of Cotentin, on the English Channel, and opposite the west coast of the Isle of Wight, in lat. 49° 40′ N., and long. 1° 35′ W. Napoleon I. began to build the great defences of this northern stronghold of France. His nephew, Napoleon III. developed his plans, but not with the original view of an invasion of England. Occupying a prominent position on the French coast, only some 60 miles removed from the south shore of England, the harbor-works have been extended strengthened, fortified, and provisioned with cannon—the dockyards improved, and facilities of embarkation afforded, to a degree that, as it is unparalleled in ancient or modern times, not unnaturally excites the lively apprehension of Englishmen. A description of the stupendous breakwater of C., enclosing a space of nearly 2000 acres, will be found in the article BREAKWATER. In connection with its fortifications, this breakwater assumes an importance that attaches to no other work of this kind in existence. At the apex of the angle formed by the meeting of the two branches of the breakwater or *digue*, there is a center fort or battery, measuring 509 feet on the inner line of the parapet, which forms a flat semi-ellipse. The circular forts at the extremities of the breakwater are remarkably well placed for purposes of defence.

Behind the center battery there is to be an elliptical tower, measuring 225 feet on the major, and 123 feet on the minor axis. Altogether there are six large batteries on the mole. The entrances to the harbor are round the ends of the mole; and the passages are further defended by the fortifications of the Ile Pélée, and by the batteries of La Roche Chavaignac and Fort Querqueville. A series of coast redoubts, and the two large fortifications of Les Roches des Flamands and du Homet, are situated behind this outer zone of defence. 'The arsenal,' says Mr. W. H. Russell, who visited C. during the summer of 1860, 'is enclosed by a continuous line of bastion and curtain of a very elevated profile, defended by outworks, wet and dry ditches, and by profuse batteries of the heaviest guns, either in casement or *en barbette*. Wherever you look, you fancy that on the spot you occupy are specially pointed dozens of the dull black eyes from their rigid lids of stone. Altogether, besides the batteries on the mole, C. is defended by 24 regular forts and redoubts. The town itself is commanded by La Roule (an exceedingly strong fort) and Fort d'Octeville on the heights behind. The military port of C. consists of an outer harbor of 776 feet in length by 663 feet wide, its minimum depth being 58 feet, and the entrance to which is 206 feet wide at its narrowest point. This harbor communicates by means of a lock with a floating basin, 957 feet long by 712 wide.

The outer harbor has four building-slips for 120-gun ships, besides some smaller slips, and a fine graving dock. In August 1858, an inner floating harbor was inaugurated by the Emperor of the French, in the presence of the Queen and many of the Lords and Commons of Great Britain. This harbor, entirely cut out of the solid rock, has a length of about 930 yards, and a breadth of 437 yards, and is surrounded by beautiful building-slips and capacious graving docks. It is calculated that the roads of C. cannot, on account of the small depth of the greater portion, shelter more than 25 or 30 sail of the line, and about as many frigates, at one time. C. has a commercial port quite distinct from the other, situated on the south-east; but it displays little activity, the principal exports being eggs, butter, and cattle. The town itself is insignificant, the streets being narrow and dirty; and there are no public buildings of note. There are some manufactures of hoisery, chemicals, lace, and leather, and sugar and salt refineries; but the industrial energies of the great bulk of the population are absorbed in the arsenal and dock-yards. C. is a very ancient place; in the 10th c. it was known under the name of *Carusburg*. In 1758, C. was taken by the English, who destroyed the naval and military works, and levied a contribution on the town. Pop., exclusive of naval and military forces, (1876) 36,338; (1881) 35,333.

CHE'RIBON, or SHERIBON, a seaport town of Java, situated on the north coast, 125 miles east-south-east of Batavia. It has a considerable trade in coffee, indigo, and teak-wood, and is the residence of a Dutch governor. Pop. 11,000.

CHERIMOY'ER, or CHIRIMOYA (*Anona Cherimolia*), the most esteemed fruit of Brazil and Peru, now common, and even naturalized in some parts of the East Indies, and other tropical countries of the Old World. It is a fruit of most delicious flavor, is sometimes described as the finest of all fruits, and sometimes as inferior only to the mangosteen. It belongs to the same genus with the Custard Apple (q. v.). Both flowers and fruit emit a pleasant fragrance, but when the tree is covered with blossom, the odor is so strong as to be almost overpowering. The fruit varies from the size of an orange to 16 lbs. or upwards in weight. It is roundish, or heart-shaped. Externally, it is greenish, covered with small knobs and scales. The skin is rather thick and tough. Internally, the fruit is snow-white and juicy, and contains a number of small brown seeds. The eatable part is soft like a custard, and forms almost the entire mass of the fruit. The C. attains its highest excellence only in particular soils and situations, and some varieties are much finer than others. No tropical fruit seems better to deserve a higher degree of attention than it has yet received in our hot-houses.

Cherimoyer: Branchlet with leaves, and section of fruit.

CHERKA'SK. See TCHERKASK.

CHE'RRY (*Cerasus*), a genus or sub-genus of plants, of which the best known yields one of our most esteemed stone fruits. This is usually regarded as a sub-genus of *Prunus* (see PLUM), but is erected by some botanists into a distinct genus on very slender grounds, the most obvious distinction between the species of *Cerasus* and the true species of *Prunus* being that, in the former, the young leaves are conduplicate, or folded up, and in the latter they are convolute, or rolled together. Two species are pretty generally regarded as the parents of the garden cherries usually cultivated, *Prunus* or *Cerasus Avium*, and *P. cerasus*, or *C. vulgaris*—the former having the underside of the leaves hairy and a small austere fruit; the latter having smooth shining leaves and a more juicy fruit *C. Avium* attains a height of 40—50 feet. *C. vulgaris* is a smaller tree. Both have white flowers in clusters or nearly sessile umbels, and both are generally regarded as natives of Britain, and of the middle and south of Europe. In a wild state, they are usually called GEAN (*guigne*), and *C. Avium* is frequently planted—not only because it is exceeding ornamental when in flower, but also as a timber-tree, being of rapid growth, with firm, strong, close-grained wood, suitable for the purposes of cabinet-makers, turners, and musical-instrument makers. But according to some botanists, there is only one species, of which these are varieties; and according to others, *C. vulgaris* is a native of Syria and other parts of Western Asia, and is only naturalized in Europe, having been first brought to Italy by Lucullus, after his victory over Mithridates (74 B.C.), from Kerasunt, on the coast of the Black Sea, from whence it derives its name. The cultivated varieties of the C. are very numerous, and differ very considerably in size, color, and flavor.

Common Cherry (*Ce'rasus dura'cina*): *a*, branchlet with leaves and fruit; *b*, flower.

The fruit of the C. supplies the inhabitants of some parts of France with a principal article of food, especially the wood-cutters and charcoal-burners of the forests; and among their modes of preparing it is that of making it a principal ingredient in soups. It ripens in Norway and East Bothnia as far north as lat. 63°. In some parts of Germany, the public roads are lined for many miles together with avenues of C. trees. Besides its use for the dessert and for preserves, the C. is extensively used for making liqueurs. See KIRSCHWASSER and MARASCHINO. Varieties of C. with double flowers, and with pendulous branches, are frequently planted for ornament in shrubberies, and few trees or shrubs are more beautiful. The *All-saints C.* produces flowers almost all summer, and even in autumn. Its fruit is small and rather acid.—The other species of C. are numerous. Some species are low, or even prostrate shrubs, as *C.* or *P. chamæcerasus*, the GROUND C. of the south of Europe and Siberia; and *C.* or *P. pumila*, the SAND C. of North America.—The genus or sub-genus *Cerasus* contains also the different kinds of Bird C. (q. v.) and Choke C. (q. v.), including the American WILD C., famous for its medicinal bark; the MAHALEB (*C.* or *P. Mahaleb*) of the south of Europe, and the CAPOLLIM (*C.* or *P. capollim*) of Mexico and Peru—the first famous for the fragrance of its flowers, and the second for the fragrance of its fruit; and the CHERRY-LAUREL (q. v.).

CHE'RRY-LAUREL, or LAU'REL-CHERRY, a name given to those species of *Prunus* or *Cerasus* (see CHERRY) which have evergreen leaves. They are also often called LAUREL. They have small flowers in long racemes, and small fruit; the fruit of a nauseous taste; and most parts of the plant, but particularly the leaves and kernels, remarkably abounding in hydrocyanic (prussic) acid, and therefore very poisonous.—The COMMON C., sometimes called the BAY-LAUREL or LAUREL-BAY, very often spoken of simply as the LAUREL or COMMON LAUREL (*Prunus* or *Cerasus Lauro-cerasus*), is a shrub, sometimes of a very large size, with ovato-lanceolate, convex, smooth, remotely serrated, shining, yellowish green leaves, and erect racemes of flowers. It is originally from Asia, but is now naturalized throughout the south of Europe, and is one one of the most common ornamental shrubs in Britain, where it suffers only from such severe frosts as are of rare occurrence. It is propagated by seeds, layers, and cuttings. Its leaves resemble bitter almonds in smell and taste, and contain in great abundance the same essential oil (see ALMONDS, VOLATILE OIL OF), rich in hydrocyanic acid. From these leaves, by maceration in water for 24 hours, and subsequent distillation, is obtained the *Laurel-water* (q. v.), or *Cherry-laurel water*, sometimes employed in medicine as a substitute for hydrocyanic acid, and which formerly was so much used as a poison. The leaves are sometimes

employed also for flavoring puddings, sauces, &c., and are safer for such purposes than oil of bitter almonds, but ought to be used with caution.

Another species, also very common as an ornamental shrub in Britain, but not quite so hardy as the common C. is the PORTUGAL LAUREL (*Prunus* or *Cerasus Lusitanica*), a native of Portugal, a large shrub—sometimes a tree—with dark-green leaves and lateral racemes. It does not grow so well under the shade of trees as the common cherry-laurel. From the dissimilarity of form and color of their leaves, these species present a pleasant appearance when mixed, as they usually are, in the shrubbery.

CHE'RSO, an island of Illyria, belonging to Austria, in the Adriatic, 12 miles south-south-west of Fiume. A bridge unites it with the adjoining isle of Lossini. It has an area of about 105 square miles, with a population of about 15,000. Its surface is generally hilly and rugged, with forests in the north. The chief town is Cherso, at the head of a bay on the west side. Pop. (1880) 4670.

CHERSO'N. See KHERSON.

CHERSONE'SUS, the ancient name of several peninsulas and promontories in Europe, the most important of which are the Crimea (q. v.), *C. Taurica;* Gallipoli (q. v.), *C. Thracia;* and Jutland (q. v.), *C. Cimbrica.*

CHERT, or HO'RNSTONE, a variety of quartz, always massive, and having a kind of granular appearance and structure. It is common in the Mountain Limestone, Oolite, and Green-sand formations; sometimes forms rocks; and often contains petrifactions. It passes into common quartz and chalcedony, also into flint and flinty slate. Its colors are gray, white, red, yellow, green, or brown. The name C. is sometimes limited to the finer varieties, and the coarser are called Hornstone.—The name C. is very commonly given to the silicious concretions which occur as nodules and layers in limestone rocks, like flints in the chalk. When these materials exist to such an extent as to render the limestone useless for economical purposes, it is said to be 'cherty.'

CHE'RTSEY (Anglo-Saxon, Ceort's Eye or Island) a town in the county of Surrey, on a low strip of land between the right bank of the Thames, here crossed by a stone bridge, and the brook from Virginia Water, 20 miles west-south-west of London. It is irregularly built, chiefly consisting of two long cross-streets, and is surrounded by villas. The chief trade is in malt and flour. Many vegetables are raised for the London market. Pop. (1871) 3146. C. arose in a monastery founded in 666, and rebuilt in 964 by Edgar and the Benedictine monks. The South Saxon kings had a seat here during the heptarchy. Charles James Fox lived on St. Anne's Hill, an abrupt elevation about a mile from the town. Cowley the poet resided in Chertsey.

CHE'RUB, in the plural *Cherubim* or *Cherubs*, is the Hebrew name of a winged creature with a human countenance, which in the Scriptures is almost always represented in connection with Jehovah, and especially as drawing his chariot-throne. Cherubim are first mentioned in the Old Testament as guards of paradise; a C. with a flaming sword hindered the return of the expelled human pair. In the Holy of Holies in the tabernacle, and afterwards in the temple, cherubim wrought in embossed metal were represented above the mercy-seat, or covering of the Ark of the Covenant, so that they appeared to rise out of it. Figures of cherubim are also wrought into the hangings of the Holy of Holies. The cherubim that appear in the visions of Ezekiel and the revelations of John depart much from the early representations. In Ezekiel they have the body of a man, whose head, besides a human countenance, has also that of a lion, an ox, and an eagle; they are provided with four wings, two of which support the charoit of Jehovah, and serve to fly, while the other two cover the body; the hands are under the wings, and the whole body is spangled with innumerable eyes. In the Revelation, four cherubim, covered with eyes, and having six wings, surround the throne of Jehovah; the first has the face of a lion, the second of an ox, the third of a man, and the fourth of an eagle. This gave rise at a very early period to the symbolical figures of the four evangelists, the human countenance being associated with Matthew, that of the lion with Mark, of the ox with Luke, and of the eagle with John. Most Jewish writers and Christian Fathers conceived the cherubim as angels; and Dionysius the Areopagite, in his *Celestial Hierarchy*, makes them a separate class in the first hierarchy. Most theologians also considered them as angels, until Michaelis showed them to be a political creation; and Herder, in his *Spirit of Hebrew Poetry*, compared them to the griffins that watch treasures and other fabulous figures. In Christian art, they are generally represented as sexless figures, with wings from the shoulders, the legs also being either covered by wings, or having wings substituted for them. Very often they have also a glory round the head.

Cherub.

CHERUBINI, LUIGI-CARLO-ZENOBIO-SALVATORE-MARIA, an eminent musical composer, was born at Florence in 1760, and received his early musical training there under the Felici (father and son), P. Bizzari, and C. Castrucci. He afterwards studied for a year at Bologna under Sarti, to whom he owed his thorough knowledge of counterpoint and fugue. He visited London in 1784, where he brought out two operas, *La Finta Principessa* and *Giulio Sabino*, and afterwards settled in Paris for the remainder of his life, paying occasional visits to Italy. His *Ifigenia in Aulide* appeared in 1788; and in 1791 his *Lodosika*, which work first secured proper appreciation for his genius, and effected a change in the whole character of the French school of composition. These operas were followed in succession by *Elisa*, *Medea*, *Les Deux Journées* (also known as *Die Wasserträger*), *Anacreon*, and *L'Hôtellerie Portugaise*. His latest opera, *Ali Baba*, was produced, after a long interval, in 1833. Besides operas, C. wrote numerous masses, motets, and other sacred compositions of so great merit, that Beethoven regarded him as the greatest living master of sacred music; also quartets for the violin, viola, and violoncello, and symphonies. His latest work, *Cours de Contrepoint et de Fugue*, appeared in 1835. C. died at Paris in 1842, and his *Requiem*, the last of his masses, was performed at his funeral service.

CHERU'SCI, a German tribe first mentioned by Cæsar. They dwelt north of the Silver Bacencis, or Harz Forest, but the exact boundaries of their territory cannot be ascertained. They are chiefly memorable in connection with their great leader Arminius, or Hermann, who, having formed an alliance with other German tribes, attacked and annihilated the Roman legions under Varus, in the forest of Teutoburg, 9 A.D. After the death of Arminius, internal strifes broke out among the C., and Tacitus says that they were subjugated by the Chatti, a neighboring tribe. Notwithstanding this they again appear as the chief tribe in the military league of the Saxons about the end of the 3d century. In the beginning of the 4th c., they are included among the peoples who had leagued against Constantine, and towards the close of the same are still mentioned distinctively by Claudian.

CHE'RVIL (*Anthriscus Cerefolium*), an umbelliferous plant which has been long cultivated as a pot-herb, and used in soups and for a garnish, &c., in the same manner as parsley. It is much more used in some parts of the continent of Europe than in Britain. It is a native of Europe, naturalized in some parts of England. The leaves have a peculiar, somewhat sweetish, pleasantly aromatic smell and taste, by which the plant may be known from its congener *Anthriscus vulgaris* or *Scandix Anthriscus*, a poisonous weed, whose leaves have a disagreeable smell, and which is also distinguished by its hispid fruit.

There is a variety of C. with large roots, for the sake of which it is cultivated.—The umbelliferous plant called VENUS' COMB or SHEPHERD'S NEEDLE (*Scandix pecten* or *S. Pecten Veneris*), a native of Britain and of the continent of Europe, often found in cornfields, and remarkable for the appearance and large size of its fruit, and another species (*S. australis*) which grows in the south of Europe, have a taste and smell resembling C., and are used in the same way on the continent. SWEET C. or SWEET CICELY (*Myrrhis odorata; Scandix odorata* of the older botanists), a native of the south of Europe and of some parts of Asia, common in the neighborhood of houses in Britain, although probably not a true native, is frequently cultivated in Germany under the name of *Spanish C.* or *Anise Chervil.* In Scotland, the plant is commonly called *Myrrh* by the peasantry. Its smell is peculiarly attractive to bees; and the insides of empty hives are sometimes rubbed with its leaves, to induce swarms to enter.—The species of *Chærophyllum*, coarse weeds, are also called chervil.

CHE'SAPEAKE BAY, the largest inlet on the Atlantic coast of the United States, being 200 miles long, and from 4 to 40 broad. Its entrance, 12 miles wide, has, on the north, Cape Charles, in lat. 37° 3′ N., and long. 76° 2′ W.; and on the south, Cape Henry, in lat. 36° 56′ N., and long. 76° 4′ W., both promontories being in Virginia. C. B. has numerous arms, which receive many navigable rivers, such as the Susquehanna and the Patapsco on the north, through Maryland; the James on the south-west, from Virginia; and the Potomac on the west, between these two states. Unlike the shallow sounds towards the south (see CAROLINA), this network of gulfs and estuaries, to say nothing of its noble feeders, afford depth of water for ships of any burden, virtually carrying the ocean up to the wharves of Baltimore and the arsenals of Washington.

CHE'SELDEN, WILLIAM, an English surgeon and anatomist, was born in 1688, at Burrow-on-the-Hill, in Leicestershire. He commenced his medical studies at fifteen, at twenty-three established himself as a lecturer on anatomy, and in the following year was elected a fellow of the Royal Society. He was afterwards appointed surgeon to St. Thomas's, St. George's, and Westminster hospitals, where he acquired great reputation as an operator. In this respect, few surgeons, if any, ever surpassed him. He died at Bath, 11th April 1752. C.'s principal works are—the *Anatomy of the Human Body* (1713), long a text-book on the subject in England; a *Treatise on the Operation for the Stone* (1723); and *Osteology, or Anatomy of the Bones* (1733). He also contributed several valuable papers to the Philosophical Transactions of the Royal Society.

CHE'SHIRE, a maritime county in the west of England, bounded north by the river Mersey, and partly also by the Irish Sea, in lat. 52° 56′—53° 54′ N., long. 1° 47′—3° 11′ W. Its greatest length from north-east to south-west is 58 miles; greatest breadth, 32; area, 1052 square miles, of which only $\frac{1}{18}$ is uncultivated; circuit, 200 miles, of which 8 are coast. The surface forms an extensive nearly level plain between the Derbyshire and Welsh mountains, well wooded, and studded with small lakes or meres, and chiefly occupied by grazing and dairy tracts, which are among the most important in England. This plain, comprising four-fifths of the surface, rests on new red sandstone, and is crossed, near the middle, by a tract of high ground running south-west from a promontory overlooking the Mersey, near the mouth of the Weaver, to Beeston Castle rock, 366 feet high. On the east border of the county is a line of new red sandstone hills. In the north-east is part of the Lancashire coal-field. In the east are large tracts of peat, and much of the county is wet and rushy. The north-west part of C. forms a hammer-headed peninsula called Wirral, about 8 miles broad, between the estuaries of the Dee and Mersey. Coal measures appear on the west side of this peninsula, as well as on the west border of the main part of the county. The chief rivers are the Dee, Mersey, and Weaver, which are navigable. The Dee skirts the county on the west 55 miles, and the Mersey on the north for 40 miles. The Weaver rises in the east part of the county, and runs 40 miles west-north-west into the Mersey. The county contains an almost unrivalled system of canals, including the celebrated Bridgewater Canal, and is traversed by the main line of the London and Liverpool Railway, and the Crewe, Chester, and Holyhead Railway. The chief mineral products are rock-salt and coal. The rock-salt, discovered in 1670, and mined by gunpowder, is found near the Weaver and its branches, especially near Northwich, at the depth of 28 to 48 yards, in two beds, the upper one being 15 to 25 yards, and the lower one about 40 yards thick, under a stratum of hard rock, 25 to 35 yards thick. The mines, one occupying 35 acres, when lighted up, resemble a fairy palace sparkling with gems and crystal. Much salt is also made from brine-springs 20 to 40 yards deep. Coal is worked in the north-east part of the county. There are also lead (with cobalt) and copper-mines, and in almost every part of the county free-stone, limestone, millstone, and marl are found. The climate is moist. The soil is mostly a clayey or sandy loam, with marl and peat, and very fertile. The soil and climate are well fitted for pasturing, dairy-farming, and cheese-making, which are the chief agricultural occupations. About 90,000 cows are kept in C., capable of producing about 15,000 tons of cheese. In the cattle-plague of 1855–6 upwards of 70,000 cows perished, 36,000 of these being slaughtered as a preventative. Pop. (1871) 561,131; (1881) 643,237.

There are extensive manufactures in the towns of the county, of which the chief are Chester (the county-town), Macclesfield, Stockport, Congleton, Knutsford, and Birkenhead. The county of C. returns 6 members to parliament. C. has some Roman roads, tumuli, barrows, remains of religious houses, and many old castles and halls. The 12th Roman legion occupied Chester till the 3d century. Egbert, in 828, added C. to the Anglo-Saxon kingdom of Mercia. William the Conqueror erected C. into a county palatine, under Hugh Lupus, with an independent parliament and 8 barons. Henry VIII. subordinated it to the English crown; but C. did not send representatives to the English parliament till 1549, and the separate jurisdiction ceased entirely only in 1831.

CHE'SNUT, or CHESTNUT (*Castanea*), a genus of plants of the natural order *Cupuliferæ*, closely allied to the Beech (*Fagus*), and distinguished from it by long male catkins, longitudinally set with groups of flowers, a 5—8-celled ovary, and compressed rounded nuts. The name is derived from the town of Castanum, near Magnesia, in Asia Minor. The COMMON C., SPANISH C., or SWEET C. (*C. vulgaris*), is said to have been first brought from Asia Minor to Sardinia, and from thence to have gradually extended over the south of Europe, where it has long been naturalized, and forms extensive woods. It is an ornamental, stately, or, in exposed situations, a very spreading tree, of great size and longevity, the still surviving C. of Totworth in England was known as a boundary-mark in the reign of King John. A celebrated C. tree on Mount Etna measured 204 feet in circumference of trunk. The C. has oblongo-lanceolate, accuminate, serrated, smooth leaves. The timber is durable and hard, and is used in house-building, for making furniture, and for many other purposes. The timber of the C. so much resembles that of the oak, as in old buildings to be distinguished with difficulty. The bark is used for tanning, but is worth only about half the price of oak-bark. Young C. trees are much esteemed for hop and espalier poles. The C. is therefore frequently grown in England as coppice-wood; but it succeeds well as a timber-tree even in Scotland, although it does not generally ripen its fruit. In Devonshire,

Branchlet, Leaves and Catkins of Sweet Chestnut.

however, and in some other parts of England, it is planted to a considerable extent as a fruit-tree. It succeeds throughout all the middle latitudes of Germany, but dislikes a damp foggy atmosphere. It prefers a dry light soil, and succeeds only where there is a dry subsoil.

The nuts are generally two in each husk. They form a principal part of the food of the poor in the south of Europe, being used either roasted or boiled, and often ground into flour, and made into a kind of bread. They contain 15 per cent. of sugar, and by pressure yield a sugary juice, which readily undergoes the vinous fermentation, and from which a crumb-like kind of sugar may be obtained. The best kinds of chestnuts are called by the French *Marrons*. When cultivated as a fruit-tree, the C. is generally grafted, by which means the better varieties are secured.—Other species of C. also bear eatable fruits: those of the AMERICAN C. (*C. Americana*), a tree much resembling the common C., and of the DWARF C., or CHINQUAPIN (*C. pumila*), a low tree, or more generally a shrub of 7—8 feet high, are used in America. The fruit of the Dwarf C. is of the size of a common hazel-nut; the nut is convex on both sides. The plant reaches its southern limit on the banks of the Delaware.—A number of species are natives of the East. The inhabitants of the mountains of Java eat the fruit of the SILVERY C. (*C. argentea*), and the TUNGURRUT (*C. Tungurrut*), boiled or roasted, like the common chestnut. Both of these are large trees, the Tungurrut reaching a height of 150 feet.—The HORSE C. (q. v.) is entirely different from the true chestnut.

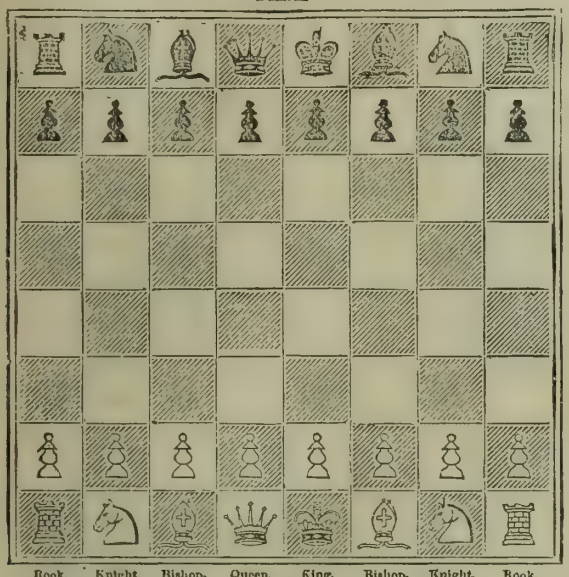
CHESS (Fr. *échecs*, Ger. *schach*). The origin of this, the most purely intellectual of all games of skill, has been much disputed; thus much may now be considered as certain, that, under the Sanscrit name of *Chaturanga*, a game, essentially the same as modern C., was played in Hindustan nearly 5000 years ago. In its gradual diffusion through the world in succeeding ages, the game has undergone many alterations and modifications, both in nature and in name; but marked traces of its early Asiatic origin and descent are still discerned by the learned in its nomenclature and other characteristics. From Hindustan, C. spread into Persia, and thence into Arabia. The Arabs, it would appear, in the 8th c., introduced the game into Spain and the rest of Western Europe; and in England, chess-play seems to have been known prior to the Norman Conquest. Into Constantinople, and probably some other cities of Eastern Europe, the game may have been imported from Persia at a period earlier than its Moorish conveyance into Spain.

The original Hindu game was played on a board of sixty-four squares, as now, but by *four persons*, two being allied against two, as in whist. Hence the name *Chaturanga*, from *chatur*, 'four,' and *anga*, 'a member' or 'component part.' The name *Shatranj*, used by the Persians and Arabs, is a corruption of the Sanscrit. The English, French, and other European names are derived from the Persian term *shah*, 'king.' *Check*, the warning when the king is in danger, is but another form of *shah*; in fact, 'king' is sometimes used for 'check,' and in German *schach* is both the name of the game and the term of warning. The term *rook* is from the Sans. *roka*, Pers. *rukh*, meaning a ship or chariot; *pawn* is said to be from *peon*, an attendant, or foot-soldier.

The books written upon C. 'would form a tolerably large library.' Of works on the antiquities of the subject, we may

mention Dr. D. Forbes's *History of Chess* (Lond. 1860). The best modern practical works on the art of chess-play are the *Chess-Player's Hand-book, C. Praxis,* and *Chess: Theory and Practice,* by Staunton; Morphy's *Games at C.*, edited by Lowenthal; Jaenisch's *Treatise on the Openings,* translated by Walker; and Horwitz and Kling's *Collection of End-games.* The subject is also pretty fully treated in Chambers's *Information for the People,* 'In-door Amusements.'

The game of C. is played upon a square board marked out into sixty-four square divisions, which are colored alternately black and white, in order the more clearly to determine and denote the respective movements of the several pieces. In placing the board for play, each player must always have a *white* corner square at his right hand. There are two sets of pieces, of opposite colors,



of sixteen men each, and of various powers according to their rank. These sets of men are arrayed opposite to each other, and attack, defend, and capture, like hostile armies. The accompanying diagram will best explain the name, form, and place of each man at the commencement of the game:

The superior officers occupying the first row on each side are called *pieces;* the inferior men, all alike, standing on the row immediately in front of the pieces, are called *pawns.* Their moves and powers, along with the peculiar terms used in C., may be briefly described as follows:

A *Pawn,* at his *first* move, may advance either one or two squares, straightforward; but after having once moved, he can only advance a single square at a time. In capturing* an adverse piece, however, a pawn moves one square diagonally either right or left; but the pawn never moves backward. On arriving at an 8th square, or the extreme line of the board, a pawn may be exchanged for any piece his owner chooses to call for, except a king; so that a player may have several queens on the board at once. If, on moving two squares, a pawn pass by an adverse pawn which has arrived at the 5th line, the advanced adverse pawn may take the other *in passing* in exactly the same manner as if the latter had moved but one square.

A Bishop moves any number of squares diagonally, but diagonally only; therefore a bishop can never change the color of his square.

A Knight moves two squares, so as always to change color—that is, he moves one square forward or backward, and one diagonally. On account of this crooked movement, he can leap over or between any surrounding pieces; and therefore a knight's check—unless he can be taken—always compels the king to move.

The Rook, or Castle, moves any number of squares forward, backward, or sidewise, but not diagonally.

The Queen is by far the most powerful of the pieces, and moves over any number of squares, either in straight lines or diagonals, forward, backward, or sidewise; so that her action is a union of that of the rook and bishop. At starting, the queen always stands on a square of her own color.

The King is the most important piece on the board, as the game depends upon his safety. He moves only one square at once, in any direction, except when he *castles*—a term to be explained presently. The king cannot be taken; but when any other piece attacks him, he is said to be in *check,* and must either move out of check or interpose some one of his subjects, unless the checking piece can be captured. When there is no means of rescuing the king from check, he is said to be checkmated, and the game is over. Of course, the two kings can never meet, as they would be in check to each other. *Double-check* is when a piece, by being moved, not only gives check itself, but also discovers a previously masked attack from another.

Castling is a privilege allowed to the king once in a game. The move is performed either with the king's rook or queen's rook—in the former case, the king is moved to the king's knight's square, and the king's rook is placed on the king's bishop's square: in the latter case, the king is played to the queen's bishop's square, and the queen's rook is played to the queen's square. But the king cannot castle after having once moved, nor at a moment when he is actually in check, nor with a rook that has moved, nor when he passes over a square attacked or checked by an adverse piece, nor when any piece stands between him and the rook with which he would castle, nor when in the act of castling either the king or rook would have to capture an adverse piece.

A *drawn* game results from neither player being able to checkmate the other; thus, a king left alone on each side must of course produce a draw, as do also a king with a bishop, or a knight, against a king.

Stalemate, or the not being able to move either the king or any other piece, also constitutes a drawn game.

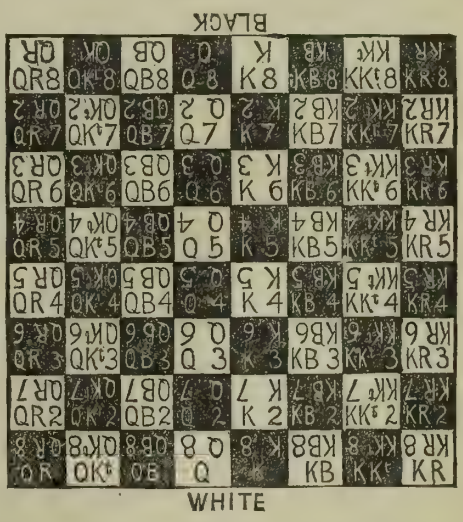
Odds is a term applied to the advantage which a stronger player should give to a weaker: thus, the removal of a rook or knight from the better player's forces may be fair odds; or if the players are more nearly matched, the one may give a pawn. When the odds of a pawn are given, it is always understood to be the king's bishop's pawn.

Gambit is a technical word implying the sacrifice of a pawn early in the game, for the purpose of taking up an attacking position with the pieces.

Supposing the worth of a pawn to be represented by unity, the following is a tolerable average estimate of the comparative value of the pieces: Pawn 1, bishop 3, knight 3, king 4, rook 5, queen 9.

The chess-men being placed, the players begin the engagement by moving alternately; each aiming to gain a numerical superiority by capturing his opponent's men, as well as such advantages of position as may conduce to victory.

The rows of squares running straight up and down the board



are called *files,* those running from side to side are called *lines,* and those running obliquely across are termed *diagonals.*

The accompanying diagram will show at once to the learner how each square is named; and by its aid he will speedily be enabled either to play over printed games, or to record his own. The playing over the following short game will serve him as a little initiatory practice.

WHITE.	BLACK.
1. King's Pawn two.	1. King's Pawn two.
2. King's Bishop to Queen's Bishop's 4th.	2. King's Bishop to Q Bishop's 4th.
3. Queen to King's Rook's 5th.	3. King's Knight to K Bishop's 3d.
4. Queen takes King's Bishop's Pawn, giving Black checkmate.	

The foregoing brief mode of giving a checkmate is called the

* Taking is always performed by lifting the captured man from the board, and placing the captor on his square. The pawn is the only man whose mode of taking differs from his ordinary move.

Scholar's mate, and is often practised upon young and unwary players. Any contractions used, such as 'K' for king, or 'B' for bishop, &c., will readily be understood by the use of the diagrams.

In the conduct of the game, and in the practice of C., the following rules, precepts, and hints will be found very generally useful:

Play forth your minor pieces early, and castle your king in good time. You may sometimes delay castling with advantage, but not often.

Do not expect to be able to establish an enduring attack with half your forces at home.

Seek to let your style of play be attacking; and remember the gaining or losing of time in your measures is the element of winning or losing the game.

Never touch a piece without moving it, nor suffer yourself or your opponent to infringe any other of the laws of the game.

You will find, when first player, that the opening, springing from your playing 1st King's pawn two, and then your King's Knight to the Bishop's 3d, is one of the best that you can adopt; but do not adhere to any one opening only.

If you wish to adopt a purely defensive opening, you may play 1st King's pawn one, and follow up with Q P 2, and Q B P 2.

Next to playing with good players, nothing will conduce to improvement more than looking on at two expert players whilst they play. Wanting these advantages, it is best to play over openings, and actual games, from books or journals.

To prevent blunders and oversights, always endeavor to perceive the motive of your adversary's move before you play; and look often round the board to see that you are not losing sight of any better move than the one you intended, or that you are not suffering yourself to be tempted by a bait.

When an onlooker, never interfere.

Always endeavor to lose with good temper, and to bear your adversary's faults with a good grace.

THE LAWS of CHESS.

The laws of C. are at present in a somewhat unsettled, unsatisfactory condition; but the following are the principal prevailing regulations of the game:

1. If any error have been committed in the placing of the board or men, either player may claim that the game shall be finished as it stands, after four moves have been completed on each side, but not else.

2. A move once made, by your having moved a piece and left hold of it, cannot be retracted.

3. If you touch a piece, you must play that piece; but as long as you retain your hold, you can play it where you like. If you touch a piece that cannot move, your opponent may compel you to play your king, unless the king be unable to move. When you touch your pieces for the mere purpose of adjusting them, you are bound to say so.

4. If you make a false move, your opponent may either cause you to retract it and move your king, or he may claim that the false move shall stand, or that you shall make a legal move with the same piece, at his pleasure.

5. If you touch one of your opponent's men, he may compel you to take that man; or if that be impossible, to move your king, provided he can move without going into check.

6. If on the king being checked, due notice is not given, the player whose king is attacked is not bound to notice it.

7. In every fresh game, except when one is drawn, the first move alternates.

8. Drawn games counting as no games at all, the player who had the first move in a drawn game is also entitled to it in the next. (This absurd regulation is fast becoming obsolete; and it is now a common agreement in playing a series of games, that the move shall invariably alternate).

9. A player who gives the odds of a piece, is entitled to the first move.

10. The time for consideration of a move is not limited; but a player leaving a game unfinished without his opponent's permission, loses such game.

11. When at the end of a game one player is left with just sufficient superiority of force to win—such as a king and rook against king, king and two bishops, or king, knight, and bishop against king—he who has the greater force must give checkmate within fifty moves on each side, or else the game is adjudged to be drawn. This law is framed to prevent unskilful players from wearying their opponents by persisting in the attempt to accomplish what they are too untutored to effect; and it is perfectly just since the allotted number of moves is amply large enough and to spare.

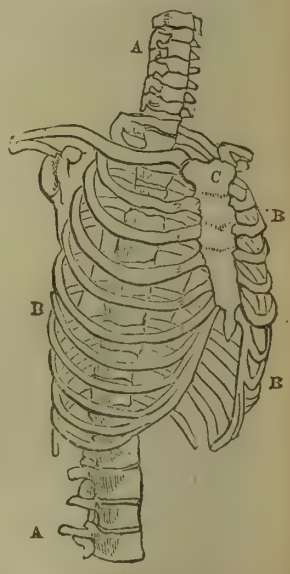
12. In case of any dispute about the laws, both players are to agree as to an umpire, whose decision is to be considered final.

As there is no branch of chess-study better calculated to advance the skill of a learner than the attentively playing over recorded games between first-rate players, we have given an example of a game played blindfold, simultaneously with five other games, by the celebrated American chess-player, Paul Morphy. This gentleman visited England and the continent of Europe in 1858, and in his contests with the best players fairly carried all before him, so that he soon ranked as the greatest chess-player living.

White—Mr. Morphy.	Black—Mr. C——
1. P to K 4.	1. P to K 4.
2. K Kt to B 3.	2. Q Kt to B 3.
3. K B to Q B 4.	3. K B to Q B 4.
4. P to Q Kt 4.	4. B takes Kt P.
5. P to Q B 3.	5. B to Q R 4.
6. P to Q 4.	6. P takes P.
7. Castles.	7. P takes P.
8. Q B to R 3.	8. P to Q 3.
9. Q to Q Kt 3.	9. K Kt to R 3.
10. Q Kt takes P.	10. K B takes Kt.
11. Q takes B.	11. Castles.
12. Q R to Q.	12. Kt to K Kt 5.
13. P to K R 3.	13. K Kt to K 4.
14. Kt takes Kt.	14. Kt takes Kt.
15. B to K 2.	15. P to K B 4.
16. P to K B 4.	16. Kt to Q B 3.
17. K B to B 4, ch.	17. K to R.
18. Q B. to Kt 2.	18. Q to K 2.
19. Q R to K.	19. R to B 3.
20. P takes P.	20. Q to K B squ.
21. R to K 8.	21. Q takes R.
22. Q takes R.	22. Q to K 2.
23. Q takes Kt P, ch.	23. Q takes Q.
24. P to K B 6.	24. Q takes Kt P. ch.
25. K takes Q.	25. B takes P, ch.
26. K takes B.	26. P to K R 4.
27. R to K Kt, and wins.	

CHEST, or THORAX, in Anatomy, is the part of the body which lies beneath the neck and above the Abdomen (q. v.), constituting the uppermost of the two divisions of the trunk, or that which contains the heart and lungs, and is bounded externally by the ribs. The C. is somewhat conical in form, the broad or lower end of the cone being shut in by the diaphragm, a large muscular partition which projects upwards from the lower ribs, being convex towards the C., and concave towards the abdomen. In Respiration (q. v.), the diaphragm descends by its own muscular contraction, while at the same time the ribs are drawn upwards and outwards by the intercostal muscles. The cavity of the C. is thus enlarged, the lungs are expanded, and air is drawn into them through the trachea or windpipe and bronchi. See LUNGS. The combination of bone, cartilage, muscle, and tendon entering into the composition of the C. is such as to permit of expansion-movement to the extent required, and yet to guard against over-expansion, which would be fatal to the delicate textures within. The bones of the C. are at the same time a powerful protection against external injury.

The structures forming the walls of the C. are: 1. The backbone or spinal column, AA, divided into 24 vertebræ, 12 of which, called the dorsal vertebræ, form the thoracic portion. 2. Twelve ribs, B, B, B, attached to the transverse processes or projecting portions of the dorsal vertebræ, and ending in front in the costal cartilages, by which the ribs are connected with 3. The sternum or breast-bone, C, which occupies the middle line. 4. The Diaphragm (q. v.). See also SKELETON.



Chest.

The contents of the C. are the heart, the great arteries and veins, the lungs, the trachea or windpipe, the bronchi or branches of the trachea, leading to the lungs, the œsophagus or gullet, and the Thoracic Duct (q. v.), or general terminus of the lymphatic system of vessels, by which the chyle and lymph are discharged into the blood. The very great importance of these parts to life, and their great liability to deranged action, renders the C. the seat of a large proportion of the diseases which afflict humanity, and especially of those which end in death. Indeed, of the three organs which the great physiologist, Bichat, called the 'tripod of life'—viz., the brain, heart, and lungs—the C. contains two; hence its condition in almost all diseases, and

especially in fatal diseases, is an object of the utmost solicitude to the physician.

The diseases of the C. depend in some cases on alterations in its form, as by Rickets (q. v.) and other diseases affecting the bones in early childhood or in youth, as by too tight lacing in girls. The lungs and air-tubes are subject to a great variety of diseases, among which the principal are consumption or phthisis pulmonalis, pneumonia, pleurisy, bronchitis or pulmonary catarrh. The heart is subject to pericarditis, endocarditis, and chronic organic disease of the valves, as well as to enlargement (hypertrophy), dilatation, and degenerations of its muscular texture. The aorta, or great artery, is often affected with degeneration of its walls, and occasionally with aneurism. The great veins are liable to over-distension, and to obstruction by tumors or by coagulation of the contained blood. The thoracic duct is also sometimes obstructed by external pressure; and the œsophagus has a number of diseases usually described in connection with the alimentary canal. Most of the diseases here referred to are described either under special articles, or under LUNGS and HEART.

The examination of the C. by physicians is now conducted not only by an investigation of the symptoms or obvious characters of the disease, but by a minute and elaborate examination into the physical condition of the contained organs by means of Auscultation (q. v.), Percussion (q. v.), Measurement, &c. The application of these methods is too complicated and technical for explanation in detail, but their results will be shortly alluded to incidentally in the articles above referred to on the diseases of the chest. The name of Laennec (q. v.) will be long remembered in medicine as that of a great original observer, who has contributed more than any other to the progress of knowledge in this department.

CHEST, MILITARY, is a technical name for the money and negotiable securities carried with an army, and intended to defray the current expenses. In the English military system, this department is managed by the commissariat.

CHEST, NAVAL. The name of C. has been given to certain funds, maintained for the benefit of seamen belonging to the royal navy. A fund, called the *Chest at Chatham*, was suggested so long ago as the days of Drake and Hawkins, for the relief of wounded and superannuated seamen. In 1590, all seafaring men in Queen Elizabeth's service consented to a stoppage out of their pay of 2*d*. to 6*d*. per month, to support this fund. The money was not in those days, as it would be now, put out to interest; it was kept in a C., and hence the name given to the fund itself. During the 18th c., the system became organized in a better manner; but still the fund retained the name of C.; insomuch that when the office was removed from Chatham to Greenwich, in 1803, it became the *Chest at Greenwich*. The C. is managed *ex officio*, and the accounts are annually laid before parliament. Handsome gifts are occasionally made to the fund by individuals. Disabled sailors receive a present sum of money, if not deprived of the power of earning a living; but if their injuries are more permanent, they receive a pension from the C., for one year, or for several years, or for life, paid half-yearly.

CHE'STER, an ancient and episcopal city, municipal and parliamentary borough, and river-port, the capital of Cheshire, on the right bank of the Dee, 22 miles from the north of its estuary, 16 miles south-east of Liverpool. It stands on a rocky sandstone height, and is mostly enclosed in an oblong quadrangle of ancient walls, 7 or 8 feet thick, nearly 2 miles in circuit, and with 4 gates, and now forming a promenade with parapets, where two persons can walk abreast. The two main streets cross each other at right angles, and were cut out of the rock by the Romans 4 to 10 feet below the level of the houses. The houses in these streets are curiously arranged: the front parts of their second stories, as far back as 16 feet, form a continuous paved promenade or covered gallery, open in front where there are pillars and steps up from the street below, with private houses above, inferior shops and warehouses below, and the chief shops of the town within. This arrangement, called the 'rows' together with the ancient walls, and the half-timbered construction of many of the houses, with quaintly carved ornamented gables of the 16th c., render C. perhaps the most picturesque city in England. C. cathedral is an irregular massive structure of crumbling sandstone, 375 by 200 feet, with a tower of 127 feet. It was formerly the church of the abbey of St. Werburgh, and for 650 years was one of the richest in England. St. John's Church, now partially in ruins, is supposed to have been founded by Ethelred in 698. The Dee is crossed by a superb stone arch of 200 feet span. Suburbs of villas have recently arisen outside the walls; and a public park was opened in 1867. The C. railway station is the center of several important railways. C. has manufactures of lead, iron-foundries, chemical works, and an iron-shipbuilding yard. The chief exports are cheese, copper, cast-iron, and coal. C. has many charitable and religious institutions, and is the abode of many wealthy families. Pop. (1871) 35,257; (1881) 36,788. The city is a county in itself, and till of late returned two members to parliament; but it was disfranchised for seven years from 1883 for bribery and corruption. In 1880, 2434 vessels of 179,124 tons entered the port in spite of the silting up of the mouth of the Dee.

C. was *Devana Castra*, or Colonia Devana, an important Roman station, and has yielded many Roman remains—as masonry, coins, inscriptions, fibulæ, altars, a hypocaust, and a statue of Pallas. C. was only in 828 taken by the Saxons from the Britons. Its strength made it a refuge against the descents of the Danes and Northmen, but the Danes took it in 894. Ethelfrida retook it in 904, and rebuilt the walls. From the Norman Conquest to the time of Henry III., the Earls of Chester had their own courts and parliaments at C., with 8 subfeudatories and the superiors of the great religious houses, Cheshire being then a county palatine. Henry III. made his eldest son Earl of Chester, a title held since by the Prince of Wales. Llewelyn ravaged C. in 1255. The 25 famous C. mysteries or religious plays by Randle a monk (1250—1260), were acted in the church. After a long siege the parliamentary forces defeated those of Charles I. at C., and took the city. Pearson and Porteus were bishops of Chester. Trinity Church contains the remains of Matthew Henry, the biblical commentator. The commerce of C. has steadily declined since the rise of Liverpool.

CHESTERFIELD, a municipal borough in Derbyshire, near the Hipper and Rother rivulets, 24 miles north-north-east of Derby by rail. There are manufactures of leather, silk, lace, earthenware, and machinery, and there are several blasting-furnaces in the neighborhood. The manufactures are increasing rapidly, and the minerals in the neighborhood, including coal, iron, potters' and brick clay, slates, and lead are being greatly developed. Population (1851) 7100; (1871) 11,427; (1881) 12,221. Trade is facilitated by a canal connecting C. with the Trent, and by the main line of the Midland Railway.

CHE'STERFIELD, EARL OF (PHILIP DORMER STANHOPE), an English statesman and author, eldest son of the third Earl of Chesterfield, was born in London, September 22, 1694, and studied at Cambridge. In 1714, he made the tour of Europe, and the following year was appointed a gentleman of the bedchamber to the Prince of Wales. About the same time, he was elected M.P. for St. Germains, in Cornwall. In 1726, on his father's death, he became Earl of C., and in 1727 was sworn a privy councillor. In 1728, he was appointed ambassador extraordinary to Holland, and in 1730 was made a knight of the Garter and Lord Steward of the Household, but soon resigned that office. An eloquent and frequent speaker, he took an active part in the important business in the House of Lords, and was for several years the strenuous opponent of Sir Robert Walpole, then premier. In 1744, he connected himself with the administration, and in 1745 was re-appointed ambassador to the Hague, but was soon nominated Lord-lieutenant of Ireland, where he rendered himself exceedingly popular. In October 1746, he became one of the principal secretaries of state, but two years after, declining health caused him to resign office, and in 1752 he was seized with deafness.

Distinguished by brilliancy of wit, polished grace of manners, and elegance of conversation, he lived in intimacy with Pope, Swift, Bolingbroke, and other eminent men of the day. Dr. Johnson, whose Dictionary, on its appearance, he affected to recommend, called him 'a wit among lords, and a lord among wits.' He wrote several papers, on temporary subjects, in *The Craftsman*, *The World*, periodicals of the time; but he is now best known by his *Letters to his Son*, Philip Dormer, written for the improvement of his manners. These letters have been often republished, and they afford a good idea of the mental and moral calibre of the author. Lord C. died March 24, 1773.

CHESTERFIELD INLET, a long and narrow gulf, penetrating to the westward from the north-west of Hudson's Bay. Its extreme dimensions are 250 and 25 miles; and the lat. and long. of its mouth are 63° 30′ N., and 90° 40′ W. C. I. is studded nearly throughout with islands.

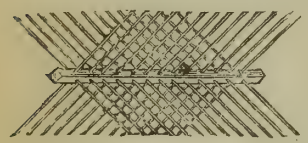
CHEVALIE'R (Fr. *cheval*, a horse), in Heraldry, a horseman armed at all points. In its more general acceptation it signifies a Knight (q. v.). See also BANNERET and CHIVALRY.

CHEVALIER, MICHEL, an eminent French economist, born at Limoges, January 13, 1806, was, at the age of 18, admitted a pupil of the Polytechnic School. Thence he went to the School of Mines, and some days before the revolution of July, he was attached as an engineer to the department du Nord. Led away by the theories of the St. Simonians, he was for two years editor of the *Globe*, the organ of that sect. Joining the schism of M. Enfantin he took an active part in the compilation of the *Livre Nouveau*, the standard of their doctrines, and in 1832 suffered six months' imprisonment, on account of his free speculations in regard to religious and social questions, being regarded as an outrage on public morals. On his liberation, he at once retracted all that he had written in the *Globe* contrary to Christianity, and against marriage, and obtained from M. Thiers a special mission to the United States, to inquire into the systems of water and

railway communication there. The results were published in his *Letters from North America* (1836, 2 vols. 8vo). After a visit to England, he issued a work, entitled *Material Interests in France; Public Works, Roads, Canals, Railways* (1838, 8vo). He was named, successively, Chevalier of the Legion of Honor, Councillor of State (1838), a member of the Superior Council of Commerce, and of the Royal Council of the University; and, in 1840, Professor of Political Economy in the College of France. In 1840, he was re-established in the Corps of Mines as engineer of the first-class; and in 1846, elected a member of the Chamber of Deputies.

Under the Republic, he lost his various employments. He published, in 1848, *Letters on the Organization of Labor and the Question of the Laborers;* and after the *coup d'état* of December 2, was restored to his professorship, and named councillor of state. In 1860, C. assisted Mr. Cobden in carrying into effect the commercial treaty between France and England, and was created a senator. He became a Grand Officer of the Legion of Honor, 1861. He died 28th Nov. 1879. W. wrote also *Political Economy* (1842—1850); *Probable Fall of the Value of Gold* (1859—translated by Cobden); *Mexico, Ancient and Modern* (1863); &c.

CHEVAUX-DE-FRISE, in Fortification, is a hastily constructed substitute for a regular abattis, to stay the progress of an advancing enemy. It may be constructed in any way of wood or iron, provided it presents an array of sharp or ragged points towards the enemy. Sometimes it is made of barrels or centers of timber, with spears springing out from all sides, in such a way as to constitute both a support and a defence. Among the *matériel* of an army under the care of the engineers, are sometimes comprised C. formed of cylindrical iron barrels, about 6 feet long, each having 12 holes to receive as many spears; the spears can be packed away in the barrel, when not in use. Each such piece constitutes a *cheval;* and many such, ranged end to end, form *chevaux,* to be used in ditches around a fortification, on the berme beneath the parapet, behind the glacis, across a breach in the rampart, or in any spot where a check to the storming-party is needed. At Badajoz, during the Peninsular war, great service was rendered by a C. formed of sword-blades fixed into beams of wood. The name is said to have been derived from 'Friesland horse,' and to have been first applied by the French during the wars of the 17th century.



Cheval-de-Frise.

CHE'VIOT HILLS, a mountain-range, occupying contiguous parts of the counties of Northumberland and Roxburgh, on the English and Scotch borders, and running 35 miles from near the junction of the Till and Tweed, in the north-east, to the sources of the Liddel, in the south-west. The highest points are C. Hill, 2658 feet, and Carter Fell, 1850. West of Carter Fell, these hills chiefly consist of carboniferous sandstone and limestone, with protrusions of trap. The east portion of the range is porphyritic, and includes higher and more or less conical hills. In the C. H. are the sources of the Liddel, Tyne, Coquet, and some of the branches of the Tweed. Grouse abound, and the golden eagle is seen. These hills afford pasture for the Cheviots, a superior breed of sheep. They have been the scene of many bloody contests between the English and Scotch.

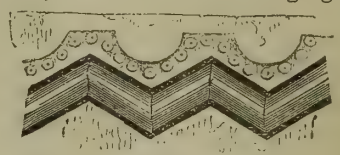
CHEVRE'TTE. See GYN.

CHEVREUL, MICHEL EUGENE, a distinguished French chemist, born August 31, 1786, at Angers, in the department of Maine-et-Loire. In 1820, he was made an examiner in the Polytechnic School; and in 1824, director of the dyeing department in the manufactory of the Gobelins. This last position led him to institute a series of accurate researches on colors, the results of which he made known in a series of *Mémoires* of the Academy of Sciences. Previous to this, C. had made himself known in the scientific world by a variety of researches and writings. In 1826, he was made a member of the Academy; and in 1830, Professor of Applied Chemistry in the Museum of Natural History. Besides a great number of articles in the *Journal des Savants,* beginning with 1820, the following works of C. deserve mention: *Leçons de Chimie appliquée à la Teinture* (1828—1831); *De la Loi du contraste simultané des Couleurs et de l'Assortiment des Objets coloriés* (1839); *Théorie des Effets Optiques que présentent les Etoffes de Soie* (1846); *De la Baguette divinatoire, du Pendule, et des Tables tournantes* (1854); *Des Couleurs et de leur Application aux Arts Industriels* (1864); and a work on a new organic acid, *L'Acide Avique* (1871). C. is a Fellow of the Royal Society of London, and a Commander of the Legion of Honor.

CHE'VRON, in Heraldry, an ordinary representing the couples or rafters of a house, and supposed to betoken the accomplishment of some memorable work, or the completion of some business of importance, generally the foundation of his own family by the bearer. The C. is formed of two lines placed pyramidically, i. e., joined together at the top, and descending to the extremities of the shield in the form of a pair of compasses. *Chevronel,* a diminutive—half the size—of the chevron. *Per chevron,* or *party per chevron,* is where the shield is divided by a line in the form of the chevron.

Chevron. Chevronel. Per Chevron.

CHEVRON, in Architecture, a moulding in the form of a succession of chevrons, otherwise called a zigzag moulding. In general, it is characteristic or Norman architecture, but it is also found with the pointed arch, during the transition period from Norman to Early English.



Chevron, or Zigzag: Andover, Hants.

CHEVRONS are braids or bands of lace, worn as distinguishing marks by the non-commissioned officers of regiments. The corporals, and the various grades of sergeant, have C. varying from one to four in number, either of white or of gold lace. In most corps, they are worn on the right arm only; but in the Guards, and some Line regiments, they are worn on both arms.

CHEVROTAINS, a family of ungulates distinct from *Bovidæ* and *Cervidæ,* and in some respects nearer to the *Suidæ.*

CHEVY CHASE, the name of perhaps the most famous of British ballads. In its present form, the piece does not seem to be older than about the beginning of the 17th c., though doubtless more ancient versions existed, and are partly incorporated. It is impossible to reconcile its incidents with history, but the event which is meant to be commemorated appears to have been the battle of Otterburn, in August 1388—a fight which Froissart declares to have been the bravest and most chivalrous which was fought in his day. According to the ballad, Percy vowed that he would enter Scotland, and take his pleasure for three days in the woods of his rival, and slay the deer therein at will. Douglas, when he heard the vaunt, exclaimed: 'Tell him he will find one day more than enough.' Accordingly, at the time of the hay-harvest, Percy, with stag-hounds and archers, passed into the domains of his foe, and slew a 'hundred fallow-deer and harts of grice.' When the English had hastily cooked their game, and were about to retire, Earl Douglas, clad in armor, and heading his Scottish spears, came on the scene. Haughty challenge and defiance passed between the potentates, and the battle joined. In the center of the fray the two leaders met, but an English arrow struck Douglas to the heart. Sir Hugh Montgomery, having seen the fall of Douglas, dashed on Percy, and struck his spear through his body a long cloth-yard and more. Although the leaders on both sides had fallen, the battle, which had begun at break of day, continued till the ringing of the curfew-bell. Scotchmen and Englishmen claim the victory. When the battle ended, representatives of every noble family on either side of the Border lay on the bloody greensward.

CHEYENNE, the capital of Wyoming territory, U.S., on a wide plain 6000 feet above the sea, 1260 miles east of Sacramento in California. It is an important station of the Pacific Railway, and has extensive machine shops and repairing places. Saddles are manufactured, and moss agate jewelry. C., settled in 1867, had in 1870 a population of 1450; in 1880, 4000.

CHEYNE, GEORGE, an eminent Scottish physician, born in Aberdeenshire in 1671, was at first intended for the church, but preferring the medical profession, studied at Edinburgh, under the celebrated Dr. Pitcairn. In 1700, after taking the degree of M.D., he repaired to London, where he practised in winter, and in Bath in summer. From full living he became enormously fat, as well as asthmatic, and resolved on strictly adhering to a milk and vegetable diet, from which he derived so much benefit that he recommended it in all his principal medical treatises. In 1702, he published *A New Theory of Fevers,* and, in 1703, a work *On Fluxions,* which procured him admission into the Royal Society. Among his other works are: *Philosophical Principles of Natural Religion,* 1705; *Observations on Gout* 1722; *Essay on Health and Long Life,* 1725; *The English Malady, a Treatise on Nervous Dis-*

orders, 1733; *Essay on Regimen*, 1739; *Account of Himself and of his various Cures*, 1743. Dr. C. died at Bath, April 12, 1743.

CHIABRERA, GABRIELLO, an Italian poet, born at Savona, 8th June 1552. He was educated at Rome under the care of his uncle, after whose death he entered the service of Cardinal Cornaro, but was obliged to leave it in consequence of the revenge he had taken on an Italian nobleman who had done him an injury. In his 50th year, he married, and remained independent for the rest of his life. He died 14th October 1637. C.'s poetical faculty developed itself late. Having commenced to read the Greek writers at home, he conceived a great admiration of Pindar, and strove successfully to imitate him. He was not less happy in catching the naïve and pleasant spirit of Anacreon; his canzonetti being distinguished for their ease and elegance, while his *Lettere Famigliari* was the first attempt to introduce the poetical epistle into Italian literature. C. also wrote several epics, bucolics, and dramatic poems. His *Opere* appeared at Venice, in 6 vols., 1768.

CHIA'NA (in ancient times, *Clanis*), a river in Tuscany, formed by several streams from the Apennines, and falling into the Arno a few miles below Arezzo. Along with another river of the same name, which, flowing in the opposite direction, enters the Paglia at Orvieto, it waters the perfectly level Val di Chiana, which its overflow rendered once the most pestilential district of Italy. Ferdinand III. and his minister, Fossombroni, undertook extensive hydraulic works for improving the bed of the river, which they led through the lakes of Montepulciano and Chiusi, and employed for the artificial irrigation of the whole valley. The district has since become the most fruitful, perhaps, of all Italy—a perfect garden, supporting a population of more than 100,000.

CHIANTI, a mountain-range in Tuscany, 15 miles N.E. of Siena. The mountain gives name to an excellent wine grown in the neighborhood.

CHIA'PA, or CHIAPAS, a state in the south-east of the Mexican confederation, lying to the south-west of Yucatan. It contains about 19,000 square miles, and 194,000 inhabitants, chiefly aborigines. Near Palenque, one of the towns of C., are most extensive and magnificent ruins.

CHIARAMO'NTÉ, a town of Sicily, about 32 miles west-south-west of Syracuse. It is situated on a hill, and has well-built, regular streets. Wine of good quality is produced in the district. Pop. about 9000.

CHIA'RI, a town of Lombardy, 14 miles west of Brescia, on the railway between that place and Milan. It is an ancient place, many Roman remains being still found here; and at one time it was strongly fortified, but its walls are now ruinous. Silk is the staple manufacture. Pop. 10,000.

CHIAR-OSCU'RO (Ital.), an artistic term composed of two Italian words, one signifying light, the other darkness or shadow. But C. neither signifies light nor shadow; neither is it described by saying that it is the art of disposing of both the lights and shadows in a picture, so long as either is regarded apart from the other. It is rather *the art of representing light in shadow and shadow in light*, so that the parts represented in shadow shall still have the clearness and warmth of those in light, and those in light the depth and softness of those in shadow. It is not the making of the one die softly and gradually away into the other, but the preservation of both in combination, as we constantly see it in nature, when the light is not the mere glare of the sun striking on a particular object, nor the shadow the entire absence of the influence of light. That the skilful treatment of C. is a matter of extreme difficulty, is plain enough from the very small number of artists who ever attain to it. Still, it is a branch of art without the mastery of which no painting can be successful in any department. It is as indispensable in portrait-painting as in the highest department of ideal art; and though a just and even a lofty conception of the subject may be distinctly indicated by attention to form alone, it is impossible that its realization can ever be satisfactorily accomplished by any one who has not mastered this most subtle mode of handling colors. The only mode by which a knowledge of C. can be attained, so as to apply it to practice, is by studying it as exhibited by such painters as Titian, Rubens, Rembrandt, and, above all, Correggio.

CHIAVA'RI, a maritime town of Piedmont, situated on the Gulf of Rapallo, at the mouth of the Sturla, 21 miles east-south-east of Genoa. The houses in general are well built, with open arcades skirting the narrow streets. C. has several fine churches, the principal of which is the *Madonna del' Orto*. Numerous picturesque old towers, one of them of considerable size, are scattered over the town. Lace and silk are manufactured here; and the place is also noted for its light, handsome, cheap furniture, made chiefly of cherry-wood. The anchovy fishery is important; and in the vicinity are extensive slate-quarries. Pop. 10,457.—The old province of C., of which the above town was the capital, had an area of 155 square miles, with a population of 109,000. Its surface is generally mountainous, but it has valleys of great fertility, yielding grain, grapes, olives, &c. Cattle, sheep, goats, and silkworms are reared.

CHIAVE'NNA, a town of Lombardy, beautifully situated in the midst of vineyards, at the junction of the valley of St. Giacomo and Val Bregaglia, 38 miles north-north-west of Bergamo. It is overlooked by the Rhetian Alps; and its position on the Spügen road secures it considerable traffic. Silk, cotton, and a coarse ware cut out of a soft stone found in the neighborhood, are the chief manufactures. Pop. about 4000.

CHICA, a red feculent substance, valuable as a dye-stuff, giving an orange-red color to cotton. It is obtained by boiling the leaves of a species of *Bignonia* (*B. Chica*), a native of the banks of the Cassiquiare and the Orinoco. The Indians use it for painting their bodies. The C. plant is a climber, with abruptly bipinnate leaves, smooth heart-shaped leaflets, and flowers in pendulous axillary panicles. See BIGNONIACEÆ.

CHICA, PITO, POSO, or MAIZE BEER, is a fermented liquor made from maize or Indian corn. It is much used in some parts of South America, and is made in a similar manner to ordinary beer; but the Indians sometimes prepare by chewing instead of crushing the grains; and that which is so prepared (*Chica mascada*, or chewed C.) is most highly esteemed by them. When they wish to make this liquor particularly strong and well flavored, they have also a practice of pouring it into an earthen jar, which contains some pounds of beef; and having made the jar perfectly air-tight, they bury it several feet deep in the ground, where it is left for several years. On the birth of a child, it is their custom thus to bury a jar of C., to be drunk at the same child's marriage. C. has an agreeable flavor, and is very strong and intoxicating. A spiritous liquor is obtained from it by distillation; vinegar is also made from it.

CHICACO'LE, a town of the district of Ganjam, in the presidency of Madras, being in lat. 18° 18′ N., and long. 83° 58′ E., and lying 415 miles to the south-west of Calcutta, and 435 to the north-east of Madras. It stands on the left or north bank of the Naglaudee, not far from the Bay of Bengal. It is a military station, and contains, besides its garrison, (1871) 15,587 native inhabitants. The place has a reputation for its richly worked muslins.

CHICA'GO (pronounced *She-kaw-go*), the principal city of Illinois, and seat of Cook county, is situated on the south-western shore of Lake Michigan, at the mouth of the Chicago River, lat. 41° 50′ 20″ N., long. 87° 37′ W. The name is of Indian origin, signifying 'wild onion,' and is first mentioned by Perrot, a Frenchman, by whom it was visited in 1671. In 1803, a stockade fort was erected near the mouth of the river, and named Fort Dearborn. When the war with Great Britain broke out in 1812, the government, apprehensive that a post among the Indians so far from the frontiers could not be successfully maintained, ordered the commander to abandon it.

The Indians destroyed the fort, which was rebuilt in 1816. C. was first settled in 1831, previous to which time it was a mere frontier-post; in 1832, it contained about a dozen families, besides the officers and soldiers in Fort Dearborn. The town was organized by the election of a Board of Trustees, August 10, 1833. In September 26 of the same year, a treaty was made for all their lands with the Pottawatomies, 7000 of the tribe being present, after which they were removed west of the Mississippi River. The first charter of the city was passed by the legislature March 4, 1837. The following table exhibits the rapid increase of Chicago. The estimated number of the population in 1835 was 1000, and the exact number, according to the census returns, was, in

1840	4,470	1855	83,509
1845	12,080	1860	150,000
1848	20,035	1865	187,446
1850	28,260	1870	298,977
1852	38,733	1875	410 000
1853	60,652	1880	503,304

C., perhaps the most remarkable city in the world for its rapid growth, is built upon a plain sufficiently elevated to prevent inundation. Some years ago, the elevation of the principal streets, also the buildings, were raised from 4 to 10 feet, the object of this gigantic undertaking being to admit of a thorough system of sewerage. The Chicago River and its branches separate the city into three divisions, connected by large tunnels. The main stream, flowing directly west, is about 100 yards wide, and forms one of the best harbors on the lakes. Vessels ascend the river and its branches a distance of 4 miles from its mouth, thus affording nearly 18 miles of wharfage. The water for the city is now supplied by a tunnel from Lake Michigan, which was opened in 1867, and supplies 57,000,000 gallons daily. There are also about 40 artesian wells. C. possesses a splendid system of public parks,

and numerous handsome buildings. More than 30 railways meet here.

The Illinois and Michigan Canal, completed in 1848, connects the Chicago and Illinois rivers, thus affording communication between the lakes and Mississippi to the coal-fields of Illinois, and to the vast quarries of so-called Athens marble, regarded as the finest building-material in the country. It is found on the banks of the canal, about 20 miles from C.; and is easily worked when first quarried, like the Caen stone.

The 36 public schools of C.—some capable of holding 1000 children—afford the means of education, free of charge, to every child in the city. There are also numerous private schools and seminaries, besides several colleges, medical, theological, literary, and scientific institutions.

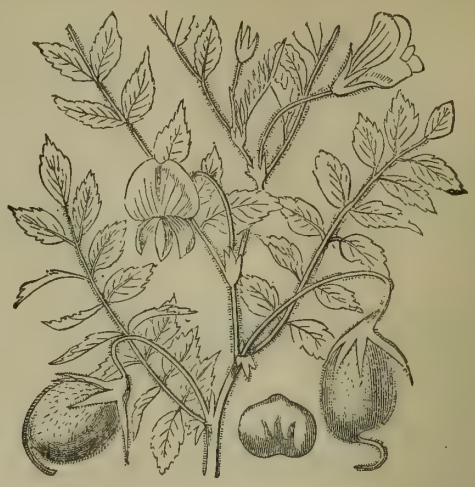
Since 1853, pork-packing has been conducted on an enormous scale. In 1872, 1,456,650 hogs were packed as pork; in the year 1880, 5,375,000 hogs were slaughtered. The packing-houses can now prepare about 100,000 a day, and about 65,000 cattle. Since 1854, C. has been the largest primary grain-dépôt in the world. In 1872, 88,426,842 bushels of bread-stuffs were received. The grain received in 1880 amounted to 161 million bushels. C. is also the most extensive lumber market in the world. There are 80 newspapers and periodicals, while upwards of a million books, manufactured in C., were distributed during 1880. The debt of C. was 12,794,271 dollars in 1880.

In October 1871, a terrible fire occurred, which burned 18,000 houses, extending over more than 2000 acres; 200 persons perished, and nearly 100,000 were rendered homeless. The property burned was estimated at 200,000,000 dollars. This stupendous calamity awakened the practical sympathy of the civilized world. The city was entirely rebuilt in a style of great magnificence within two years. Another fire in 1874 did damage to the amount of 4,000,000 dollars.

CHICH'EN, a town of Central America, in the north-east of the peninsula of Yucatan, which separates the Gulf of Mexico from the Caribbean Sea, 18 miles to the south-west of Valladolid. It is one of the principal towns of the state, and is worthy of notice chiefly for the remains of an ancient city, comprising a ruined temple 450 feet long, a pyramid with a base of 550 feet square, and a domed edifice ornamented with sculpture.

CHI'CHESTER, a municipial and parliamentary borough and episcopal city in Sussex, 17½ miles east-north-east of Portsmouth. It stands on a plain between an arm of the sea and the South Downs, which rise gently on the north. It is well built and has wide streets. The two main streets cross at right angles, and meet in an elaborately worked eight-sided cross. Within the suburbs the city is surrounded by an ancient wall, 1½ mile in circuit, with some semicircular bastions, and now a promenade under the shade of elms. The cathedral, erected in the 12th and 13th centuries, on the site af a wooden one founded 1108, and burned 1114, measures 410 by 227 feet, with a spire 300 feet high. The aisles are double—a mode of construction to be seen nowhere else in Britain. The cathedral has a rich choir, and portraits of the English sovereigns from the Conquest to George I., and of the bishops down to the Reformation. The chief trade is in agricultural produce and live-stock. There are malting, brewing, and tanning establishments. Pop. (1881) 9652. C. returns one member to parliament. The harbor, 2 miles to the south-west of the city, is a deep inlet of the English Channel of about 8 square miles; has several creeks and Thorney Isle; and is connected with C by a canal. C. was the Roman *Regnum*, and has afforded Roman remains—as a mosaic pavement, coins, urns, and an inscription of the dedication of a temple to Neptune and Minerva. C. was taken and partly destroyed, in 491, by the South Saxons. It was soon after rebuilt by Cissa, their king, and called Cissancaster, or Cissa's Camp. It was for some time the capital of the kingdom of Sussex. In 1642, the royalists of C. surrendered to the parliamentarians, after a siege of ten days.

CHICK PEA (*Cicer*), a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, having pinnate leaves; solitary, axillary, stalked flowers; and two-seeded pods, inflated like bladders. The common C. P. (*C. arietinum*) grows wild in the cornfields of the countries around the Mediterranean Sea, and in many parts of the east. It is an annual, 1½—2 feet high, of a stiff upright habit, covered with glandular hairs. The seeds abound in farina, and have a slightly bitterish taste. They are about the size of common peas, curiously wrinkled, so that they have been thought to resemble a ram's (*arietis*) head. They are used as food, either boiled or roasted, and are the most common *parched pulse* of the East. They are an important article of French cookery. They have been in general use from the earliest times, and the plant is extensively cultivated in Egypt Syria, India, the south of Europe, &c. Its cultivation extends as far north as the southern parts of Germany; but in the climate of Britain it is found too tender to be a profitable crop. It is the *Gram* of India, and the *Garvance* of the French, whence the English name *Caravances*. The herbage affords a nutritious food for cattle, and the seeds are one of the occasional substitutes for coffee. In great summer heats, drops



Chick Pea (*Cicer arietinum*).

exude from this plant, which, on drying, leave crystals of almost pure oxalic acid.

CHI'CKEN-POX, a contagious febrile disease, chiefly of children, and bearing some resemblance to a very mild form of small-pox (q. v.). C. is distinguished by an eruption of vesicles or blebs, which rarely become pustular or yellow, and leave only a very slight incrustation, which falls off in a few days, without any permanent mark or pit, as in small-pox. From its vesicular character, it has been called the *crystal pock*. It has bean argued that C. is, in fact, only small-pox modified by previous vaccination; but this opinion, though maintained on good authority, is not generally received by medical men. It is a disease of little or no danger, the fever being often hardly perceptible, and never lasting long.

CHI'CKWEED (*Stellaria media*), one of the most common weeds of gardens and cultivated fields, is a species of STITCHWORT (q. v.). It is a native of most parts of Europe and of Asia, appearing during the colder months even on the plains of India; an annual, with a weak procumbent stem and ovate leaves, very variable; some of the smaller varieties in dry sunny situations sometimes puzzling young botanists, from having only five or three instead of ten stamens; but always characterized by having the stem curiously marked with a line of hairs, which at each pair of leaves changes from one side to another, and in four changes completes the circuit of the stem. The leaves of C. afford a fine instance of the *sleep of plants*, closing up on the young shoots at night. C. is a good substitute for spinach or greens, although generally little regarded except as a troublesome weed, or gathered only by the poor to make poultices, for which it is very useful, or for feeding cage-birds, which are very fond both of its leaves and seeds. A number of species of a nearly allied genus, *Cerastium*, natives of Britain, also bear the name of C., or MOUSE-EAR C., and the name is occasionally given to other plants, either botanically allied, or of somewhat similar appearance.

Chickweed (*Stellaria media*): *a*, branch with leaves and flowers, reduced; *b*, a flower; *c*, parts of fructification.

CHICLA'NA, a pretty town of Andalusia, Spain, 12 miles S.E. of Cadiz. It manufactures linen, earthenware, and brandy. The mineral baths are much frequented. Pop. (1877) 11,677.

CHICOPEE, formerly CABOTSVILLE, and including Chicopee Falls, a manufacturing town of Massachusetts, U. S., on the left

bank of Connecticut River, at the mouth of Chicopee River, 5½ miles north of Springfield. Chicopee Falls supplies water-power to numerous cotton and woollen factories, paper-mills, brass cannon and bell foundries, and the Ames Manufacturing Company, which makes machinery, swords, bronze cannon, statues, &c. C. has 10 churches and several newspapers. Pop. (1880) 11,325.

Chicory Root.

CHI'CORY, or SU'CCORY (*Cichorium*), a genus of plants of the natural order *Compositæ*, sub-order *Cichoraceæ*, distinguished by bracts in two unequal rows, the outer always reflexed, the inner latterly becoming so, a nearly naked receptacle, obovate striated achenia, and a pappus of two rows of minute scales. The species are few in number, herbaceous plants, full of milky juice, natives chiefly of the warmer temperate regions of the eastern hemisphere. The common C. or SUCCORY (*C. Intybus*) is a perennial plant, found wild in England and most parts of Europe, growing in waysides, borders of fields, &c. It has a long carrot-like root, externally of a dirty or brownish yellow color, and white within. The stem rises to the height of 2—5 feet, branching, the leaves are *runcinate*, resembling those of the dandelion; the flowers sessile, axillary, in pairs, rather large, beautiful, generally blue, more rarely pink or white. C. is pretty extensively cultivated, both in England and on the continent of Europe for its roots. It is also cultivated for feeding cattle with its leaves. The blanched leaves are sometimes used as a salad, and they are readily procured in the winter by placing the roots in a box with a little earth in a cellar.—To this genus belongs also the ENDIVE (q. v.).

C. has been used as a substitute for coffee, or to mix with coffee, for at least a century. The roots are pulled up, washed, cut into small pieces, and dried on a kiln, which leaves a shrivelled mass not more than one-fourth the weight of the original root. It is then roasted in heated iron cylinders, which are kept revolving as in coffee-roasting, during which it loses about 25 to 30 per cent. of its weight, and evolves at the same time a disagreeable odor, resembling burned gingerbread. An improvement to the C. during roasting is the addition of 2 lbs. of lard or butter for every cwt. of C., which communicates to it much of the lustre and general appearance of coffee. It is then hand-picked, to remove chips of wood, stones, &c., and is reduced to powder, and sold separately as *C. powder* or *C. coffee*, or is added to ordinary ground-coffee, and is sold as a mixture. C. contains a good deal of sugar, but otherwise does not serve to supply the animal economy with any useful ingredient. It gives off a deep brown color to water, when an infusion is made, and hence its main use in coffee. Some people dislike the taste of C., and when largely used, it has a tendency to produce diarrhœa; but many people prefer to use coffee mixed with C. owing partly to the taste it communicates, but mainly to the appearance of strength which it gives to the coffee. The C. is liable to adulteration; and roasted beans, pease, carrots, parsnips, mangold-wurzel, acorns, horse-chestnuts, biscuit, oak-bark tan, logwood and mahogany dust, and even the livers of horses and bullocks, are said to be employed in its adulteration.

Chicory.

CHIEF, in Heraldry, an ordinary formed by a horizontal line, and occupying the upper part of the escutcheon. Like the other honorable ordinaries, the C. ought properly to take up a third part of the shield; but when the other charges are numerous, the C. is frequently diminished in size.—Any object borne in the upper or chief part of the shield is said to be *in chief*, though the C. be not divided off from the rest of the field, as a separate portion.—*On a Chief:* Is when the object is represented on the C., divided off as above described.

In Chief.

CHIEF-JUSTICE. See JUSTICE, LORD CHIEF.

CHIE'M-SEE, a lake of Upper Bavaria, the largest in the country, lies about 42 miles south-east of Munich. It is situated at an elevation of more than 1600 feet above the sea; its length is 12 miles, with a breadth of 9, and its greatest depth 500 feet. Its shape is irregular, and its coast much indented. It has three islands; the Achen and Prien flow into it, and its surplus water is discharged by the Alz into the Inn. The C. is famous for its fish; and a small steamer which plies on it, enables travelers to view its fine scenery.

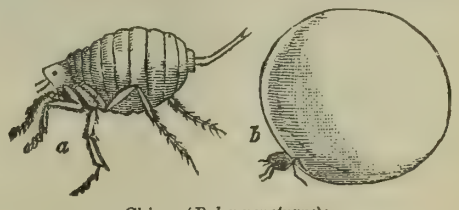
CHIE'RI, a town of Piedmont, Northern Italy, situated on the slope of a hill 9 miles south-east of Turin. C. is an ancient place. By the later Romans it was called Carea. The church of St. Dominico, built in 1260, has some good paintings; and that of Santa Maria della Scala, built in 1405, is one of the largest Gothic structures in Piedmont. C. is one of the oldest manufacturing towns in Europe, its manufacture of fustians and cotton stuffs dating from 1422. Silk, cotton, and linen are still important manufactures. Pop. 9000.

CHIE'TI, an archiepiscopal city of Italy, capital of the province of the same name, is situated on a hill near the Pescara, about 100 miles north of Naples. It is a well-built and flourishing place, with some imposing public edifices, including a cathedral, lyceum, and theater; and its agreeable situation has made it the residence of numerous wealthy families. The district around is fertile and well cultivated, and in the city, the cloth and silk manufactures afford employment for a considerable number of people. Pop. 15,000. C. is a very old place, being built on the site of the ancient *Teate* of the Romans, many of the remains of which are still visible. In the year 1524, St. Gaetano founded here the order of the Theatines.

CHIFF-CHAFF (*Sylvia hippolais*), a small species of warbler, very widely diffused, being found both in England and in the neighborhood of Calcutta. It is common in the south of Europe, is in Britain a summer bird of passage, arriving, however, very early in spring, and does not extend northward into Scotland. Its general color is brown; the under parts lighter. It is a very sprightly little bird; but its song consists merely of a frequent repetition of two notes resembling the syllables chiff-chaff. It is also called the Lesser Pettychaps.

CHIGNE'CTO BAY, the more westerly of the two inlets at the head or north end of the Bay of Fundy, in British North America. It separates Nova Scotia from New Brunswick, is 30 miles long and 8 broad, and has an isthmus of only 14 miles in width between it and Northumberland Strait, in the Gulf of St. Lawrence.

CHI'GOE, or (JI'GGER (*Pulex*, or *Sarcopsylla penetrans*), a species of Flea (q. v.), rather smaller than a common flea, and with less powerful limbs, found in the West Indies and South America, where it is excessively troublesome, attacking any exposed part of the human body, and effecting a lodgment between



Chigoe (*Pulex penetrans*):
a, male; *b*, gravid female.

the skin and flesh, often under the skin of the foot or the nails of the toes. At first, its presence is indicated only by a slight itching or tingling; but an ulceration is likely soon to be the result, which is not only very painful, but even dangerous, when the female C. is allowed to remain and to deposit her numerous eggs.

Before these are deposited, her abdomen becomes distended in an extraordinary manner, as a membraneous bag, to the size of a pea. The ulcer speedily contains a great colony of chigoes. The negresses of the West Indies are very expert in extracting the C., which is also removed by washing with tobacco-juice. Rubbing with tobacco-leaves is also employed as a preventive of its attacks.

CHIH-LE, or PECHIH-LE, one of the northern provinces of China, and the most important of the 18, as being the center of government, and containing Pekin, the imperial capital, the residence of the emperor and court. Pop. about 28,000,000; area, 58,949 square miles.

CHIHUA'HUA, a city of the Mexican confederation, with 12,000 inhabitants, and a considerable trade between Santa Fé, in New Mexico, and the United States. It is in lat. 28° 40′ N., and long. 105° 33′ W., and has a cathedral, convents, and an aqueduct

3 miles long, besides appropriate buildings, as the capital of the state of its own name. The territory in question, stretching in lat. from 27° to 32° N., and in long. from 104° to 108° 40′ W., is divided from Texas, in the United States, by the Rio Bravo del Norte. It is a table-land, more remarkable for mineral resources than for agricultural productions. It abounds in nitre and other salts, and is rich in mines of gold and silver. Pop. 180,000.

CHI'LBLAINS. See CHAPPED HANDS.

CHILD, SIR JOSIAH, an eminent London merchant, and one of the ablest of the earlier English writers on commerce and political economy, born in 1630, was the second son of Richard Child, a merchant of London. His principal work is entitled, *Brief Observations concerning Trade and the Interest of Money* (Lond. 1668, 4to); a 2d edition, much enlarged, entitled *A New Discourse of Trade*, was published in 1690. In this work he explains his plans for the relief and employment of the poor, including the substitutions of districts or unions for parishes, and the compulsory transportation of paupers to the colonies. He was one of the directors, and for some time chairman of the East India Company, and is said to have written several tracts in defence of the trade to the East Indies, which were published anonymously. In 1678 he was created a baronet, and died in 1699.

CHI'LDERMAS, or HOLY INNOCENTS' DAY (28th December), is observed by the Church of Rome with masses for the children killed by Herod. It was considered unlucky to marry or to begin any work on this day. From Fenn's *Letters* (vol. i. p. 234) we learn that the coronation of King Edward IV. was put off till the Monday, because the preceding Sunday was Childermas Day. C. is also a holiday of the Church of England.

CHILD-KILLING. See INFANTICIDE.

CHILDREN, LEGAL CAPACITY OF. See INFANT, MINOR, PUPIL, GUARDIAN, TUTOR.

CHILD-STEALING. See ABDUCTION.

CHI'LI, (spelled CHILE by its own subjects), the best governed and most prosperous of the republics of Spanish origin in South America, occupies the southern strip of the continent to the west of the Andes, with the adjoining islands. Till of late, C. was separated from Peru by a Bolivian coast territory. Since the war of 1879–80, C. has annexed this district (including the desert of Atacama), and insists on keeping the southernmost Peruvian province, Tarapaca (16,000 sq. miles, with 42,000 inhabitants). C. no longer claims any interest in Tierra del Fuego, or in the south of Patagonia (as for many years it did), and has made a treaty to that effect with the Argentine Republic. Within the nominal limits of C., however, lies the virtually independent Araucania (q. v.) comprising most of the mainland south of the Biobio; while the southern settlements are confined chiefly to Chiloe (q. v.) and its archipelago. Three new southern provinces have lately been organized; till of late there were but 16 provinces, and these had an area of 130,000 sq. m. The population was given by the census of 1875 at 2,075,971, but about 10 per cent. was supposed to be omitted from this, and 50,000 Indians were not reckoned at all. In 1880, the pop. was estimated at 2,300,000. As contrasted with the rest of Spanish America, C. contains an unusually large proportion of European blood. The most remarkable aboriginal race are the Indians of Araucania (q. v.). Santiago is the capital of C.; Valparaiso the chief port.

The constitution is nominally republican, but has been hitherto substantially a dictatorship. The state has nevertheless maintained a degree of peace and prosperity unknown to the other commonwealths of kindred race. The president is elected, indirectly, for five years. He chooses a council of fifteen, removable at his pleasure. The legislature consists of a senate and 37 members elected for six years, and a chamber of deputies, elected for three years, in the proportion of one for every 20,000 inhabitants. The elections are usually controlled by the government, as the electors are mostly members of the national guard, and hold offices dependent on the president.

The revenue of the republic in 1880 was £3,286,000, and the expenditure £3,075,061. The debt in 1880 was £14,916,410, including £7,000,000 for railways. The total value of imports in 1879 was £4,559,076, the exports being valued at £8,531,567—chiefly copper, silver, wool, wheat, tallow, hides, and jerked beef. Most of the trade is with Great Britain—the imports thence being mainly cottons, woollens, and articles of iron. The manufactures are not extensive, but include hempen cloth, cordage, soap, leather, earthenware, charcoal, flour, brandy, and coarse metal-work. C. has about 1000 miles of railway lines. A line across the Andes to Buenos Ayres has been projected. The army, during the war in 1879–80 with Peru, comprised 20,000 men, besides a national guard raised to 30,000 men The navy, which took an important part in the war, consisted in 1879 of 10 small steamers, and two large and powerful ironclads.

The constitution, adopted in 1810, was modified in 1833. The most serious attempt at revolution occurred in 1851. The Araucanians have repeatedly given C. much trouble, but are now nominally subject to the republic. In 1864, C. gave Peru very valuable support in her war with Spain, and took a large share in the deciding final engagement. A dispute had been going on between C. and Bolivia as to the possession of Atacama desert on the seaboard towards the Peruvian frontier. In 1879 Chili declared war with Bolivia, with which Peru was allied. For a time the Peruvian fleet was victorious, but gradually the Chilians obtained the mastery both by sea and by land. Peruvian armies were defeated; Peruvian towns were bombarded (including Callao); and the chief war-ships of Peru taken; and in 1881 the Chilians occupied Lima and Callao, and were in a position to dictate the terms of peace.

History.—Immediately after the conquest of Peru, C. was seized by Almagro, a companion of Pizarro, subsequently becoming the seat of a captain-generalship, which held sway as far as Cape Horn. In 1810 commenced the war of independence, which, at the close of eight years, was decided against Spain by the victory of Maypu.

Geology.—The predominant rocks of C. are crystalline and metamorphic. They form the range of the Andes, except in those districts in which active volcanoes exist, where they are covered with recent volcanic rocks. They occupy also the whole of the level ground between the mountain-range and the shores of the Pacific, with the exception of a narrow stretch of palæozoic fossiliferous strata which run along the coast south from Santiago for a distance of 300 miles. The coast-line of C. is being continually altered from the elevation of the whole country to an extent of at least 1200 miles along the Pacific shores, produced by volcanic agency. In 1822, the coast was raised 4 feet at Quintero, and 3 feet at Valparaiso. Oysters and other mollusks were left dry, and perished, becoming offensive as they decomposed. The change of level was permanent, over an area of 100,000 square miles, nearly as large as the whole extent of Great Britain and Ireland. A similar extensive elevation was noticed in 1835 by Captain Fitzroy.

Physically, the continental portion of the republic—for its insular section will, in this respect, be noticed under the head of CHILOE—presents many singularities. Of all the maritime regions on the globe, it is perhaps the most isolated. On every side but the sea—and that sea very remote from the main thoroughfares of commerce—it is beset by difficulties of communication. With the lonely wilderness of Patagonia to the south, and the dreary desert of Atacama on the north, it is bounded on the east by a mountain-chain which, altogether impracticable in winter, can be crossed, even in summer, only by a few passes ranging between 12,450 feet and 14,370 in elevation. Moreover, this strip between the Andes and the Pacific is broken into plateaus in the interior, and valleys on the coast, by two longitudinal ranges, with numerous lateral spurs; while, throughout the length and breadth, the general level gradually descends, as well to the south as to the west.

In point of mere temperature, so rugged a surface—covering fully 15° of latitude, and attaining an altitude of more than four miles within about 2° of longitude—must present nearly every possible variety. Through the reciprocal action of the Andes (q. v.) and the prevailing winds, the rain-fall graduates itself, with something of mathematical regularity, from the parching skies of the north to the drenching clouds of the south—a graduation which, disturbed merely by the melting of the mountain-snows, is, in a great measure, necessarily reflected in the condition and magnitude of the countless water-courses. Hence the rivers to the north of the Maypo, which enters the Pacific near latitude 34°, are but inconsiderable streams; while, further to the south, the Maule, the Biobio, and the Calacalla are all to some extent navigable.

From the cause last mentioned, different districts vary remarkably in their productions. To the north of the Coquimbo, about lat. 30°, is chiefly an arid waste, redeemed, however, from being valueless by its mines; and to the south of the Biobio, about lat. 37°, timber and pasturage divide the soil between them. The intermediate center alone is fitted for agriculture, yielding, besides maize and hemp, European grains and fruits in abundance. Notwithstanding all the varieties and viscissitudes of climate, the country may claim to be, on the whole, extremely healthy. The Chilians are more enterprising than the inhabitants of the other South American republics. Their agriculture, though primitive, is favored by a singularly fertile soil. Enormous herds of cattle are kept. The merchants often amass considerable wealth. Roman Catholicism is the prevailing religion; but other faiths are protected by a law of 1875. Education is as yet very little extended, but of late much has been done to promote it; there are more than 500 government schools, besides monastic, municipal, and private schools. There is a kind of university at Santiago.

CHILI, or CHILLI. See CAPSICUM.

CHILI NETTLE. See LOASACEÆ.

CHILI SALTPETRE is a commercial name applied to the nitrate of soda. See SODA, NITRATE.

CHILLIANWA'LLA, a village of the Punjab, being five miles from the left or east bank of the Jhelum, the most westerly of the five rivers which give name to the country. It is in lat. 32° 40′ N., and long. 73° 39′ E., being 85 miles to the north-west of Lahore. C. claims notice as the scene of Lord Gough's dearly won victory, over the Sikhs, of January 1849, and also as the site of an obelisk erected to the memory of those who fell in the two Sikh wars.

CHILLICO'THÉ, or CHILICOTHE, a city of Ohio, U. S., beautifully situated on the right bank of the Scioto River, 45 miles from its confluence with the Ohio, and the same distance south of Columbus, on the Cincinnati and Marietta Railway, and Ohio and Erie Canal; has 13 churches, 3 banks, court-house, foundries, engine and implement factories, &c. Founded in 1796, and former capital of the state. Pop. (1870) 8920; (1880) 10,938.

CHILLINGWORTH, WILLIAM, a famous theologian of the Church of England, was born at Oxford 1602, and educated at Trinity College in that university, where the arguments of a Jesuit named Fisher induced him to become a Roman Catholic. He withdrew to Douay; but was induced by his god-father, Dr. Laud, then Bishop of London, to re-examine the whole controversy between Catholics and Protestants, and in 1631, he returned to the bosom of the Anglican Church. Four years later, he published a work, entitled *The Religion of Protestants a Safe Way to Salvation*. It was exceedingly keen, ingenious, and conclusive in point of argument. C. was perhaps the ablest disputant of his age; and had there not been a certain fickleness and want of solidity about his intellect, and a nervous suspicion that all human reasoning might be vitiated by undiscovered fallacies, he might have produced a really great work. *The Religion of Protestants* acquired a wide popularity. C. was offered much church preferment, which he at first refused—having certain scruples in regard to the subscription of the 39 Articles—but afterwards accepted. He became Chancellor of the Church of Sarum, and prebendary of Brixworth, in Northamptonshire. He was a strong royalist, and on the breaking out of the civil war, accompanied the king's forces. He died January 1644. The best edition of *The Religion of Protestants* appeared in 1742, with sermons, &c., and a life of the author, by Dr. Birch.

CHILLON, a celebrated castle and fortress of Switzerland, in the canton of Vaud, 6 miles south-east of Vevay. It is situated at the east end of the Lake of Geneva, on an isolated rock, almost entirely surrounded by deep water, and is connected with the shore by a wooden bridge. The castle is said to have been built in 1238, by Amadeus IV. of Savoy, and it long served as a state prison. It is famous as the prison of Bonnivard, the prior of St. Victor, who having, by his efforts to free the Genevese, rendered himself obnoxious to the Duke of Savoy, was carried off by emissaries of that potentate, and confined here for six years, at the end of which time the castle had to surrender to the Bernese and Genevese, when Bonnivard was liberated. C. has been immortalized by Byron's *Prisoner of Chillon*. The castle is now used as a magazine for military stores.

CHILOE′, the insular province of Chili (q. v.), is an archipelago on the west side of South America, which takes its name from its principal island. It is separated from the rest of the republic, or rather from Patagonia, by the Gulf of Ancud, extending in S. lat. from 41° 40′ to 43° 20′, and in W. long. from 73° to 74°. The province—which, in 1875, numbered 64,536 inhabitants—contains, in addition to C. Proper about 60 islets, of which about 30 are uninhabited. In the archipelago are two towns, both of them seaports of C. Proper—Castro, the ancient capital, on the east coast; and San Carlos, the modern seat of government, towards the north-west extremity. The atmosphere, like that of the mainland opposite, is excessively moist; the westerly winds, more particularly in winter, bringing almost constant rain. The climate, however, is on the whole healthy. This fact is the more remarkable inasmuch as C. Proper is one natural forest, measuring 100 miles by 40, with a partially cleared and cultivated margin on the sea. The chief products are wheat, barley, potatoes, apples, and strawberries; and cattle, sheep, and pigs are reared in considerable numbers. Agriculture, however, is in a very primitive state; and the staple food of many consists of mussels and oysters. The population, equally indolent and poor, differs from that of the rest of Chili in the great preponderance of aboriginal blood. Schools are numerous; but, from the ignorance of the teachers, education has not made satisfactory progress. The principal manufacture is a coarse woollen cloth, dyed blue. This Archipelago was discovered by the Spaniards as late as 1558; and as it was the last integral portion of Spanish America to be colonized, so also was it the last to throw off the mother-country's yoke.

CHILOGNA'THA AND CHILO'PODA. See MYRIAPODA.

CHI'LTERN HILLS, the south part of the low chalk range which runs north-east, about 70 miles, from the north bend of the Thames, in Oxfordshire, through Bucks and the borders of Herts and Beds, and ends in Norfolk and Suffolk. In Oxford, Herts, and Beds, the C. H. are 15 to 20 miles broad, and the highest points are Wendover, 905 feet; and Whitehouse, 893.

CHILTERN HUNDREDS. In former times, the beech-forests which covered the Chiltern Hills, in Buckinghamshire, were infested with robbers, and in order to restrain them, and protect the peaceable inhabitants of the neighborhood from their inroads, it was usual for the crown to appoint an officer, who was called the Steward of the Chiltern Hundreds. The office, which has long ceased to serve its primary, now serves a secondary purpose. A member of the House of Commons cannot resign his seat unless disqualified either by the acceptance of a place of honor and profit under the crown, or by some other cause. Now, the stewardship of the C. H. is held to be such a place, and it is consequently applied for by, and granted, in the general case as a matter of course, to any member who wishes to resign.

As soon as it is obtained, it is again resigned, and is thus generally vacant when required for the purpose in question. When the C. H. are not vacant, however, the same purpose is served by the steward-ship of the manors of East Hendred, Northshead, and Hempholme. As to the offices which are held to vacate seats, see ELECTION. 'The practice of granting the Chiltern Hundreds for the purpose above described began only about the year 1750, and its strict legality has been doubted, on the ground that the stewardship is not an office of the kind requisite to vacate a seat. The gift of the Chiltern Hundreds lies with the Chancellor of the Exchequer, and there is at least one instance of its being refused. In 1842, after very awkward disclosures had been made before a committee of the House of Commons, as to corrupt compromises, which had been entered into for the purpose of avoiding investigation into gross bribery in the election to certain boroughs, of which Reading was one, the member for Reading applied for the stewardship of the Chiltern Hundreds, and was refused—the Chancellor of the Exchequer being of opinion that, by granting it, he would in some sort have made himself a party to transactions which he did not approve, and of which the House of Commons had implied its condemnation.'—*Standard Library of Political Knowledge*, p. 500.

CHIMÆ′RA, a genus of cartilaginous fishes, ranked by Cuvier with the Sturgeons (*Sturionidæ*), but now generally regarded as the type of a distinct family, of which only two or three species are known. The gills have a single wide opening, as in the sturgeons; but the gill lid or *operculum* is merely rudimental, and concealed in the skin, whilst there is an approach to sharks in the

Chimæra Monstrosa.

structure of the gills. The only known species of C. is *C. monstrosa*, occasionally found in the British seas, and more common in more northern latitudes. It is sometimes called the *King of the Herrings*. It pursues the shoals of herrings, and is consequently sometimes taken in herring-nets. It is seldom more than three feet long. Its general color is silvery white, the upper parts mottled with brown. It produces very large leathery eggs.

CHIMÆRA, a mythical monster, described by Homer as having a lion's head, a goat's body, and the tail of a dragon. The rationalistic account of C. is, that it represented a mountain in Lycia whose top was the resort of lions, its middle of goats, and the marshy ground at the bottom of which abounded with serpents. In the same manner, Bellerophon's (q. v.) victory over the C. is explained by saying, that he first made his residence on this mountain. The myth seems, at all events, to have belonged to Asia Minor, as gigantic carvings of the C. on rocks are there found. It is usually represented as a lion, out of the back of which grows the head and neck of a goat.—C. is used figuratively to denote any monstrous or impossible conception, the unnatural birth of the fancy. It is frequently depicted on shields, as a heraldic charge.

CHIMA'PHILA. See WINTER-GREEN.

CHIMBORA'ÇO, a conical peak of the Andes, in Quito, 21,510 feet above the sea, but only about 12,000 above the level of its own table-land. It is capped with perpetual snow, and was long regarded as the loftiest mountain in the world. Latterly, however, it has been ascertained to be overtopped by some peaks, not merely of the Himalayas, but even of the central division of its own chain. The summit was for the first time reached by Stübel in 1872. Whymper ascended twice in 1880, and found that there was a large glacier on Chimboraço.

CHIME'RE, 'the upper robe worn by a bishop, to which the lawn-sleeves are now generally attached.' Since the time of Queen Elizabeth, it has been of black satin, but previously it was of a scarlet color, like that worn by the bishops when assembled in convocation, and when the sovereign attends parliament.

CHIMES, music performed on bells in a church tower, either by the hands of a performer or by mechanism. The most perfect C. are to be found in Holland and Belgium.

CHI'MNEY (Fr. *cheminée*, Lat. *caminus*). There seems to be reason to believe that the C., in its present sense of a funnel from the hearth or fireplace to the roof of the house, is a modern invention. In Greek houses it is supposed that there were no chimneys, and that the smoke escaped through a hole in the roof. What the arrangement was in houses in which there was an upper story, is not known; perhaps the smoke was conveyed by a short funnel through the side-wall of the house, which seems to have been the first form of C. invented in the middle ages. The Roman *caminus*, again, was not a C., but a sort of stove; and it has been a subject of much dispute, whether the Romans had any artificial mode of carrying off the smoke, or whether it was allowed to escape through the doors, windows, and openings in the roof. As the climate and the habits of the people both led to the houses of the ancients being very much more open than ours are, it is probable that the occasional fires which they had of wood or charcoal may have given them no great inconvenience. It is known, besides, that the rooms in Roman houses were frequently heated by means of hot air, which was brought in pipes from a furnace below. In England, there is no evidence of the use of C.-shafts earlier than the 12th century.

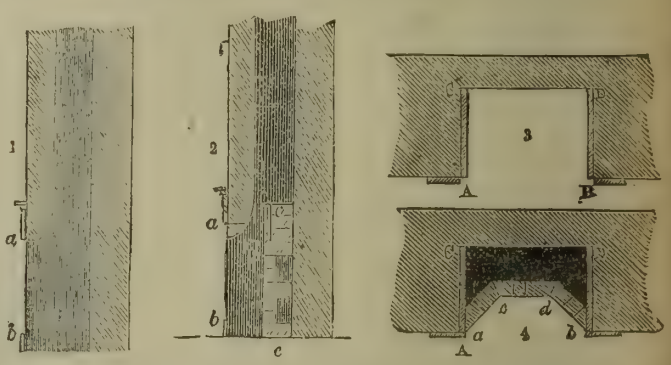
In Rochester Castle (*circa* 1130), complete fireplaces appear; but the flues go only a few feet up in the thickness of the wall, and are then turned out through the wall to the back of the fireplace, the openings being small oblong holes. The earliest C.-shafts are circular, and of considerable height. Afterwards, chimneys are found in a great variety of forms. Previous to the 16th c., many of them are short, and terminated by a spire or pinnacle, having apertures of various shapes. These apertures are sometimes in the pinnacle, sometimes under it, the smoke escaping as from some modern manufacturing C.-stalks which are built in the form of an Egyptian obelisk. Clustered C.-stalks do not appear until late in the 15th c., when they seem to have been introduced simultaneously with the use of brick for this purpose. Each of the earlier clustered chimneys consists of two flues which adhere to each other, and are not set separate, as afterwards was the practice. Long after they were invented, and in use for other rooms, our ancestors did not generally introduce them into their halls, which, till the end of the 15th, or beginning of the 16th c., continued as formerly to be heated by a fire on an open hearth in the center of the hall, the smoke escaping through an opening in the roof known by the name of *louvre*. In many of the older halls in which chimneys exist, they have evidently been inserted about this period.

Tisbury, Wilts: From Parker's *Glossary*.

The action of a C. depends upon the simple principle, that a column of heated air is lighter than a cooler column of equal height; when therefore a flue full of heated air communicates freely by the lower part with the cooler air around it, the greater weight of the latter pushes the warm air upwards, and thus an ascending current is produced. Other conditions being equal, the draught of a C. will thus be proportional to its perpendicular height, and the difference between the temperature within and without it. The straighter and more perpendicular the C., the stronger will be the draught, because the friction of the ascending current will be less, and the cooling effect of a long or tortuous course will be saved. The maximum efficiency of a given C. is attained when all the air that passes up enters by the bottom of the fire. In this case, its temperature is raised to the uttermost by passing through the whole of the fire, and the fire is at the same time urged to vivid combustion by the blast thus obtained. A powerful furnace may be constructed by connecting a suitable fireplace, capable of being closed all round excepting at the bottom, with a tall C.; and the amount of draught may be regulated by increasing or diminishing the aperture through which the air is admitted to the bottom of the fireplace, or by an adjustable opening above the fireplace, which will diminish the effective draught as its size is increased, or by a combination of both of these contrivances.

When the fireplace can be enclosed thus, there is little liability to descending currents or 'smoky chimneys,' as they are called, even when the C. is very short, or has a tortuous course. It is chiefly with open fireplaces that this defect occurs, and the means of prevention and cure is a subject of some interest and importance. As with most other evils, the prevention is far easier than the cure; for by properly constructing the C. in accordance with the principles above stated—by placing the opening of the C. as nearly over the fire, and contracting the open space above the fire, as much as possible—downward smoking may in most cases be easily prevented. When a C. is in the neighborhood of a wall or building nearly as high as itself, or—what is still worse—higher, it is apt to smoke on account of the eddies and other complex currents in the air, caused by the interference which such an obstacle presents to the regular movement of the wind. In towns, such tortuous movements of the atmosphere are very common, and the contrivances for preventing the wind from blowing down the chimneys are very numerous, and often grotesque. Revolving cowls of various forms, but alike in having a nearly horizontal outlet, which is so turned by the wind that the mouth shall always point in the direction opposite to that whence the wind is blowing, are the most common, and usually the most effectual. They are generally constructed of sheet-zinc, with an arrow, a flattened pigeon, or other device, as a vane, to determine the rotation of the cowl. The curing of smoky chimneys, in conjunction with the economizing of fuel, was one of the favorite subjects of investigation of that very practical philosopher, Count Rumford. He says: 'Those who will take the trouble to consider the nature and properties of elastic fluids—of air, smoke and vapor—and to examine the laws of their motions, and the necessary consequences of their being rarefied by heat, will perceive that it would be as much a miracle if smoke should not rise in a chimney—all hindrances to its ascent being removed—as that water should refuse to run in a siphon, or to descend a river. The whole mystery, therefore, of curing smoky chimneys is comprised in this simple direction: find out and remove those local hindrances which forcibly prevent the smoke from following its natural tendency to go up the chimney; or rather, to speak more accurately, which prevent its being forced up by the pressure of the heavier air of the room.'* He then goes on to speak of above 500 smoking chimneys that he has had under his hands, and which were supposed incurable, and states that he was never obliged, 'except in one single instance, to have recourse to any other method of cure than merely reducing the fireplace and throat of the chimney, or that part of it which lies immediately above the fireplace, to a proper form and just dimensions.'

The figures illustrate his method of proceeding. Fig. 1 is a side view of a vertical section of a C. and fireplace before alteration; fig. 2, the same after the reduction of the fireplace and throat of



chimney. *ab* is the opening of the fireplace in both; this is lowered by the piece at *a*, fig. 2, and the depth diminished by the brickwork, *ce*, behind; *cd* is a movable tile, to make room for the C.-sweeper. Figs. 3 and 4 are plans of the fireplace, looking down upon the hearth: the original opening of the fireplace is shown by ACDB, fig. 3; the contracted opening, by *acdb*, in fig. 4. The dark space is filled with rubbish and faced with brick-work.

The slope of *ac* and *bd*, fig. 4, is better adapted for radiation into the room than the square opening of fig. 3: the fire being brought further forward, has also more heating effect; the space of the fireplace being smaller, the air within it will with a given sized fire become hotter, and therefore have more ascending power; while in the contracted throat widening downwards, and having its sides

* *Essays: Political, Economical, and Philosophical*, by Benjamin Count Rumford, vol. i. p. 299.

strongly heated, there is a rapid rush of heated air, which carries the smoke upwards, and resists the passage of temporary down-draughts. Most modern chimneys and fireplaces are now constructed in accordance with Count Rumford's suggestions. See GRATE.

One frequent cause of smoky chimneys is the want of sufficient inlet for air to the room. Sandbags placed under doors, and other devices for preventing ventilation, may cause a well-constructed C. to smoke. Openings must exist somewhere, of sufficient capacity to supply the air which is to ascend the chimney. If the air enters the room on the same side as the fireplace, a temporary descending current is likely to be produced. The openings are best opposite the fire. For the methods of arranging and regulating such openings for the admission of air, see VENTILATION.

Tall factory-chimneys, usually built of brick, are very costly structures, many of them rivaling in height our loftiest cathedral spires. Their construction has been considerably economized by building from the inside, and thus saving the expensive scaffolding. Their walls are built very thick at the base, and gradually thinner upwards: recesses are left at regular intervals in the inside, and stout wooden or iron bars rest upon these to form a sort of temporary ladder for the workmen to ascend; the materials are hoisted by ropes and pulleys.

Sheet-iron chimneys are largely used in Belgium. They are much cheaper but less durable than brick, and are objectionable on account of their rapid cooling by the action of the external air.

CHIMPA'NZEE (*Troglodytes niger*), a species of ape; one of those which in form and structure exhibit the greatest resemblance to man. It is a native of the warmest parts of Africa; to which also the Gorilla (q. v.), a larger species of the same genus, belongs. The C. is sometimes called the black Orang; but differs from the Orang (q. v.) (*Pithecus*) of Asia in the proportionally shorter arms, which, however, are much longer than those of man; in the possession of an additional dorsal vertebra, and an additional or thirteenth pair of ribs; and in other particulars, in some of which it more nearly resembles, and in others more widely differs, from

Chimpanzee.

the human species. In both, the difference from man is very wide in the general adaptation of the structure for movement on all fours and for climbing and moving about among branches, rather than for erect walking, although the C. is able to move in an erect posture more easily than any other ape, usually however, when so doing, holding its thighs with its hands; and still more in the form of the skull, and consequent aspect of the countenance, the facial angle being as low as 35° in the C. when it is measured without regard to the high bony ridges which project above the eyes; the jaws excessively projecting, and the outline of the face rather concave. There is also an important difference from the human species in the dentition; although the number of teeth of each kind is the same, the canine teeth of the apes is elongated, so as to pass each other, and corresponding intervals are provided for them in the opposite jaw. An interesting point of difference of the anatomy of the C. and Orang from that of man, is in the muscle which in man terminates in a single tendon, and concentrates its action on the great toe, terminating in the apes in three tendons, none of which is connected with the great toe or hinder thumb, but which flex the three middle toes; part of the adaptation of the foot for clasping as a hand. The great toe both of the C. and Orang is shorter than the other toes, and opposed to them as a thumb.

The C. does not seem to attain a height of quite four feet when in an erect posture. Its skin is thinly covered with long black hair in front; the hair is thicker on the head, back, and limbs. The ears are remarkably prominent, thin, and naked, not unlike human ears in shape. The nose appears as little more than a mere wrinkle of the skin. The thumb of the hand is small and weak, that of the foot comparatively large and powerful. In a wild state, the animal appears to be gregarious, but its habits are not well known. Truth and fable have been so mixed up in the accounts of it, that new information must be obtained from reliable sources before even things not in themselves very improbable can be believed. In a state of confinement, it exhibits, at least when young, considerable gentleness and docility, and readily learns to imitate human actions, in eating with a spoon, drinking out of a glass, and the like; but its intelligence does not appear to be superior to that of many other monkeys, or indeed of many kinds of brutes. Its natural food consists chiefly of fruit and other vegetable substances; in confinement, it exhibits a great fondness for sweetmeats and for wine. The C. is impatient of cold, and the climate of Britain soon proves fatal to it.

CHINA. See CHINESE EMPIRE.

CHINA, or CHINA-WARE. See PORCELAIN.

CHINA BARK, a name of Cinchona (q. v,) Bark, often to be met in books, and in common use on the continent. It is derived, not from the empire of China, but from *Kina* or *Quina*, the Peruvian name of cinchona.

CHINA CLAY, or KA'OLIN. See CLAY.

CHINANDE'GA, a town of Central America, Nicaragua, stands in a fertile plain at the foot of some mountains, about 18 miles north-west of Leon, and about ten miles from the Pacific coast. The houses are straggling, of one story, built of adobes, and many of them are enclosed by gardens and plantations. Maize, sugar, cotton, hides, and poultry are produced in the vicinity. Pop. about 10,000.—OLD CHINANDEGA, which is contiguous, has a pop. of about 4000.

CHINA GRASS, or CHINESE GRASS, the popular name of a fibre used in China for the manufacture of a beautiful fabric known as *Grass-cloth*. The name appears to have originated in the belief that the fibre was that of a grass; but this is not the case, it being chiefly obtained from *Bœhmeria* (q. v.) *nivea*, a plant allied to the nettle. Besides this and other species of the natural order *Urticaceæ*, other plants, as species of *Corchorus* (q. v.) and *Sida* (q. v.), are believed to yield fibres employed in the same manufacture. The fibres are said not to be spun after the European manner, but joined into long threads by twisting their ends together. Grass-cloth is now brought in considerable quantity to Europe, especially in the form of pocket-handkerchiefs. It has a fine glossy appearance and a peculiar transparency.

CHINA ROOT, the root, or rather the *rhizome* (root-stock) of *Smilax China*, a climbing shrubby plant, closely allied to sarsaparilla, and belonging to the same genus; a native of China, Cochin-China, and Japan. See SARSAPARILLA and SMILACEÆ. The stem is round and prickly, the leaves thin and roundish oblong; the rhizome tuberous and large; sub-astringent and diaphoretic. It is occasionally used in medicine, and is imported in a dry state into Europe; but it is also employed in the East as an article of food. It abounds in starch.

CHINCHI'LLA, a town of Spain, in the province of Albacete, 10 miles south-east of the city of that name. It is situated on an abrupt rocky hill, crowned by a castle, and is surrounded by walls. The town is in general well built, with good streets, and a fine parish church, containing some excellent works of art. It has manufactures of cloth, linen, leather, earthenware, and glass, and a trade in the agricultural produce of the district. Pop. 7500.

CHINCHILLA (*Chinchilla*, *Eriomys*, or *Callomys*), a genus of South American quadrupeds, of the order *Rodentia;* the type of a family, *Chinchillidæ*, allied to Cavies (*Caviedæ*), but differing from them in possessing clavicles. The general aspect is somewhat rabbit-like. There are several genera of *Chinchillidæ*, distinguished in part by the number of toes; the true chinchillas having four, with the rudiment of a fifth on the fore-feet, and four on the hind-feet; whilst in the genus *Lagidium* or *Lagotis* there are four on each foot; and in *Lagostomus*, four on the fore-feet and three on the hind-feet. All the species of this family are gregarious; feed much on roots, for which their strong and sharp incisors are particularly adapted; and live either in holes, which they select for themselves in rocky districts, or in burrows, which they excavate. They are valued for their fur, particularly the CHINCHILLA of the Andes (*C. lanigera*), of which the fur

Chinchilla.

constitutes an important article of commerce. Their numbers are said to be sensibly decreasing in consequence of the demand for the fur. The ancient Peruvians were accustomed to employ the wool of the C. for the manufacture of fine fabrics. Molina suggests, that it might easily and profitably be kept in a domesticated state.

CHINCHO'N, a town of Spain, in the province of Madrid, 25 miles south-south-east of the city of that name. It is pleasantly situated on a hill near the Tagus. Agriculture forms the chief occupation of the inhabitants. Pop. (1877) 4771. After a Countess of C., wife of the governor of Peru in 1638, Peruvian bark was named *Chinchona*, now habitually misspelled *Cinchona* (q. v.).

CHINDWA'RA, a town in the Central Provinces of India, lat. 22° 3′ N., and long. 78° 58′ E. It occupies a plateau amid the Deoghur Mountains, standing 2100 feet above the level of the sea. Its climate is consequently one of the most agreeable and salubrious in India, attracting many visitors in search of health or recreation. Pop. (1872) 8626.

CHINE, La, a village of the Dominion of Canada, on the south side of the island of Montreal, and about 9 miles to the west of the city of that name. Both the city and the village stand on the left bank of the St. Lawrence, or rather, of a branch of the Ottawa; for here, and at least 10 or 12 miles further down, these united rivers keep their waters unmingled. As the intermediate portion of the stream forms the Rapids of St. Louis, the consequent interruption of the navigation naturally rendered La C. a turning-point between the maritime and the inland communications. Gradually, however, its importance in this respect has been diminished, if not extinguished, by works between it and Montreal—a canal, a railway, and even improvements in the rapids themselves. The pop. in 1871 was 1696.

CHINESE EMPIRE, a vast territory in Eastern Asia, comprehending five great divisions—viz., 1. Mantchuria (q. v.); 2. Mongolia (q. v.); 3. Turkestan (q. v.); 4. Tibet (q. v.); 5. China Proper, or the Eighteen Provinces (*Shih-pa-sang*), including the two large islands of Formosa and Hainan—the former being reckoned in the province of Fuh-keen, and the latter as a department of Kwang-tung.

China Proper occupies the eastern slope of the table-lands of Central Asia. In form it approaches to a square, and covers a surface eighteen times as large as Great Britain. It is inhabited by more than 360 millions of the human race, living under the same government, ruled by the same laws, speaking the same language, studying the same literature, possessing a greater homogeneity, a history extending over a longer period, and a more enduring national existence than any other people, whether of ancient or modern times; indeed, when we consider its high antiquity, its peculiar civilization, its elaborate administrative machinery, its wondrous language, its philosophy and classic literature, its manufacturing industry and natural productions, giving rise to such gigantic commerce with our own land, China is perhaps the most remarkable country in the world, and is worth a closer and more serious study than has yet been generally accorded to it. China Proper is included between 18° and 40° N. lat. (which takes in the island of Hainan), and 98°—124° E. long. Its coast-line exceeds 2500 miles, and the land-frontier 4400 miles. A line running direct north and south would give a length of 1474 miles; and another at right angles to this, 1355 miles; but one drawn diagonally from its north-eastern extremity through Yun-nan would measure 1669 miles. The area of China Proper is usually given at 1,548,000 square miles; other authorities allege that the entire dimensions of the 18 provinces (19 with Sheng-king in Manchuria) cannot be much under 2,000,000 square miles. All these measurements, however, must be taken as mere approximations.

Physical Features.—China has a general slope from the mountains of Tibet to the shores of the Pacific. The two principal mountain-chains divide it into three longitudinal basins, drained by those great rivers for which China is famous. Within its provinces are found alluvial plains, fertile river-valleys, large populous towns, as well as thinly inhabited hilly and mountainous regions. To describe its surface more particularly, it may be viewed under its natural divisions of mountainous country, hilly country, and the Great Plain. The first comprehends more than half the region between the meridian 113° and Tibet. East of this meridian, and to the south of the Yang-tze-kiang river, is the hilly country, which includes the provinces of Fuh-keen, Keang-se, Kwang-tung, and a portion of Hu-nan and Hupih; while to the north-east stretches the Great Plain. This latter extends from the Great Wall to 30° N. lat.: a line drawn from King-chow in Hupih to Hwae-king on the Yellow River, may be considered its western limit; and the sea forms its boundary on the east. This vast and generally fertile tract has an area of 210,000 square miles, and supports a population of 177 millions.

From the mountains of Tibet two grand ranges stretch across China, having a general direction from south-west to north-east. The more northerly of these—the Thsin-ling or Blue Mountains—are included between the parallels of 31° and 34°. The southern or Nan-ling chain is a spur of the Himalayas. Commencing in Yun-nan, it bounds Kwang-se, Kwang-tung, and Fuh-keen on the north, and passing through the province of Che-keang—where some of its peaks reach the height of 12,000 feet—enters the sea at Ning-po; thus forming a continuous barrier—penetrated only by a few steep passes, of which the Mei-kwan, or Mei Pass, is the best known—that separates the coast-land of South-eastern China from the rest of the country. This great chain throws off numerous spurs to the south and east, which, dipping into the sea, rise above it as a belt of rugged islands along the southern half of the Chinese sea-board. Of this belt, the Chusan Archipelago is the most northerly portion.

The magnificent *river-system* of China is represented by those noble twin streams, the Hoang-ho or Yellow River, and the Yang-tze-kiang, which, springing from the same water-shed, the eastern mountains of Tibet, are widely separated in their mid course, but of late entered the sea within 2° of each other. The former has its source in 35½° N. lat., and about 96° E. long.; and after a very tortuous course, now empties itself into the ocean in lat. 38°. (For the changes in its lower course, see the article HWANG-HO.) It is for the most part little adapted for navigation. But the river most beloved by the Chinese is the Yang-tze-kiang (q. v.)—in its upper course called Ta-kiang, or Great River—with a drainage basin of 750,000 square miles. Of the other rivers, the Peiho in the north, and the Choo-keang in the south, are the most noteworthy.

The principal *lakes* of China are five in number—viz., the Tung-ting-hu, in 113° E. long., with a circumference of about 220 miles; the Poyang-hu, in 116° E. long., 90 miles in length and 20 in breadth; the Hung-tsin-hu, in Keang-su; the Tsau-hu, between Ngankin-fu and Nankin; and the Tai-hu, in 120° E. long.

The *Grand Canal* has greatly facilitated the internal navigation of the country. Until lately, the great annual grain-fleet, with its 430,000 tons of rice for the use of the capital, passed from the south to the neighborhood of Pekin by this great water-way; thus avoiding the storms and pirates of the coast, but the alteration already mentioned in the course of the Hoang-ho has rendered it comparatively useless. It connects Tien-tsin in Chih-le with Hang-chow in Che-keang; though the canal proper commences in Shan-tung, and its total length is about 650 miles.

Another world-famous structure is the *Great Wall*, called Wan-li-chang (myriad-mile-wall) by the Chinese. There have been several great walls built against invaders: one in 300 B.C., and a larger one in 214 B.C., but there is no reason to suppose that either corresponds with the present one. In 1368, the pressure of the Mongols first suggested to the emperors of the Ming dynasty the idea of a continuous and comprehensive wall; and at detached periods in successive centuries, the present great wall came into existence. Part of it dates from the period between 1530 and 1620 A.D. (see *Proc. of the Geog. Society*, 1882). It traverses the northern boundary of China, extending from 3½° E. to 15° W. of Pekin, and it is carried over the highest hills, through the deepest valleys, across rivers, and every other natural obstacle. The length of this great barrier is 1259 miles. There are four different kinds of masonry in various parts of it; but the most important portion consists really of two parallel walls of burnt brick, the interval between them being filled up with clay, stone, and brickbats. Including a parapet of 5 feet, the total height of the wall is 20 feet; thickness at the base, 25 feet; and at the top, 15 feet. Towers or bastions occur at intervals of about 100 yards. These are 40 feet square at the base, and 30 feet at the summit, which is 37 feet, and in some instances 48 or 50 feet, from the ground. Earth enclosed in brickwork forms the mass of the wall; but for more than half its length it is little else than a heap of gravel and rubbish.

Geology.—The high lands, where are the sources of the great rivers of China, consist of granitic and metamorphic rocks. These are continued round the south and south-east of the country, until they leave a huge basin, through which flow the Yang-Tze-kiang and Hoang-ho, occupied by fossiliferous strata. The wild and rugged scenery of the larger portion of China is owing to the predominance of those crystalline and sub-crystalline rocks. The fossiliferous strata exhibit representatives of the various formations. The Palæozoic rocks are but sparingly developed in a narrow stripe which runs from near Pekin, in a south-westerly curve, to nearly the center of the empire. Cretaceous rocks occur in the valley of the Yang-tze-kiang. Tertiary beds fill up the eastern portion of the immense basin; while extensive districts to the west of this region, extending to the crystalline rocks in the extreme west, are covered with modern detritus.

Though no active volcanoes are known to exist except one in Formosa, yet indications of volcanic action are not wanting. Salt and hot-water springs are found in Yun-nan; sulphur springs near Foochow; and wells of petroleum in Shen-se and Formosa. The most famous amongst the *minerals* of China is jade or the yu-stone, obtained chiefly in Yun-nan. Coal, limestone, and porcelain clays

CHINA
Geographical Miles, 60=One Degree
0 50 100 200 300
English Miles, 69 = One Degree
0 50 100 200 300
Longitude East 115 from Greenwich
MONGOLIA
TIBET
BURMAH
PEKIN
GULF OF PE-CHE-LEE
YELLOW SEA
EAST SEA
SOUTH SEA
NAN-HAI
GULF OF TONKING
Hainan Strait
NANKIN
CANTON
Hoang-ho (Former Mouth)
Hoang-ho
Yang-tsze-kiang
Min R.
Si-kiang or Canton R.
Hong-kong(Br.)
Macao
PIRATE I.
LIEN-CHOO PENINSULA
TINHOSA I.
Formosa Channel
Basil I.
LINDSAY I.
COREAN ARCHIPELAGO
Seul or King-ki-tao
QUAELPAERT
HALLS I.
Shan-tung Pr.
Corea
Manchuria
Mongolia
Thibet
Great Wall
Tsin-ling Mts.
Nan-ling Mts.
Yun-ling Mts.
Tan-sia-shan Mts.
Mt. Young-tsiang-chan
Mt. Kin-ling
Mt. Omi
Mt. Kiu-hua
Mt. Tai-shan
Mt. Heng-shan
Mt. Hoa-shan
Mt. Hing-shan
Mt. Wu-tang
Mt. Lu-shan
Mt. Tien-mu
Mt. Tien-tai
Mt. Wu-i
Mt. Nan-ngao
Mt. Tai-yun
Mt. Tai-hang
Mt. Yen-shan
Mt. Ta-hing
Mt. Ta-pan
Mt. Ta-liang
Mt. Ta-lu
Mt. Ta-yu
Mt. Ta-ku
Mt. Ta-ling
Mt. Ta-ho
Mt. Ta-ho
Mt. Ta-ho

are abundant. Precious stones are said to be met with in some districts. In Yun-nan, gold is washed from the sands of the rivers, and in the same province silver-mines are worked; here, too, is obtained the celebrated pe-tung or white copper. All the commoner metals are likewise found in China. Near the city of Ning-po are extensive stone-quarries.

Vegetable Productions.—Our knowledge of the flora of China has been much advanced by the researches of Fortune, Richthofen, and others; and there are now numerous works discussing the geography, culture, and varieties of the tea-plant, and of the botany of the country generally. The tea-plant (*Thea viridis* and *Thea bohea*) is the most important vegetable production of China (see TEA). The tallow-tree (*Stillingia sebifera*) the *Dryandra cordata* or varnish-tree, the camphor-tree (*Laurus Camphora*), the Chinese pine (*Pinus Sinensis*), the Chinese banyan (*Ficus nitida*), the funereal cypress —introduced into this country by Mr. Fortune—and the mulberry, are amongst the most important trees of China. The cocoa-nut and other palms flourish on the southern coast. Of the bamboo, which grows as far north as lat. 38°, there are 63 principal varieties; and it is said that the bamboos of China are more valuable than her mines, and, next to rice and silk, yield the greatest revenue. The various uses to which they are applied is truly astonishing; and, amongst others, the bamboo is famous as an instrument of punishment. The fruits of both the tropical and temperate zones—apples, grapes, pomegranates, mangoes, pine-apples, three species of orange, the lichi, &c.—are found in the country; and camellias, azaleas, and gardenias are natives of the 'Flowery Land.' The *nymphæa*, or water-lily, is greatly prized by the Chinese, both for ornament and in an economical point of view. *Agriculture* is held in higher estimation in China than, perhaps, any other country in the world. On the first day of each year, a grand state-ceremony is performed in its honor. The emperor, accompanied by his great officers of state, repairs to the Sacred Field, and having offered sacrifices on an altar of earth, he traces a furrow with the plough, and his example is followed by princes and ministers. A like solemnity is celebrated by the governor of every province, who represents the emperor. The agricultural system of the Chinese is rude, but effective; and every inch of arable land is carefully cultivated. Spade-husbandry and irrigation are carried on to a great extent.

The Chinese have a strong perception of the value of night-soil as a manure; for, whilst in this country thousands of pounds' worth are annually thrown into the Thames, in China it is everywhere saved, bears a high price, and is collected in a manner exceedingly offensive to European notions. In the northern provinces, the cereals are principally maize, barley, and wheat; but in the south, rice is raised in vast quantities, and forms the staple food of the people. Tobacco and the poppy are also raised in considerable quantities.

Animals.—Very little is really known of the zoology of China. Some of the more ferocious of the carnivorous animals still linger in the jungles of Yun-nan, and are occasionally found along the whole of the Nanling range of mountains as far as Ning-po, where there is a mart for their skins. Wild cats are common in the forests of the south, and bears are still found in the hills of Shan-se. Of the ruminantia, there are the musk deer (*Moschus moschiferus*), the moose-deer, and a few other species. The gold and silver pheasant, the argus pheasant, and other gallinaceous birds, hold a prominent place in the ornithology of China. Fly-catchers, thrushes, grackles, and goat-suckers have their representatives in China, and there are several species of crows, jays, and magpies. Water-fowl inhabit the lakes, rivers, and marshes. The larger reptiles are unknown; but tortoises and turtles abound on the coast, and lizards are plentiful in the south. The ichthyology of China is considered to be one of the richest in the world. Sharks, rays, sturgeons, and other cartilaginous fishes, are common on the coast; and the carp formerly was very plentiful in the lakes and rivers. The goldfish has been introduced into Europe from China. Of insects, the arachnidæ are large and numerous; indeed, a tree-spider captures and kills small birds. Locusts often commit extensive ravages. Silk-worms are highly valued, and reared in large numbers.

In a country of such vast extent—extending from 18° to 45° N. lat.—the *climate* must vary greatly. Indeed, as regards both climate and productions, China may be divided into three zones —the northern, the central, and the southern. The northern zone extends to the 35th parallel, and includes the fine provinces of Shang-tung, Chih-le, Shan-se, Shen-se, and Kan-su. It produces the grains, fruits, and animals of Northern Europe. Here the children are red-cheeked, and the extremes of heat and cold are great. In Chih-le, the winters are very severe; and at that season ice a foot thick renders the rivers unnavigable. The natural productions of this and the contiguous northern provinces are wheat, barley, oats apples, the hazel-nut, and the potato; they are also rich in wood and minerals.

The central zone, the richest portion of China, contains eight provinces—Sze-chuen, Kwei-chow, Hunan, Hupih, Keang-su—and is bounded by the 27th or 28th parallel; tea and silk are its characteristic products; the middle portion is the granery of China, and the eastern part is celebrated for its manufactures of silk and cotton. The southern zone embraces five provinces—Yun-nan, Kwang-tung, Kwang-se, Fuh-keen, and Che-keang. The exchange of its tropical productions for those of the northern zone is an important branch of the internal commerce of the country. Kwang-tung lies partly within the tropics; and the whole province is tropical, both in climate and productions. The following table (no later census has been made) exhibits the situation, area, and population of the eighteen provinces into which China is divided for administrative purposes :

PROVINCES.	Population. Census of 1812.	Sq. Miles.	Pop. per Sq. Mile.
Northern Provinces—			
Chih-le	27,990,871	58,949	475
Shang-tung	28,958,764	65,104	444
Shan-se	14,004,210	55,268	252
Ho-nan	23,037,171	65,104	420
Eastern Provinces—			
Keang-su	37,843,501	44,500	850
Gan-hwuy	34,168,059	48,461	705
Keang-se	23,046,999	72,176	320
Che-keang	26,256,784	39,150	671
Fuh-keen	14,777,410	53,480	276
Central Provinces—			
Hu-pih	27,370,098	70,450	389
Hu-nan	18,652,507	74,320	251
Southern Provinces—			
Kwang-tung	19,174,030	79,456	241
Kwang-se	7,313,895	78,250	93
Yun-nan	5,561,320	107,969	51
Kwei-chow	5,288,219	64,554	82
Western Provinces—			
Shen-se	10,207,256	67,400	153
Kan-su	15,193,125	86,608	175
Sze-chuen	21,435,678	166,880	128
Totals,	360,279,897	1,298,079	277

But, according to the *Almanach de Gotha* for 1880, the population of C., properly so called, was estimated at 405,000,000; and of the rest of the empire, including Mantchuria, Mongolia, Tibet, and Corea, 28,000,000—in all, 433,000,000. After Pekin, the capital, the largest cities in China are Canton, Tien-Tsin, Foochow, Hankow, Hang-chow-Foo, Ning-po, Amoy, Shanghai, &c.

Inhabitants.—The Chinese proper, by far the most numerous race, are the most important of the Mongolo-Tartar stock (to which the other races in the empire also belong). See CHINESE LANGUAGE, WRITING, AND LITERATURE. A tawny or parchment-colored skin, black hair, lank and coarse, a thin beard, oblique eyes, and high cheek-bones, are the principal characteristics of the race. The average height of the Chinaman is about equal to that of the European, though his muscular power is not so great; the women are disproportionately small, and have a broad upper face, low nose, and linear eyes. Of the general character of the Chinese, it is not easy to form a fair and impartial judgment; and those who have resided long in the country, and know them well, have arrived at very different conclusions. M. Huc asserts that they are 'destitute of religious feelings and beliefs,' 'sceptical and indifferent to everything that concerns the moral side of man,' 'their whole lives but materialism put in action;' but 'all this,' says Mr. Meadows, 'is baseless calumny of the higher life of a great portion of the human race.' He admits, indeed, that these charges are true of the mass of the Chinese, just as they are true of the English, French, and Americans; but as amongst these there is a large amount of generosity and right feeling, and also 'a minority higher in nature, actuated by higher motives, aiming at higher aims,' so also, he maintains, is there amongst the Chinese a similar right feeling, and a like minority who live a higher life than the people generally. See HIOUEN-THSANG. As regards valor, their annals record 'deeds akin to the courage of antiquity;' they have no fear of death, commit suicide as the solution of a difficulty, and endure the most cruel tortures with a passive fortitude; but neither their arms nor discipline enable them to stand before European forces. The Chinese are, as a race, unwarlike, fond of peace and domestic order, capable of a high degree of organization and local self-government, sober, industrious, practical, unimaginative, literary, and deeply imbued with the mercantile spirit. It is to be observed that the inhabitants of China Proper are essentially one people; the difference, except in dialect, being hardly more marked than between the Northumbrian peasant and the Cornish miner. The south-eastern Chinese—the people of Kwang-tung, Fuh-keen, and the south of Che-keang—are the most restless and enterprising in all the eighteen provinces of China, and may be regarded as the Anglo-Saxons of Asia. In the mountainous districts of the four south-eastern provinces of China, but principally in Kwang-se, are certain tribes who maintain a rude independence, wear a

peculiar dress, and are descended from the aboriginal inhabitants of China. Of these, the Meaon-tze are the best known.

The *manners and customs* of the Chinese can only here be glanced at. The *worship of ancestors* is a remarkable and prominent feature in their social life, and is dictated by that principle of filial piety which forms the basis of Chinese society. The rich have in their houses a chamber—a kind of domestic sanctuary—dedicated to their forefathers. Tablets, representing the deceased persons, and inscribed with their names, are here carefully preserved; and at stated seasons, prostrations and ceremonies are performed before them according to the Book of Rites. All Chinese worship from time to time at the tombs of their parents. In everything that relates to death and sepulture, the customs of the Chinese are no less singular. They meet their last enemy with apparent unconcern; but whilst their future state troubles them little, they regard the quality of their coffins as of vital importance, and frequently provide them during their lifetime; indeed, a coffin is reckoned a most acceptable present, and is frequently given by children to their parents. 'To be happy on earth,' say the Chinese, 'one must be born in Su-chow, live in Canton, and die in Lianchau' —Su-chow being celebrated for the beauty of its women, Canton for its luxury, and Lianchau for furnishing the best wood for coffins. Yet death is never alluded to in direct terms, but indicated rather by periphrases, such as—the person 'exists no more,' 'he has saluted the age,' 'ascended to the sky,' &c. Bauquets are offered to the dead, and pathetic speeches addressed to them. In China, *marriage* is universal, and within the reach of all; but there is a strict separation of the sexes, and bethrothal is undertaken by the parents or by professional match-makers. Minute ceremonial observations regulate every step, and frequently the bride and bridegroom see each other on the wedding-day for the first time. Women hold a very inferior position, and are little better than slaves. Polygamy is not recognized by law, but secondary wives are common, especially when the first proves barren.

Chinese (Marriage) Match-makers.

Infanticide, though regarded as a crime, is undoubtedly practised to some extent, as is proved by edits issued against it; and parents possess almost unlimited authority over their children. The intercourse of the Chinese with each other, especially of the upper classes, is regulated by a tedious and elaborate etiquette; indeed, they are the slaves of custom, and everything is done by precedent. Many curious instances of Chinese politeness might be cited. The well-bred host presses many things on a visitor, which the latter must never dream of accepting. 'A Chinaman,' says Mr. Oliphant, 'has wonderful command of feature; he generally looks most pleased when he has least reason to be so, and maintains an expression of imperturbable politeness and amiability, when he is secretly regretting devoutly that he cannot bastinade you to death.' The *Le-king*, or Book of Rites, regulates Chinese manners, and is one cause of their unchangeableness; for here they are stereotyped, and handed down from age to age. The ceremonial usages of China have been estimated at 3000; and one of the tribunals at Pekin—the Board of Rites—is charged with their interpretation. Chinese cookery, in the use of made dishes, more nearly resembles the French than the English. Birds'-nests soup, sharks' fins, deer-sinews, and ducks' tongues, are amongst its delicacies. The wine, or weak spirit (*tsew*), more correctly speaking, used by the Chinese is made from rice; and from this, again, they distil a stronger spirit, the 'samshoo' of Canton. The former is drunk warm in minute cups at their meals; tea never appears during a repast, though it may be taken before or after. The Chinese have numerous *festivals;* and perhaps the most remarkable of these is that celebrated at the commencement of the new year, when unbounded festivity prevails. Preparatory to this, debts are settled, and the devout repair to the temples to gain the favor of the gods. The first day of the year may, in one sense, be reckoned the birthday of the whole people, for their ages are dated from it. Visiting is, at the same time, carried on to a great extent, whilst parents and teachers receive the prostrations and salutations of their children or pupils. The festival of the dragon-boats is held on the fifth day of the fifth month; and at the first full moon of the year, the feast of lanterns. In the manufacture of these the Chinese excel; and on the night of the festival, lanterns illuminate each door, wonderful in their variety of form and material.

In the matter of *dress*, the Chinaman exhibits his usual practical sense, and varies the material according to the season, from cotton-wadded or fur-lined coats to the slightest silk gauze, or grass-cloth. On the approach of cold weather, he lights no fire in his dwelling, but puts on additional clothing until the desired temperature is attained. A tunic, or kind of loose jacket fitting close round the neck, and a wide short trouser, are his principal garments. Shoes are made of silk or cotton, with thick felt soles. White is the color of mourning.

The Tartar tonsure and braided queue became general with the Mantchu conquest of the country, since which 180 millions of men have the hair removed from their heads at short intervals; and as no Chinaman is his own barber, a great number of this calling find employment. The Chinaman is very sparing in his ablutions, and appears to be afflicted with a strange hydrophobia; for cold water, either as a beverage or for washing his person, he holds in abomination. Long nails are fashionable. The costume of the women differs but little from that of the men, and their shoes are the most remarkable part of their toilet. A lady's shoe measures about 3½ inches from the heel to the toe. The feet of the Tartar women are left as nature made them; but amongst the Chinese, all young girls of the better classes are crippled by a tyrant custom. In early infancy the feet are tightly bound, the four small toes being tucked under the sole, of which, after a time, they become a part, and the heel is brought forward. The process is at length complete; stumps have been substituted for the ordinary pedal extremities, and the Chinese lady totters on her goat's feet.

The principal *manufactures* of the Chinese are silk, cotton, linen, and pottery, for which latter they are especially celebrated. The finest porcelain is made in the province of Keang-se. The Chinese invented printing in the beginning of the 10th c., and in 932 A.D. a printed imperial edition of the sacred books was published. The skill of the Chinese in handicraft is astonishing. Their rich silks and satins, light gauzes, beautiful embroidery, elaborate engraving on wood and stone, delicate filigree-work in gold and silver, carvings on ivory, fine lacquered ware, antique vessels in bronze, and their brilliant coloring on the famous pith paper, command our admiration.

Of the grand modern discoveries in the *physical sciences* the Chinese are profoundly ignorant, and the study of nature is altogether neglected. The Chinaman objects to be wiser than his forefathers, but spends a lifetime in studying his classical literature and the sages of antiquity; and here is doubtless one great cause of the homogeneity of the race, and the stereotyped nature of the Chinese mind.

Of *animal physiology and medicine* the Chinese have very crude notions, as is shown by their *scheme* of the human body, in which the heart is placed in the center, with the other organs ranged round it, and their unphilosophical theory of the pulse, which plainly demonstrates that they are ignorant of the true circulation of the blood, and the vascular system in man; hence their practice of medicine must be empirical. Chinese physicians believe that man is composed of five elements; that so long as each maintains its due proportion, health is preserved; but should one gain the ascendancy, illness follows, and the equilibrium must be restored by proper remedies. Acupuncture is practised. The Chinese have had the opportunity of practically testing the superiority of Western medical science, by the establishment of English and American hospitals, by the establishment of a university with foreign professors at Pekin, and by extensive translations of scientific works into Chinese.

In vol. xxiv. of *Nature* (1881) will be found an interesting account of the progress of science in China by means of the translations made under the authority of the department for the translation of foreign books at the Kiangnan Arsenal, Shanghai. Up to 1881, 98 works (mostly scientific) in 236 volumes had been published, and upwards of 30,000 copies of these works (83,500 volumes) had been sold.

Government.—In the centralized autocratic government of China, the emperor is absolute in the empire, the governor in the province, the magistrate in the district. The emperor claims no *hereditary* divine right, and is not always the eldest son of the preceding monarch; the ablest son is nominated, but his right to the throne as the *Teen-tze*, or *Tien-tze*, 'son of heaven,' the *Fung-tien*, 'divinely appointed,' can only be established by good government, in accordance with the principles laid down in the national sacred books. If, on the contrary, he violates these principles, the people firmly believe that heaven signifies, by unmistakable signs, that their ruler is not its chosen representative. 'The rivers rise from their beds, the ground sullenly refuses its fruits, the plains tremble, the hills reel, and the typhoon rages over seas and coasts, all like uttering a "Numbered, numbered, weighed and parted," that requires no interpretation, but is read in anxiety by the people, in dismay and terror by the prince,' who seeks by repentance, and a return to the true principles of the government, to avert his doom. The emperor is absolute as legislator and administrator; but he must legislate in accordance

with the general principles acknowledged in the country. He also constitutes, in his own person, the highest criminal court. The Chinese possess a carefully digested code of laws, which is added to and modified from time to time by imperial edicts. Their penal code commenced 2000 years ago, and copies of it are sold at so cheap a rate as to be within reach of people of the humblest means. Death, which the Chinaman prefers to long confinement, is the penalty for a large number of offences, and in ordinary years about 10,000 criminals are executed. Several modes of torture are legal. The emperor is assisted in governing by two councils—1. *The Inner or Privy Council*, composed of six high officials, three of whom are Chinese and three Mantchus.

The four senior ministers exercise functions corresponding to those of an English prime-minister. 2. *The General or Strategical Council*, which closely resembles our cabinet; being composed of the most influential officers in the capital, who exercise high legislative and executive duties. Under these are six *yamuns* or colleges of government, each charged with a distinct department of government. Over all is the Court of General Inspection, or the *Censorate*, as it is called by foreigners. The mandarins composing this number from 40 to 50; they are 'the eyes and ears of the emperor;' for it is their province to see that all officers of the government, provincial or metropolitan, are faithful in the discharge of their respective duties; and they alone have the right to make representations or complaints to the emperor.

The *administrative machinery* of the Chinese is very perfect in its organization, and demands an attentive consideration for the right understanding of the people and government. In each of the 18 provinces is an imperial delegate or governor, who, besides being at the head of the civil jurisdiction, is commander-in-chief, and possesses the power of life and death for certain capital offences. He is privileged to correspond with the cabinet-council and the emperor. Under the governor are the Superintendent of Provincial Finances, the Provincial Criminal Judge, and the Provincial Educational Examiner; each communicates with his especial board in Pekin. The governor is also assisted by many other judicial and administrative officials. The governmental organization of each province is complete in itself, but in a few instances two provinces—Kwang-tung and Kwang-se, for instance—form a viceroyalty, over which a governor-general, in addition to the governors, exercises authority. Every province is again subdivided into districts, departments, and circuits. The average number of districts in a province is eighty, and each of these is about the size of an English county. A civil functionary, called sometimes the district-magistrate, presides over this division, and is assisted by several subordinate officers. A group of districts—six is the average number for the whole 18 provinces—forms a department, and is ruled by a prefect, who resides in the *fu* or departmental city. Three departments, on an average, constitute a circuit, of which an intendant (Taou-tae) has the charge.

The several grades of mandarins, or Chinese government officials (Chinese name, *kwan-fu*), are distinguished chiefly by a different-colored ball or button on the top of the cap. There are twelve orders of nobility confined to the imperial house and clan, and also five ancient orders of nobility open to the civil and military servants of the state. The normal government of China is less a despotism than a morally supported autocracy, and it is in principle paternal. What the father is to his family, that the governor, the prefect, and the magistrate are intended to be, each in his own sphere, to the people; whilst the emperor stands in the same relation to the myriad inhabitants of his vast dominions. In ordinary times, the Chinaman enjoys much practical freedom, and can travel through the country without passport, or follow any calling he likes.

The Chinese executive system is based on those noteworthy *competitive examinations*, which are intended to sift out from the millions of educated Chinese the best and ablest for the public service. The first examination takes place every three years in the capital of each department, when the lowest degree—that of bachelor—is conferred on a certain number of candidates from each district. Triennial examinations are held in the provincial capital, presided over by two examiners from Pekin, at which sometimes as many as 10,000 bachelors present themselves, and compete for the degree of licentiate. Some 1200 obtain it, and these may attend the triennial metropolitan examination at Pekin, when about 200 may hope for the coveted degree of doctor, which insures immediate preferment.

Much has been written by English authors on Chinese government. Mr. Meadows, from whose works the foregoing sketch of the administrative system of the country has been chiefly derived, has entered very fully into what may be termed the *philosophy of Chinese government*, which he sums up in the following doctrines, and believes them to be deductible from the classic literature of the country, and the true causes of the wonderful duration of the Chinese empire. 1. That the nation must be governed by moral agency, in preference to physical force. 2. That the services of the wisest and ablest men in the nation are indispensable to its good government. 3. That the people have the right to depose a sovereign who, either from active wickedness or vicious indolence, gives cause to oppressive and tyrannical rule. And to these he adds an institution—the system of public-service competitive examinations. But, on the other hand, these examinations, by directing the attention of students solely to the ancient literature of the country, to the exclusion of the physical sciences and inductive philosophy, however efficient in producing that wonderful homogeneity for which the inhabitants of the Central Kingdom are famous, stunt and stereotype the national mind, which, like the dwarfed tree the Chinaman delights to raise in a flower-pot, or the feet of a Chinese girl, can never fully expand.

Education, as the high road to official employment, to rank, wealth, and influence, is eagerly sought by all classes. Literary proficiency commands everywhere respect and consideration, and primary instruction penetrates to the remotest villages. Self-supporting day-schools are universal throughout the country, and the

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office of teacher is followed by a great number of the *literati*. Government provides state-examiners, but does not otherwise assist in the education of the people. The Chinese have a remarkable reverence for the written character. Waste printed paper is collected from house to house and burned, to preserve it from profanation.

Army.—According to the *Pekin Gazette*, China has a prodigious army, but in reality the greater part figures only on paper. Each province is provided with a military force varying from 8000 to about 68,000 men. According to good authorities, the average for each province is about 34,500 men, and 640 officers. The governor of a province is also commander-in-chief, and is assisted by a general-in-chief, as well as lieutenants and majors general. The Chinese and Tartar troops form two important divisions of the army. The Tartar garrisons are indeed the real strength of the Mantchu emperor. That at Pekin is 150,000 strong; and 18 others, averaging each about 3000 men, are dotted about the provinces, forming, with their wives and children, military colonies. These troops, which are armed with good two-edged swords, and serviceable matchlocks, or the national bow, were able to stand against the victorious Tae-ping rebels, and turn them from the capital. But since 1860, large bodies of Chinese troops have been armed and drilled after the European manner, American, French, and British officers having devoted their energies in succession to this work. Arsenals have been established, and all kinds of fire-arms are successfully manufactured. Foreign breech-loading rifles, Krupp's ordnance, and other weapons have been imported. In the prospect of a possible war with Russia about Kuldja in 1881, the Chinese government undertook a reorganization of the army, which the difficulty with France about Tonquin stimulated. Formerly, the army was said to be composed of 678 companies of Mantchus, 100 men in each; 211 companies of Mongols; 106,000 Chinese cavalry; 500,000 Chinese infantry, besides irregular militia. Now there is (1) the army of Manchuria, 30,000 men; (2) of Mongolia, 20,000; (3) of Turkestan, 40,000. Another army (4) of 100,000 defends the coast; and one (5) of 100,000 protects Pekin—in all, an effective army of 300,000 men, which in war would be raised to about 1,000,000.

Navy.—The imperial navy is divided into river and sea-going vessels. The former amount, it is said, to 1900 ships; the latter, 918—with an aggregate number of 188,000 sailors. This force, however, is insufficient to extirpate or even keep in check the pirates who infest the whole coast of China, and the expedient was formerly resorted to of promoting a pirate chief to some high and civil employment. Even yet he is sometimes appointed pilot. The Chinese are now building frigates on their own account—another evidence of the stride taken under the regency of Prince Kung.

Revenue.—The estimates of the public revenue of China vary greatly, and while they are stated by some to exceed 100 million sterling, are held by others not to come up to half that amount.

Official returns of the Chinese government—intended for a special use—were published in 1844, according to which the revenue amounted to £63,934,713, derived mainly from three sources—customs duties, licenses, and a tax upon land.

Religion.—The Chinese, remarkable in so many ways, exhibit, in the matter of religion, their usual eccentricity. Three forms of belief—the Confucian, the Buddhist, and the Taouist—may be considered the national religions, as they are believed in, more or less, by the great mass of the people. Of these, the Confucian and the Taouist are indigenous, but Buddhism was introduced from India. A struggle for ascendency was long maintained between these religions, but has now entirely ceased; indeed, it is no unusual thing for all three to be professed by the same person, and as they supplement each other, this is not altogether inconsistent. Confucianism is the basis of the social life and political system of the Chinese. It has been professed by all their greatest men, and is still the sole belief of the educated classes. It is, however, less a religion than a philosophy, and does not pretend to treat of spiritual things; hence room was left for other creeds to supply its deficiencies in this respect. The questions to which Confucius replied were: 'How shall I do my duty to my neighbor? How can I best discharge the duty of a virtuous citizen?' Funereal temples are erected to Confucius, and though his image is not used as an idol, his tablet is worshiped, and sacrifices of oxen and sheep are offered before it at the vernal and autumnal equinoxes. For an account of Confucius's philosophy, see CONFUCIUS.

Buddhism in China, though extending over the whole country and influencing more or less the mass of the people, is fast losing its hold on them and has very little of the power and authority it once possessed. Its edifices are going to decay, and no new ones rise upon their ruins. Its priests are illiterate, and together with their religion, are held in contempt by the philosophic Chinaman. Aged people and women are now its chief devotees. The accompanying sketch of the begging-monk (taken, as well as all the other cuts, from Cobbold's *Pictures of the Chinese by Themselves*) is characteristic. He wears a loose yellow robe and large stockings; at his back is a wallet in which to receive the contributions of the faithful; and he gives notice of his approach by striking his *muh-yu*, as represented in the illustration. The northern form of Buddhism, which differs considerably from that of Ceylon and the Indo-Chinese Peninsula, prevails in China. Its sacred books, in common with those of Nepaul and Tibet are written in Sanscrit, or are translations from that language. Amongst other additions to the creed are the Western Paradise and the Goddess of Mercy.

Chinese Buddhist Monk.

Taouism has not more hold than Buddhism on the literate Chinese. Its priests are generally ignorant men, few of them teaching or understanding the real principles of their faith. They practice a mystic alchemy, prepare spells and incantations, and, like modern spiritualists, hold intercourse with the dead. When all other remedies have failed with a sick person, the Taouist priests are sometimes sent for to exorcise the evil spirit that is supposed to afflict the patient; and they chant prayers from their mystic ritual, amid the din of gongs, drums, flutes, &c. These mystics worship certain stars, which are supposed to influence human life, and also genii, devils, and inferior spirits. They live in temples with their families, and are known by their slate-colored robes. For a fuller account of Taouism and its doctrines and founder, see LAO-TSE.

Besides these three religions, which alone affect the bulk of the people, there is a *ritual state worship*, which regards the emperor and court alone—a kind of philosophic pantheism, an adoration of certain natural objects; but it is a mere ceremonial, and associated with no theological doctrines. Three classes of objects are distinguished, to which the great, medium, and lesser sacrifices are offered. The first class includes the heaven and the earth. Equal to these, and likewise restricted to the worship of the emperor, is the great Temple of Imperial Ancestors. The medium sacrifices are offered to the sun and moon, the gods of the land and rain, genii, and sages. In the third class are reckoned certain natural phenomena, as well as deceased statesmen and scholars. The emperor appears to acknowledge a Supreme Being as king of kings, the rewarder of virtue and the punisher of vice; but still, Chinese philosophy, as fixed by Chu-tze, is atheistical, and deduces 'the development of the universe from one unintelligent and will-less principle.' Hence all educated Chinese are atheists, at least theoretically, as will be found by arguing with them; but when they speak of human affairs generally, and their own particular lot in life, they exhibit a belief in *Teen* as a supreme, intelligent, rewarding, and punishing power. There are besides some 30,000,000 of Mohammedans within the limits of the empire.

Between the followers of the three national religions there is not only a total absence of persecution and bitter feeling, but a very great indifference as to which of them a man may belong. It arises probably from religious apathy; preferable to the fanat-

Chinese Taouist Priest exorcising.

ical zeal of the Moslem. Amongst the politer classes, when strangers meet, the question is asked: 'To what sublime religion do you belong?' and each one pronounces a eulogium, not on his own religion, but on that professed by the others, and concludes with the oft-repeated formula: 'Religions are many; reason is one; we are all brothers.' The government is equally tolerant of religious diversity, except where a political design is suspected.

Temples belonging to the three religions are very numerous. Those dedicated to Confucius are funereal in character. The Buddhist temples are crowded with images, and Buddha is represented expounding his doctrine to attentive listeners. The many-storied tower takes the place of the bellshaped dagoba or relic-shrine of other Buddhist countries.

History and British Intercourse.—The early annals of China, like those of most other countries, belong rather to mythology than to history. Beginning with Pan-ku, the first of all beings, the country was ruled over first by gods, and then god-descended personages, who revealed to men the essential arts of life. Of those mythical rulers the most famous is Fo-hi. The historical period may be said to commence with the Hia period or dynasty, begun by Yu the Great about 2200 B.C., although a great infusion of the fabulous still continues. Some date the real history of China from the Tchow or Chow dynasty, which began with Wu-wang about 1100 B.C. It was during the reign of Ling-wang (571—544), one of this dynasty, that Confucius was born.

China would seem during this period to have been divided into a number of independent states. The kings of Tsin gradually gained the ascendency, and at last one of them reduced the other states to subjection (247 B.C.), and assumed the title of Hoang, or emperor. It is from the Tsin dynasty that the country has taken its name, Tsina or China. This first emperor finished the Great Wall (see above), as a protection against the Tartars, who had all along under the name of Hiong-nu (Huns), been a source of danger and annoyance to the richer and more pacific Chinese. We cannot enumerate the various dynasties that followed, nor the frequent divisions and reunions of the empire, varied by incursions and partial subjugations by the troublesome Tartars. At last, the Mongols or Western Tartars, being called in to aid the Chinese (1209), became finally (see KUBLAI KHAN) masters of the whole country (1279), and reigned over it till 1368, when they were expelled by the Chinese, and the Ming native dynasty succeeded, which lasted 276 years, and fell at length through its own misgovernment. A general of the last Ming emperor, who was employed in keeping the Mantchus (q. v.) in check, made peace with them, and obtained their assistance against the native usurper who had deposed his sovereign. The Mantchus established themselves in Pekin (1644), and finally, after a seven-years' struggle, acquired the sovereignty of the whole empire. Many of the conquering race now filled the highest offices of state, and owed their position to birth alone. More than one powerful emperor of the race has ably conducted the government of the country; but Hien Fung, who ruled from 1850 to 1861, was reported to have passed his time in a state of drunken imbecility. The late emperor, Tung-chi, succeeded to the throne when only a child five years old, but the government was ably carried on under the co-regency of the empress-dowager, Tze-an, the empress-mother, Tze-sse, and the enlightened Prince Kung, brother of Hien Fung. Tsai-Tien, cousin of Tung-chi, ascended the throne in 1875. As he was then only about four years old, the empresses continued to act as regents.

Of recent events in Chinese history, the most remarkable is the rise, progress, and overthrow of the Tae-ping rebels. Their famous leader, Hung-sew-tseuen, was a man of humble origin, and an unsuccessful candidate for government employment. Some Christian tracts, it is said, led him to renounce idolatry, and he

founded a society of God-worshipers, which, in the autumn of 1850, was brought into collision with the imperial authorities, and immediately assumed a political character. Hung persuaded himself and his followers that he had received a divine commission to uproot idolatry, extirpate the Tartar intruders in the country, and establish the new native dynasty of Tae-ping, or Universal Peace. He assumed the title of Heavenly or Divine Prince (Tae-ping-wang, sometimes called Tien-wang), and bestowed the titles of Eastern Prince, Western Prince, Southern Prince, Northern Prince, and Assistant Prince on five of his chosen leaders. The fanatical principle of divine revelations and other extravagances followed.

They spoke of Tien-ma, the wife of the Heavenly Father; they held that Tien-wang was the son of God as really as Jesus, and worshiped him accordingly. Polygamy was a dark feature of their system, the Tien-wang himself having married 30 wives. The course of this religio-political rebellion, the victorious march of the Tae-ping army from Kwang-se to Nankin in 1850—1853, and its subsequent career, cannot here be traced. We can only afford room to state, that after a series of wasteful and revolting barbarities, it was finally suppressed in 1865 by the imperial troops, led by British and American officers, of whom the most conspicuous and able was Colonel Gordon. See TAE-PINGS.

In early times, the Chinese do not appear to have been opposed to intercourse with foreigners; but the conduct of the Spaniards and Portuguese between 1520 and 1570 excited their hostility. The Mantchu government restricted British trade and intercourse to Canton, where it was carried on through the medium of the *hong* merchants on the one side, and the East India Company on the other. Differences arose, however, from time to time between these two commercial bodies, occasioned chiefly by the exactions of the mandarins on foreign trade. With a view to a better understanding, the British government despatched to Pekin an embassy under Lord Macartney in 1792, and another under Lord Amherst in 1816. On the 22d April 1834, the monopoly of the East India Company ceased, and British imperial officers were appointed to carry out the new judicial and fiscal arrangements. Constant dissensions between these and the mandarins continued till the end of the year 1839, when the latter, under pretence of stopping the opium-trade, committed acts of open hostility. A war broke out the following year, at the commencement of which Chinese officials talked of invading England overland, by way of Russia. The imperial government was, however, sufficiently humbled by the middle of the year 1842, and on the 29th August, a treaty of peace was signed before Nankin, by which the ports of Amoy, Fu-chow, Ning-po, and Shang-hae were, in addition to Canton, thrown open to foreign trade. The other most important articles of the treaty provided that the island of Hong-kong should be ceded in perpetuity to her Britannic Majesty, her heirs and successors, and that the emperor of China should pay 21,000,000 dollars towards the expenses of the war.

With five free ports, British trade with China soon assumed gigantic proportions; and though the Chinese evaded the treaty whenever practicable, no important event occurred to interrupt commercial intercourse till 8th October 1856, when the authorities at Canton seized the crew of the lorcha *Arrow*, a vessel registered at Hong-kong, and entitled, it was considered, to British protection.

Under pressure from the British forces at hand, the imperial commissioner, Yeh, delivered up the men, but refused all apology. Yeh continuing obstinate, Canton was stormed (December 28, 1857) by the allied French and English forces, and the Chinese imperial commissioner captured (January 5, 1858). The government of the city was still carried on by Chinese officials, but under the authority of the plenipotentiaries and commander-in-chief. The former now proceeded to the north of China, to put themselves in more direct communication with the imperial government, which still continued obstinate. The forts at the mouth of the Peiho were taken (May 20, 1858), and at length an important treaty was signed at Tien-tsin, June 26. 1858, which stipulates that the Queen of Great Britain may (Art. ii.) appoint diplomatic agents to the court of Pekin, who (Art. iii.) shall be allowed to reside at the capital, where also her Majesty may acquire a building site. The Christian religion (Art. viii.) shall be protected by the Chinese authorities. . British subjects (Art. ix.) shall be allowed to travel for pleasure or business to all parts of the interior, under passports issued by their consul. British merchant-ships shall trade (Art. x.) upon the Great River (Yang-tze); but as its lower valley is disturbed by outlaws, no port except Chin-keang shall be opened for the present. Chin-keang to be opened in a year from the date of the signing of the treaty.

By this treaty, the vexed question of transit-dues is settled, it being agreed that the British merchant may purchase at the rate of 2½ per cent. *ad valorem*, in case of imports at the port of entry; and in the case of exports he may purchase a certificate enabling him to pass his goods, duty-free, to the port of shipment. By a separate clause, the Chinese government agreed to pay two million taels (about £650,000), as indemnity for losses sustained by British subjects at Canton, and a like sum towards the expenses of the war.

The repulse on the Peiho (June 1859), by a Tartar force concealed in the Taku forts, of the expedition forming the escort of the British and French ambassadors, who were on their way to Pekin, to ratify with the emperor of China the treaty of Tien-tsin, entailed another costly demonstration in the Chinese waters. The Taku forts were captured by the allied English and French forces, August 21, 1860, and Pekin itself in Dec. 1860. The treaty of Tien-tsin was ratified, two additional articles being inserted, one of which legalized coolie emigration. Since 1861, a gradual but beneficial change has come over the spirit of the Chinese government. Prince Kung proved a vigorous and successful regent. The army has been reorganized, and is now subjected to European drill (see par. *Army*); a respect for the observance of treaties has sprung up; a national flag has been adopted, and a desire shown on the part of the Chinese to make themselves acquainted with international law. In 1866, emigration to all other countries was allowed. Shanghai has telegraphic communication with Europe, and Tien-tsin and Pekin are since 1880, connected with Shanghai. In 1883, the Chinese proposed a telegraph from Canton to Shanghai. The first Chinese railway, opened at Shanghai in 1876, was unluckily closed again.

Chinese are now found on almost every shore of the Pacific, where their industry, skill, and sobriety secure them abundant employment. They are especially numerous in the Pacific States of the American Union, where harsh measures, including a heavy tax on arriving, have recently been adopted in order to repress Chinese immigration. Between 1855 and 1880, upwards of 215,000 Chinese had, for a longer or shorter time, established themselves in the United States. The Che-foo convention, in 1876, opened three additional ports. In 1879, China seemed likely to go to war with Russia about the possession of Kuldja; but a treaty was concluded in 1881 between the two countries, in which the territory of Ili, including the town of Kuldja, was given up to China, while the latter agreed to pay an indemnity of 10,000,000 roubles. In 1880, a steamer owned and manned by Chinamen appeared in an American port; and in 1881, the authorities were proposing to lay a railway from Pekin to Tien-tsin, and were promoting manufactures after European methods.

Commerce.—The rivers and numberless canals of China are covered with vessels of all sizes; the Chinese are devoted to traffic. The total value of the imports into China in 1881 was £20,658,500, and of the exports £19,947,300. Tea and silk are the great staple exports from China.

Years.	Exports from China to Great Britain.	Imports of British Home Produce into China.
1870	£9,481,737	£6,139,633
1873.....	12,454,234	4,882,701
1875.....	14,809,632	8,528,311
1877.....	15,323,342	7,912,663

There is no *coinage* in China except the copper *tchen*, or 'cash,' which is in value about the tenth of a halfpenny; and all but the most trifling payments are made by a certain weight in silver, or in Mexican or Spanish dollars. Chinese accounts are kept in taels, mace, candareens, and cash. A tael is worth 6*s*. 8*d*., British currency.

See Meadows's *Chinese and their Rebellions* (1856); Sir J. F. Davis's *China* (1857); Davis's *China during the War and since the Peace* (1852); Williams's *Middle Kingdom* (1848); Oliphant's *Earl of Elgin's Mission to China and Japan* (1859); De Moges's *Baron Gros's Embassy* (1860); Huc's *Chinese Empire* (1858); Cooke's *China in* 1857 *and* 1858; Fortune's *Three Years' Wanderings in China* (Lond. 1847); Fortune's *Visit to the Tea Districts of China* (Lond. 1852); Edkin's *Religious Condition of the Chinese* (1858); Cobbold's *Pictures of the Chinese by Themselves* (1859); *Twelve Years in China, by a British Resident* (1860); *Memoires sur la Chine* (1869); Rev. A. Williamson's *Journeys in North China, &c.* (1870); also Dr. Gray's *China: a History of the Laws, Manners, and Opinions of the People* (1878); Richthofen's great work, *China* (1st vol. 1877); and *Boulger's History of China* (vol. i. 1881).

CHINESE EDIBLE DOG. The kind of dog used as an article of food in China, and reared in order to be so used, being esteemed as a delicacy, is a small dog of greyhound-like form, with somewhat terrier-like head, and muzzle more elongated than in terriers. It is fleet and active, gentle

Chinese Crested (Edible) Dog.

and affectionate. The skin is almost destitute of hair; but there is a variety having a crest of long hair on the head, and a large tuft of hair at the tip of the slender and otherwise naked tail.

CHINESE HEMP. See CORCHORUS.

CHINESE INK. See INDIAN INK.

CHINESE LANGUAGE, WRITING, AND LITERATURE. The Chinese language belongs to those Asiatic languages commonly called monosyllabic, because each word is uttered by a single movement of the organs of speech, and expresses in itself a complete idea or thing. All Chinese words end either in a vowel, a diphthong (in which, however, each vowel sound is distinctly pronounced, making the word often to appear or more than one syllable), or a nasal. Of such simple words of roots there are about 450. But the emphasis or accent of many of these words may be varied by the speaker in four or five different ways, so as to produce a corresponding variety in their meaning, by which means the number of simple words or roots amount to about 1200. There is no distinction of parts of speech in the Chinese language, and no recognition of the principle of inflection, Chinese words being incapable of any modification of *form*. The relations of words are ascertained by their position in a sentence. Hence Chinese grammar is *solely* syntax. Thus *ta*, according to its position in a sentence, at one time serves the purpose of an adjective, meaning 'great;' at another, a substantive, meaning 'greatness;' and again of a verb, meaning 'to enlarge' and 'to be great,' or of the adverb 'very.' There are certain words, however, which have at length lapsed into so vague and general a signification, that in conversation and literature they are now used in some cases as particles to determine the relations of other words; but in the older literature this is very rare, and is against the genius of the language. From what has been said, it will readily be inferred that the gender, number, and case of words are not determined by the *form* of the words themselves. They are, in fact, denoted by the addition of other words. Thus, *people* in Chinese is *multitude man*, *son* is *man child*, *daughter* is *woman child*. *The best of men* is in Chinese *a hundred man good*. The purest Chinese is spoken at Nankin, but the same idiom, called 'the language of the mandarins,' is spoken by the educated in all parts of the empire. For a knowledge of Chinese grammar, see Schott's *Chinesische Sprachlehre* (Berlin, 1857); Summer's *Handbook of the Chinese Language* (1863); Julien, *Syntaxe Nouvelle de la Langue Chinoise* (Paris, 1870); Morrison's *Dictionary of the Chinese Language* (Shanghae, 1865).

In Chinese the written character, generally speaking, does not indicate the sound of the word, but gives a kind of hieroglyphic or pictorial representation of the idea or thing to be expressed. Hence there are required as many of these characters or symbols as there are ideas to be represented. Since many words similar in sound are different in signification, whilst in writing each idea has its peculiar symbol, the number of words represented by writing —without reckoning those peculiar to certain dialects—is perhaps ten times greater than those distinguished by the ear. The number, in fact, is reckoned at 50,000, but these are far from being all in general use. In writing and printing, the characters are arranged in perpendicular columns, which follow one another from right to left.

In its origin, Chinese writing is hieroglyphic or picture-writing, with the addition of a limited number of symbolical and conventional signs; the larger number of Chinese characters are formed by the combination of such hieroglyphs and signs. But as one such character by itself seldom determines the sound, an additional word is conjoined for this purpose; so that the great mass of Chinese written words consist of an ideographic and a phonetic element. Native grammarians divide their characters into six classes. The first class comprises simple pictorial representations of sensible objects, such as sun, moon, mountain, &c., and contains 608 characters, The second class includes such characters as are formed by the combination of two or more simple hieroglyphs, which together convey, in a more or less intelligible manner, some other idea: for example, the hieroglyph for sun, combined with that for moon, conveys the idea of light; mouth and bird, that of song, &c.; of these there are 740. The third class embraces those characters which indicate certain relations of position, as above, below, the numerals, &c; of these there are 107. The fourth class consists of characters which, by being inverted, acquire an opposite signification, as right, left, standing, lying, &c., and contains 372. The characters of the fifth class are termed derived characters; the meaning of the simple or compound characters used to express physical objects, is transferred to mental objects, or to other physical objects with which they are associated, e. g., the hieroglyph for a heart signifies the soul—that for a room, signifies the wife, &c.; of these there are 598. The characters of the sixth class include those which are composed, as above mentioned, of sign and sound. Almost all names of plants, fishes, birds, and many other objects which it would be difficult to represent hieroglyphically, are denoted by the compound characters of the sixth class, which amount to 21,810 in number. As this class, however, consists merely of repetitions of the other five classes, the immense number of Chinese characters may be reduced to 2425; and whoever learns these may be said to know them all.

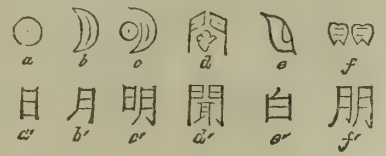
The hieroglyphical characters in their oldest form were easily recognizable figures: thus, the hieroglyph for sun was as in the fig. at *a*; for moon, as at *b*; for light, a combination of sun and moon, as at *c*; for to listen, folding-doors and an ear, as at *d*; for white, a very squint eye, in which hardly anything but the white is seen, as at *e*; for friends, the two valves of a bivalve shell, as at *f*. In the course of time, through hasty and careless tracing, the objects denoted by the hieroglyphs have almost ceased to be recognizable. The modern hieroglyphs corresponding to the above are as represented at *a'*, *b'*, *c'*, &c. See Abel Rémusat's 'Mémoire sur l'Ecriture Chinoise,' in the *Mémoires de l'Académie des Inscriptions*, vol. viii.; and for a view of the Chinese characters, both ancient and modern, Hager's *Monument de Yü* (Par. 1802.)

The Chinese literature in a geographical, ethnographical, and historical point of view, is unquestionably the most comprehensive and important of the whole of Asia. The printed catalogue of the Emperor Kien-long's library is composed of 122 volumes; and a selection of the Chinese classics, with commentaries and scholia, which was begun by the order of the same emperor, is said to comprise 180,000 volumes, of which, in the year 1818, 78,731 volumes had already appeared. In the five canonical or classical books, called *King*, are contained the oldest monuments, Chinese poetry, history, philosophy, and jurisprudence, some portions of which belong, perhaps, to the most ancient writings of the human race. Confucius (q. v.), in the 6th c. B.C., collected them from various sources, and in this collection they have been pretty faithfully handed down to us. Next to these in value are the *Sse-shu*, or the four books. These, as they were written by Confucius and his disciples, must be regarded as the most trustworthy source of insight into the intellectual and political life of the Chinese. A complete and elaborate edition of the five *King* and the four *Shoo* has been undertaken by our great English Sinologue, Dr. Legge, under the title of 'The Chinese Classics, with a translation, critical and exegetical notes, prolegomena, and copious indexes. In seven volumes,' of which five vols. appeared between 1861 and 1878. A popular edition, under the title of 'The Chinese Classics translated into English,' has also been published, of which vols. i. and ii. deal respectively with the 'Life and Teachings of Confucius' and the 'Works of Mencius.' Almost contemporary with Confucius lived Lao-tse (q. v.), who was born 604 B.C. He was the founder of a school of philosophy, more spiritual in its character than that of Confucius, but which has now degenerated into the lowest and most vulgar kind of demonology; see *Le Livre de la Voie de la Vertu*, Chinese and French, by Julien (Par. 1842). In mythology, the Chinese have *The Book of the Mountains and Seas*. *The History of the Gods and Spirits*, and some others. In jurisprudence may be mentioned the universal collection of laws, and the criminal code of the present dynasty; see *Ta-Tsing-lu-li, being the Fundamental Laws and Supplementary Statutes of the Penal Code of China*, by Staunton (Lond. 1810). The Chinese literature is also very rich in works on medicine, natural history, astronomy, agriculture, military science, music, and all branches of mechanics and industry; see *Résumé des principaux Traités Chinois sur la Culture des Mûriers et l'Education des Vers-à-soie*, by Julien (Par. 1837). In philology, the most valuable works are the dictionaries, in which the Chinese characters have been collected and elucidated by examples from the whole treasury of Chinese literature; but the greatest of all works of this kind is the dictionary of the Emperor Kang-hi, which is now regarded as the highest authority for the pronunciation and meaning of the characters. Of the encyclopædias of the Chinese, the most conspicuous are that by Ma-tuan-lin (1300 A.D.), called *Wen-hien-thong-khao*—i. e., an accurate investigation of the ancient documents, with rich supplements; and the *Koo-kin-too-shoo-tesi-ching*, or *Complete Collection of Ancient and Modern Books*—of which latter vast work a copy was secured for the British Museum in 1877.

But the most valuable portions of the Chinese literature are, undoubtedly, their historical and geographical works, which are indispensable to a knowledge of Upper Asia. Sse-ma-thsian (100 B.C.) compiled, from every recognized authority, a work called *Sse-ki*, or historical memorials, which embraces the history of China from the year 2637 B.C. up to the commencement of the dynasty of Han in the 2d c. B.C. This work has been continued by the different dynasties, and forms a complete collection of the annals of the empire up to the termination of the Ming dynasty in 1643 A.D. It is known under the title of *Nian-eul-sse*, or the 22 histories. The entire collection of the official annals from 2698 B.C. to 1645 A.D., comprising a period of 4343 years, and consisting of 3706 books, is to be found in the library at Munich.

Amid all their scientific labors, the Chinese have not neglected the art of poetry, in which they possess voluminous collections that have yet to be made known to Europe. In lyrical poetry, the most

distinguished names are Li-thai-pe and Tu-su, both of whom flourished at the beginning of the 8th c. A.D.; see Davis 'On the Poetry of the Chinese,' in the *Transactions of the Royal Asiatic Society*, vol. ii. The romantic poetry of the Chinese, although void of poetic beauty, is valuable for the insight it gives into their domestic life. Their dramatic poetry has laws peculiar to itself, and resembles partly the romantic drama of the Germans, and partly the *comedia delle arte* of the Italians. They have also a kind of novel in dialogues, which forms a subordinate species of



Chinese Characters.

drama. Besides the speaking persons or actors, there is what they call a singing person, who introduces into the piece songs which he sings to popular melodies, and appears to correspond in a rude way to the Greek chorus. The best collection of works in this species of literature is the *Yuen-dschin-pe-tschong*, i. e., the hundred dramas from the Mongol dynasty (1260—1341), from which all the Chinese dramas known to Europeans have been taken. A Chinese novel affording a graphic view of Chinese tastes and opinions was translated by Stanislas Julien, under the title of *Les Deux Jeunes Filles Lettrées*. English readers may obtain pictures of Chinese life from *Iu-kias li*, or the Two Fair Cousins, translated from the French; and *The Flowery Scroll*, translated by Bowring. There are French and English translations of a number of the more important Chinese works. See also Schott's *Chinesische Sprachlehre*, Davis's *Chinese Miscellanies*, and *Wylie's Notes on Chinese Literature*, Gabelentz's *Ch. Grammatik*, Marshman's *Elements of Chinese Grammar*, Legge's *Chinese Classics*, and Mason, *The Chinese, their Education, Philosophy, and Letters* (1881).

CHINESE SEA, or CHINA SEA, that portion of the Pacific Ocean which has China and Siam on the west, the island of Formosa on the north, the Philippines on the east, and Borneo on the south, and which forms the great Gulfs of Tonquin and Siam.

CHINESE WHITE. The white oxide of zinc has recently been introduced into the arts, under this name, as a pigment in place of the preparations of white-lead. It changes very little either by atmospheric action, or by mixture with other pigments; but it has not the body of white-lead.

CHINGLEPU'T.—1. A fort, with a town adjacent, in lat. 12° 41′ N., and long. 80° 2′ E., 36 miles to the south-west of Madras. It is accessible to an enemy only from the south, having a tank or artificial lake on the east and part of the north, and rice-fields, irrigated from the same, on the remainder of the north and on the west. In the dry season, the tank is nearly exhausted, the weeds and slime in its bed causing malaria. Notwithstanding this, however, the place is considered to be more than ordinarily healthy. Pop. of town (officially spelt *Chengalpat*) in 1871, 7979.—2. A district taking its name from the town above mentioned. It stretches in N. lat. from 12° 14′ to 14°, and in E. long. from 79° 35′ to 80° 25′, and contains 2753 square miles. Pop. (1871) 938,184. With about 120 miles of coast, it has not a single harbor or anything like shelter from the surf. Nor is its internal navigation of any value. The only considerable river, the Palar, is in most parts destitute of water during the dry season. Excepting in October, November, and December, comparatively little rain falls. From that circumstance, and perhaps also from an inferiority of soil, cultivation is said to be so much circumscribed, as to embrace only about 96,000 acres, or 1-20th part of the entire area.

CHINI′, a village of the Punjab, about a mile from the right bank of the Sutlej, the most easterly of the five rivers which give name to the country. It is in lat. 31° 31′ N., and long. 78° 19′ E., and is 8770 feet above the sea. Notwithstanding this elevation, it is a delightful place of sojourn, and was a favorite residence of Lord Dalhousie. It occupies a slight depression on the southern slope of a lofty mountain, which fertilizes the soil with a net-work of never-failing rills. The neighborhood is remarkable for the size and flavor of its grapes, while the vines, trained over horizontal lattices, afford while in foliage, a tolerably continuous shelter.

CHIN-KEANG-FOO ('River-Guard City'), a Chinese city and port on the Yang-tze-kiang, at the junction of the Grand Canal with that river, and about 150 miles from its mouth, was opened to European commerce by the treaty of Tien-tsin (1858), and a British settlement was begun in 1864; but trade is very slowly developing, and there is reason to doubt if C. will ever become a place of importance. The anchorage is bad, the port is not a natural outlet for any staple of exportation produced in the neighboring country, and it possesses no advantage as regards the introduction of foreign goods. Formerly, however, as the southern key of the Grand Canal, it was both an important stronghold and a center of traffic. The injury which the Grand Canal has sustained has for the present practically extinguished the inland trade, and the four years (1853—1857) during which it was in the barbarous hands of the Tae-pings are said to have reduced the population from half a million to 500.

CHINNOR, a musical instrument of the ancient Hebrews, with 32 strings.

CHINON, a town of France, in the department of Indre-et-Loire, beautifully situated on the Vienne, 25 m. S.W. of Tours. It has the remains of a huge old castle, formerly the occasional residence of the Plantagenet kings of England, and also of some of the French sovereigns, and celebrated as the place where Joan of Arc commenced her historical career, and as the birthplace of Rabelais. C. has manufactures of druggets, serges, earthenware, &c. Pop. (1876) 4536.

CHI'NQUAPIN. See CHESTNUT and OAK.

CHIN'SURA, a town on the right bank of the Hooghly, about 20 miles above Calcutta, in lat. 22° 53′ N., long. 88° 23′ E. Pop., along with Hooghly (1871), 34,761. It contains the Hooghly College, and is considered one of the healthiest places in Bengal. It was originally a Dutch settlement, but was ceded in 1824 to the British, along with some other places on the mainland, in exchange for the English possessions in the island of Sumatra.

CHINTZ, a highly glazed printed calico, with a pattern in many colors on a white or light-colored ground. It is chiefly used for bed-hangings, for covering furniture, and other purposes where gay colors are desired, and where there is much exposure to dust, which does not adhere to its highly calendered surface.

CHI'O. See SCIO.

CHIOCO'CCA, a genus of tropical and subtropical plants, of the natural order *Cinchonaceæ*, of which two species in particular, *C. anguifuga* and *C. densifolia*, the former a trailing herb, the latter a bushy shrub, enjoy a high reputation in their native country, Brazil, as cures for snake-bites. An infusion of the bark of the root is certainly one of the most violent emetic and drastic medicines known, its action being accompanied with spasmodic agitations of the whole frame and other symptoms, such as to preclude its use except in the most extreme cases. Yet it had at one time a high reputation in Europe, and was administered in small doses as a diuretic and purgative.

CHIO'GGIA, or CHIO'ZZA, an important commercial town and seaport of Northern Italy in the province of Venice, stands on an island of the same name in the Adriatic, and is connected with the mainland by a stone bridge of 43 arches. The population, amounting to (1881) 20,381, are chiefly engaged in the coasting-trade, in lace-making, and in ship-building.

CHIO'NIS and CHIO'NIDÆ. See SHEATH-BILL.

CHIP HATS. See BRAZILIAN GRASS.

CHI'PPENHAM, a parliamentary and municipal borough in Wiltshire, in a valley on the left bank of the upper part of the Bristol Avon, on the Great Western Railway, 22 miles east of Bristol. It consists chiefly of a well-built street above half a mile long. A bridge of 21 arches crosses the Avon here. C. is famed for its markets of cheese and corn, its cheese-market being one of the largest in Britain. There are silk and woollen manufactures; and some mineral springs in the vicinity. Population of parliamentary borough, (1881) 4495; of municipal, 1352. It returns one member to parliament. C. was the seat of the Saxon kings of Wessex. About 880, the Danes took it from Alfred, and kept it two years.

CHI'PPEWAYS. See INDIANS.

CHIQUICHIQUI PALM (*Leopoldinia Piassaba*), the PIASSABA of the north of Brazil, and one of the palms which yield the Piassaba (q. v.) fibre, now so much used for making brushes. The Piassaba fibre exported from Pará is all obtained from it. It grows in swampy or occasionally flooded lands on the banks of the Rio Negro and other rivers of Venezuela and the north of Brazil; and has a crown of very large, regularly pinnate leaves, with smooth slender stalks. The leaves, like those of many other palms, are much used for thatching. The commercial fibre is obtained from a remarkable covering of the stem; formed of marginal processes of the leaf-stalks, elongated into ribbon-like strips, and interlaced, finally splitting into fine fibres, hanging down five or six feet, and entirely concealing the stem, so as to give the tree a very extraordinary appearance. It twists readily into cordage, and the fibre has been long used for cables of canoes on the Amazon and other rivers. Before the independence of Brazil, the

Portuguese government had a factory on the Rio Negro, for the manufacture of cables of this fibre. The export of the unmanufactured fibre from Pará to England began about the middle of the present century.

CHIQUIMU'LA, Isthmus of, in Central America, to the south-east of the peninsula of Yucatan, in long. 89° W. Its breadth from the Caribbean Sea to the Pacific is about 150 miles—the greatest elevation not exceeding 2000 feet.

CHIRA'TA, CHIRE'TTA, or CHIREE'TA (*Agathotes Chirayta*, also known as *Ophelia Chirata*), an officinal plant belonging to the natural order *Gentianeæ*, and possessing properties similar to those of the common Gentian, the Centaury, and other plants of that order. It is a native of the mountains of the north of India. The whole plant is intensely bitter, and has been long used in its native country as a tonic and stomachic. It is also in high estimation with European practitioners in India as a febrifuge, and is often used by them as a substitute for cinchona. The medicinal virtues reside both in the herb and root. The whole plant is pulled up at the time when the flowers begin to fade, and is dried for use. It is now imported to some extent into Britain.

CHIRIQUI', a name of various application in Central America. —1. A province on the isthmus and in the state of Panama, Columbia; area 500 sq. m.; pop. 18,000.—2. A river flowing towards the north—the lat. and long. of its mouth being about 9° N., and 82° 30′ E.—3. A spacious lagoon with three entrances, and with a depth of water for the largest ships, which receives the river. It measures 90 m. along the coast, and 40 or 50 in width.—4. An archipelago between the lagoon and the Caribbean Sea.

CHI'RON, or CHEIRON, the most famous of the Centaurs (q. v.). In the ancient works of art, C. of course appears as half-man, half-animal; but his features, instead of expressing mere savage and sensual strength, as those of the Centaurs generally do, are marked by a mild wisdom, in harmony with the character and deep knowledge attributed to him by the Greek mythologists.

CHI'RRA POO'NJEE, a town in the north-east of India, in lat. 25° 14′ N., long. 91° 45′ E. It stands on the Cossya Hills, at the height of 4200 feet above the sea—and has a temperature during the hot months of 20° F. lower than that of the plains of Bengal. Notwithstanding this, however, the place has proved unsuccessful as a sanatorium. The vicinity abounds in mines of coal and iron, which may be profitably worked.

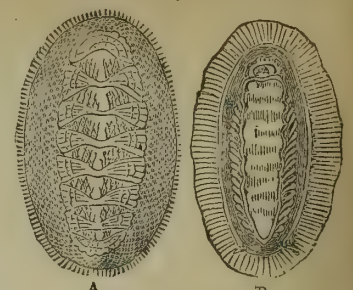
CHI'RU (*Antilope Hodgsoni*), a species of antelope, inhabiting the pine-forests and elevated open plains of Tibet, in regions bordering on the limits of perpetual snow. It is much larger than the chamois, being about five feet in length, and the height at the shoulder about three feet. The C. lives in great herds, and seems to exceed almost all the other gregarious ruminants in watchfulness against the approach of danger. Sentinels are constantly posted, to prevent surprise.

CHI'SWICK, a village in the center of Middlesex, 7½ miles south-west of St. Paul's, London, on the left bank of the Thames. Pop. (1881) 15,975. Around C. are many fine villas, extensive market-gardens, to supply London, and the gardens of the London Horticultural Society.

CHI'TIN forms the skeleton of all insects and crustaceans. In insects, it constitutes not merely the external skeleton, the scales, &c., but also forms their tracheæ, and thus penetrates into the most remote portions of their organs; indeed, one of the layers of their intestinal canal consists of chitin. Hence, we can make good preparations of these parts by treating insects with a solution of potash, which dissolves all but the C.: in this way, we can microscopically examine the most delicate parts, as, for instance, the valves of the tracheal openings.

In a state of purity, it is a white amorphous body, which usually retains the form of the tissue from which it is prepared. It has been analyzed by C. Schmidt, Lehmann, and other chemists. Schmidt considers that its composition is represented by the formula $C_{12}H_{21}NO_{10}$. The best method of obtaining C. is by boiling the elytra of the cockchafer with water, alcohol, ether, acetic acid, and alkalies. The substance left after these respective boilings is pure chitin. It seems to be identical with the substance termed by Lassaigne *Entomaderm*.

CHI'TON a Linnæan genus of mollusks. Linnæus, regarding merely the shell, placed them in the class of Multivalves, a class entirely artificial. They are now regarded as constituting a family (*Chitonidæ*) of gasteropodous mollusks, of the order *Cyclobranchiata* of Cuvier, and as occupying a place in systematic arrangement close to limpets. The shell is composed of eight narrow, transverse, calcareous pieces, overlapping each other in a row along the back, strongly attached to the mantle, which is remarkably fleshy and fibrous. They have the power of rolling themselves up into a ball. The organ of locomotion is an oval foot, more or less wide, according to the species, and extending the whole length of the animal. More than 200 species are known; they occur in all climates, most abundantly on rocks at low-water, but some of them at great depths. Some of them creep along the sand. All the British species are small; but some foreign ones grow to three or four inches in length. The fry of these mollusks swim about by means of long vibratile cilia.



A B

Chiton Squamosus:
A, animal and shell seen from above; B, animal seen from below.

CHITTAGO'NG, or ISLAMABA'D (the second name having been conferred by Aurungzebe, who captured it towards the close of the 17th c.), a city of India, standing on the Kurrumfuli, about 7 miles from its mouth, in lat. 22° 20′ N., and long. 91° 54′ E. It came into the possession of the British, along with Bengal Proper, in 1760—1765. But having originally formed part of Arracan, it was claimed, after a lapse of sixty years, by the Burmese emperor as a dependency of that territory—a claim which formed one of the grounds of the war of 1824. Through the results of that contest, C. diminished in importance, but some European merchants began to settle there in 1864, and its prosperity is returning. In 1873 it exported 104,565 tons of rice. Its shipbuilding business is now transferred in great measure to Moulmein, in Tenasserim. Pop. (1871) 20,604.

CHITTAGONG, a maritime district in Lower Bengal, taking its name from its capital above mentioned. It is bounded on the S. by Arracan, and on the W. by the Bay of Bengal, and stretches from lat. 20° 45′ to 23° 25′ N., and from long. 91° 32′ to 93° E. It has an area of 2498 sq. m., with a pop. (1871) of 1,127,402. C. (properly *Chattagrám*) also gives name to a *division;* area, 13,592 sq. m.; pop. 3,444,874. In the forests of C., large numbers of elephants are annually caught.

CHI'TTAGONG WOOD, the wood of *Chickrassia tabularis*, a tree of the natural order *Cedrelaceæ*, a native of the mountainous countries to the east of Bengal. In some parts of India, it is called *Cedar* or *Bastard Cedar*, names, however, which are also given to other kinds of wood. C. W. is much valued in India, and is used for all purposes for which mahogany is used in Britain. It makes beautiful and light furniture, but is apt to warp in very dry weather. Beautifully veined and mottled pieces are occasionally met with, and are highly valued.

CHITTO'R, the name of two fortified towns in India.—1. C. in the district of Arcot, about 80 miles to the west of Madras, in lat. 13° 12′ N., and long. 79° 9′ E. It stands on the south or right bank of Puni, an affluent of the Palar, and is about 1100 feet above the sea. Its river varies, according to the season, from a small rivulet to an expanse of 400 yards in width. When the stream is at its lowest, the very tanks, as well as the deserted channel, become little better than slime—the result being fever, ague, dysentery, and other diseases. The thermometer has occasionally reached 140° in the sun; but the annual range in the shade runs from 56° to 100°.—2. C. in Odeypoor, or Mewar, about 270 miles to the south-west of Agra, in lat. 24° 52′ N., and long. 74° 41′ E. The fortress occupies the summit of an isolated rock of nearly 6000 yards in length, and of 1200 in breadth, which is scarped all round to a depth of 80 or 100 feet, about a fourth part of its entire altitude. Within the enclosure are several antique structures—such as temples, tanks, a palace, commemorative pillars, and an inner citadel.

CHIU'SA, La, a town of N. Italy, province of Cuneo, situated on the left bank of the Pesio, 8 miles S.E. of Coni. It has manufactures of silk and glass, and a population of 3000.

CHIU'SA, La (so called from the ground having been originally *enclosed* as pasture-land for horses), a town of Sicily, in the province and 30 miles south-south-west of Palermo, on the slope of some hills. The town was built in 1320. Agates are found in the vicinity. Pop. 6840.

CHIU'SI, a town of Central Italy, province of Siena, 37 m. S.E. of Siena, with a population of 3000, stands on an eminence in the Val di Chiana, not far from the lake of the same name. In ancient times, under the name of *Clusium*, it was one of the twelve republics of Etruria, and the residence of Porsena (q. v). When Italy was overrun by the barbarians, C. fell into decay, the whole valley was depopulated, and became the pestilential pool described

by Dante. Since the improvement of the course of the Chiana (q. v.), C. has begun to flourish again along with the whole district. But it is in connection with the discovery of Etruscan antiquities that C. is chiefly heard of. Within the last quarter of a century, immense quantities of these remains have been found in the neighborhood in the grottos that served the ancient Etruscans as tombs. There are three museums in C. filled with them, and a great number are in the public gallery at Florence. They consist chiefly of sun-dried earthenware vases, black, and partly covered with mythological figures. Excavations still continue to be made, but discoveries have become rarer of late years.

CHI'VALRY (Fr. *chevalerie*, from *chevalier*, a knight or horseman), the system of knighthood, together with the privileges, duties, and manners of knights. The social arrangement to which this term is applied seems first to have assumed the character of a positve institution during the 11th c.; but so far from being an invention of that period, it had its roots in the manners of the Germanic races, amongst whom it ultimately arose, at the earliest period at which they are historically traceable. In the description which Tacitus has given us of the manners of the Germans, we find the most unequivocal indications of the existence, not only of the general spirit, but, in partially developed form, of many of the special arrangements of chivalry. But it was in connection with feudality that C. attained to its full proportions, and in many respects it must be regarded as the complement of that institution. See FEUDAL SYSTEM.

Whilst feudality exhibits the political, in C. we see the moral and social side of the arrangements of medieval life. It was in feudal mansions of the barons that the system was developed; and to the lay portion of the youth of the higher classes, the instruction which they there received in the usages of C. formed by far the most important part of education. In addition to the martial accomplishments, which corresponded to those of a modern cavalry-officer, they were instructed in the political relations which subsisted between the vassal and his lord, by which the whole body of society was then bound together; and in what might almost be called a system of ethics, strangely enough exhibiting unmistakable traces of the Stoic philosophy. The analogy between the severer virtues recommended to the special cultivation of their disciples by the followers of Zeno, and those inculcated on the novice in C., and practised by the knights of the middle ages, might be ascribed to other than historical causes, were it not that we are able to trace the connection between them with something approaching to certainty. If any one wishes to convince himself of the truth of our assertion, let him compare the last production of the intellectual life of antiquity with one of the earliest and most important of our own literature, the *Consolations of Philosophy* of Boethius with Chaucer's *Testament of Love*. The resemblance is so close, that the latter work has, not without reason, been regarded as an imitation af the former; but the main features which distinguished them, and marked Chaucer's work as belonging to the modern world, are more instructive than even their similarity. The place which Philosophy, the celestial consoler, occupies in the work of Boethius, in that of Chaucer is supplied by *Love*—a being whom we must in nowise confound either with the heathen goddess, or, as some have done with the divine love of the Christian religion. She is neither more nor less than the embodiment of an abstract idea which formed the central point of the whole system of C.; and her substitution for the Philosophy or Reason of Boethius is very characteristic of a state of society in which the affections and passions, rather than the intelligence, were the motive principles. The 'Love' of Chaucer is a complete generalization, although independent of individual object, and the consolation which she proffers to her votary is that of enlisting in his favor the special guardian, the 'Margarite,' who is supposed to watch over his individual fortunes. The 'Margarite' seems to correspond to the chivalrous idea of the *Lady-love*, in its purest sense, when its reference to a person was by no means indispensable, but when it signified rather 'the love of woman,' the highest object of the knight's ambition.

Under the protection of this guardian spirit, the lover is represented as altogether sheltered from the caprices of fortune, and in her name he has a dose of rather frigid comfort administered to him, greatly resembling that which Boethius receives at the hands of Philosophy. Such is the general idea of the book, and it is a noble idea, embracing the very essence of society as it existed then, and presenting a much deeper view of that singular institution C. than is usually to be met with in writers who have not been actually brought in contact with its influences. But to the two elements which we have mentioned as ingredients in the spiritual life of C., the Germanic traditions on the one hand, and those of classical antiquity on the other, a third falls to be mentioned, which was, perhaps, the most important of all—that of Christianity as represented by the church. The clergy were too fully aware of the importance of early impressions, not to seize on the imagination of the aspirant to C. at the all-important moment of his inauguration. The purifications, prayers, and vigils, the sacrament and the vows by which this solemn rite was accompanied, are detailed elsewhere (see KNIGHT, BANNERET, BATH, &c.); and their influence in casting a religious character over the whole institution of C., and occasionally in directing its energies specially to the propagation of Christianity, by means of the various religious orders of knighthood and the Crusades, is well known. Nor was the poet behind the priest in availing himself of the influences of C., and developing them in the region of the imagination. What Chaucer has exhibited in the work to which we have referred, may be regarded rather as the philosophical than the poetical side of the institution. But to poets of a lighter and more imaginative cast of mind, C. has furnished, from the days of the troubadours down to the present poet-laureate, no insignificant portion of their subject-matter. King Arthur and his Knights of the Round Table, the traditions regarding whom had been taken from a period altogether mythical, and long anterior to the existence of C. as an institution, became to the poetry of the middle ages very much what the heroes of the Trojan War were to that of the whole ancient world. Much astonishment has often been expressed at the contrast between the lofty and ideal purity of the code of morals inculcated by C., and the grossness of the lives of the men who were trained under its influences. The case is one which in a remarkable degree proves the practical importance of the inculcation of sound doctrine, for the practice gradually, though slowly, conformed itself to the principles; and it is probably in no insignificant degree to the elevated tone of the latter that we owe the moral superiority of the modern over the ancient world.

CHI'VALRY, COURT OF, a military court, established by Edward III., of which the Earl Marshal and the Lord High Constable were joint judges. When held before the Earl Marshal alone, it was merely a court of honor; but when both were present, it was also a criminal court. Having encroached on the common law, its jurisdiction was defined by 13 Rich. II. stat. i. Under this act, the court claimed power to give relief to such of the nobility and gentry as think themselves aggrieved in matters of honor, and to keep up the distinctions of degrees and quality. In criminal cases, a jury was sworn; but in general the proceedings of the court were summary matters, being brought under its cognizance by complaint or petition. An attempt was made to revive the functions of the court in Queen Anne's time; but, except as represented by the Earl Marshal's court (see COLLEGE OF ARMS), it has now gone into abeyance.

CHIVA'SSO, a small city of Piedmont, Northern Italy, situated in a fertile plain on the left bank of the Po, about 15 miles north-east of Turin. It was formerly a place of considerable military importance, but its fortifications were destroyed in 1804 by the French. The lampreys of C. are celebrated throughout Piedmont. It has manufactures of bricks, earthenware, soap, &c., and a trade in the agricultural produce of the district. Pop. 4800.

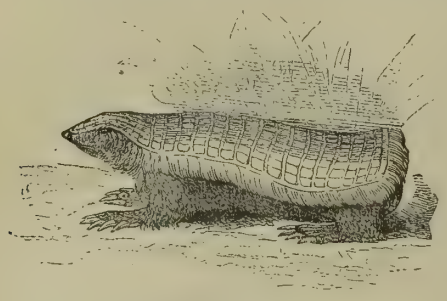
CHIVE, or CIVE (*Allium schæno'prasum*), a plant of the same genus with the leek and onion (see ALLIUM), a perennial, ½—1 foot in height, with very small, flat, clustered bulbs, increasing by its bulbs so as to form a sort of turf. The leaves are tubular, cylindrical-tapering, radical, nearly as long as the almost leafless flowering-stem, which is terminated by a hemispherical, many flowered, not bulbiferous umbel of bluish red, or, more rarely, flesh-colored flowers. The stamens are included within the perianth. This rather pretty little plant grows wild on the banks of rivers, and in marshy or occasionally flooded places in the middle latitudes of Europe and Asia. It is a rare native of Britain. In some of the mountainous districts of Europe a variety is found, larger and stronger in all its parts, and with flowering-stems more leafy. Chives—the name is generally used in the plural—are commonly cultivated in kitchen-gardens, often as an edging for plots, and are used for flavoring soups and dishes. Their properties are very similar to those of the onion. The part used is the young leaves, which bear repeated cuttings in the season.

CHIZEROTS AND BURINS form one of those peculiar races in France that live isolated in the midst of the rest of the population, and are despised and hated by their neighbors. They live in the arrondissement of Bourg-en-Bresse, in the department of Ain; and the communes of Sermoyer, Arbigny, Boz, and Ozan belong to them. According to tradition, they are descended from the Saracens. Although industrious and prosperous, they are held in the utmost contempt and detestation by their peasant neighbors, who are often indolent and destitute. They are looked upon as covetous and malicious, and scarcely would the daughter of a small farmer, or well-to-do day-laborer, become the wife of one of them, so that they mostly marry among themselves. From time immemorial, the C. and B. have been field-laborers, cattle-dealers, butchers, &c. Many of them are very good-looking. The young women are handsome, clear-complexioned, with large

black eyes. See Michel *Histoire des Races Maudites de la France et de l'Espagne* (2 vols. Par. 1847).

CHLADNI, Ernst Florens Friedrich, founder of the science of acoustics, was born at Wittenberg, November 30, 1756. He studied law in his native place, and also in Leipsic, where, in 1782, he was made Doctor of Laws. C. ultimately abandoned juridical studies altogether, devoted his mind to natural science, and, being acquainted with music, was led to observe that the laws of sound were by no means so well established as those of other branches of physics. He therefore began to apply his knowledge of mathematics and physics to acoustics, and traveled for ten years (after 1802) through Germany, Holland, France, Italy, Russia, and Denmark, giving lectures on the subject, which were very successful. He died in Breslau, April 3, 1827.—C.'s writings include, *Discoveries concerning the Theory of Sound* (1787), *Acoustics* (1802), *New Contributions to Acoustics* (1817), and *Contributions to Practical Acoustics, with Remarks on the making of Instruments* (1822). C. also wrote several essays on meteoric stones.

CHLAMY'PHORUS (Gr. chlamys-bearing; *chlamys*, a soldier's cloak), a very remarkable genus of mammalia of the order *Edentata*, ranked by naturalists in the same family with the armadillos,



Chiamyphorus.

but differing in important respects from them, and from all other known quadrupeds. Only one species is known, *C. truncatus*, five or six inches long, a native of the interior of Chili, living underground like the mole, which it much resembles in its habits, and feeding on the same kind of food. Its fore-feet are adapted for digging, although in a different manner from those of the mole. The skull is destitute of sutures; there are resemblances to the osteology of birds in the ribs and their union to the sternum; the hinder part of the body is altogether unlike that of any other known animal, in its terminating quite abruptly, as if cut off almost where its thickness is greatest, or as if the back were suddenly bent down at right angles, the tail not springing from where the line of the back appears to terminate, but far below. The whole upper and hinder parts of the body are covered with a coat of mail, made up of a series of square plates; the under parts and legs are covered with long silky hair. The tail is very peculiar; it is covered with small scales, is expanded at the tip, and is usually incurved along the belly, but is furnished with such muscles as to suggest the probability of its being employed to throw back the earth in excavations.

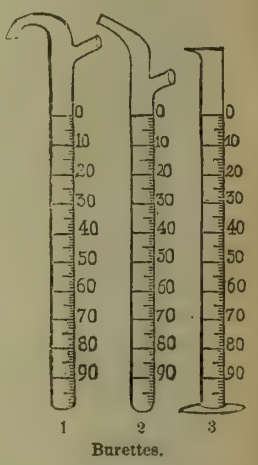
CHLOPICKI, Joseph, a Polish general, and Dictator of Poland during the revolution of 1830, was born in Galicia in 1772. He entered the army in 1787, attracted the notice of Kosciusko during the first insurrection of the Poles, and after the storming of Praga, 9th November 1794, when the hopes of the patriots were extinguished for awhile, he passed into the service of the new Cisalpine Republic, and distinguished himself in various battles. In 1806 when Bonaparte called the Poles to arms, C., among others, obeyed, and fought gallantly at Eylau and Friedland. He was subsequently sent by the emperer into Spain, and in 1812 followed him to Russia, taking part in the bloody engagements at Smolensk and Moskwa. After the relics of the invading force had returned, C. left the imperial service, on account of receiving certain slights in the way of his professional advancement. After the taking of Paris by the allies in 1814, he led back to Poland the remains of the Polish troops who had fought under Bonaparte, and was well received by the Emperor Alexander, who made him a general of division. When the second insurrection of the Poles broke out in 1830, C., who foresaw the hopeless nature of the attempt, concealed himself; but the voice of the nation called him forth from his hiding-place, and on the 5th December 1830, he was elected dictator. His moderate views, however, involved him in disputes with the extreme patriotic party, and on the 23d January 1831, he resigned his office; but he entered the Polish army as a simple soldier, and fought at Wavre and Grochow. He afterwards retired into private life, and died 30th September 1854.

CHLORAL is a limpid, colorless, oily liquid, with a peculiar penetrating odor, and is formed when anhydrous alcohol is acted on by dry chlorine gas. It dissolves sulphur, phosphorus, bromine, and iodine, and is closely allied to aldehyde. C. combined with one equivalent of water forms chloral hydrate, often popularly called chloral. C. was discovered by Liebig in 1831, and investigated by Dumas; the C. hydrate was first used as an anæsthetic and hypnotic by Liebreich in 1869. Though now often abused by being taken recklessly as a narcotic, C. hydrate is a valuable addition to the pharmacopeia; it is used to procure sleep in insomnia, and in various nervous diseases, insanity, delirium tremens, neuralgia, and strychnia poisoning. The average dose is from 15 to 30 grains; an overdose will cause death.

CHLORANTHA'CEÆ, a natural order of exogenous plants, closely allied to the peppers; herbaceous and half-shrubby plants. The number of known species is small: all of them are tropical, or natives of China and Japan. They are generally aromatic, and some of them are used as antispasmodics, stimulants, stomachics, and tonics. The roots of *Chloranthus officinalis* and *C. brachystachys* have been ranked among the most efficacious remedies in fevers and other diseases requiring continual and active stimulants, and instances have occurred of great benefit from their employment during the prevalence of epidemics in Java. *C. inconspicuus* is the Chu-Lan of the Chinese; its leaves, spikes of flowers, and berries are used by them for imparting a peculiar fragrance to tea. All the teas which have what is called the *cowslip flavor* owe it to this plant.

CHLO'RIC ACID (ClO_5) is a compound of one atom of chlorine and five atoms of oxygen, and is generally met with in combination with potash, as the white chrystalline salt, chlorate of potash (KO,ClO_5). This salt is mainly interesting from the readiness with which it parts with its oxygen to combustibles, as when thrown on red-hot charcoal, when it causes violent deflagration. The salt is employed in the fabrication of certain kinds of lucifer-matches, which give a slight explosion when struck. If a crystal of chlorate of potash be placed on a piece of paper saturated with turpentine, and a drop or two of oil of vitriol added, it causes the inflaming of the turpentine with explosive rapidity. The chlorate of potash is also used in medicine, with the view of imparting oxygen to the blood.

CHLORI'METRY, or CHLORO'METRY, is the process of estimating the proportion of available chlorine in bleaching powder (q. v.), which may vary from 20 to 36 per cent. The process depends upon the great power with which chlorine, in the act of being liberated from its compounds, causes the oxidation of many substances. The salt generally used is pure crystallized sulphate of iron, which, in its ordinary state, gives a deep blue color, with a drop of ferridcyanide of potassium, but ceases to do so when it has been fully oxidized, or converted from a proto-salt into a per-salt, through the influence of chlorine. It being known that 78 grains or parts of sulphate of iron are oxodized by 10 grains or parts of chlorine, the mode of procedure in C. is as follows: 78 grains of fine crystals of the sulphate of iron are dissolved in water slightly acidulated with hydrochloric acid in a white porcelain basin. A given quantity of the bleaching powder—say 50 grains—is dissolved in a little tepid water, and introduced into a tall measure-glass called a chlorimeter or burette (figs. 1, 2, and 3), similar to an alkalimeter, which is divided into 100 parts, and water added till the solution rises to the top mark.



Burettes.

After subsidence of the insoluble matter, the clear solution is very gradually poured into the solution of sulphate of iron in the basin, the whole being kept constantly stirred, and every now and again a drop of the iron solution is taken out and placed on a new drop of ferridcyanide of potassium placed on a white plate; and whenever the iron solution ceases to produce a deep blue, and only forms a light greenish-yellow tint, it is known that the iron has been fully oxidized by the chlorine. Suppose that at this stage the burette has been emptied to the 55th division; as we know that the liquid poured out must have contained 10 grains of chlorine, we can calculate the chlorine contained in the whole; for

$$55 : 10 :: 100 : 18{\cdot}18.$$

Thus 50 grains of the powder contain 18·18 grains of chlorine, or 36·36 per cent. Protochloride of manganese, subchloride of mercury (calomel), or a solution of indigo of known strength, may be employed instead of the sulphate of iron; but the latter is preferable, and is generally employed by chemists and manufacturers.

CHLO'RINE (Gr. *chloros*, pale green) is a non-metallic element discovered by Scheele in 1774, and named by him *dephlogisticated*

marine air. Afterwards, in 1810, Davy proved it to be an elementary body; and gave it the name which it now bears. In nature it is always found in a state of combination. United with sodium (Na), it occurs very largely as the chloride of sodium (NaCl)—common salt—in the ocean; in large beds, as rock-salt; in all natural waters, including even rain-water; in clays, soils, limestone; in volcanic incrustations; and in the vegetable and animal kingdoms. The preparation of gaseous C. by its liberation, directly or indirectly, from common salt, has been fully described under BLEACHING POWDER, which is the form in which C. is prepared and employed commercially. For experimental purposes, the gas may be received in jars filled with water at the pneumatic trough, when the C. rises into the jar, and displaces the water. When thus obtained, it is a yellowish-green gas with a peculiar and suffocating odor, is not combustible, and a very feeble supporter of ordinary combustion. A lighted candle placed in it burns with a very smoky flame, owing to the hydrogen of the oil alone burning, and the carbon being liberated. Several of the metals, such as antimony, copper, and arsenic, in a fine state of division, or in the condition of thin leaves, at once become red hot, and burn when introduced into the gas. A piece of thin paper soaked in turpentine likewise bursts into flame. C. has the symbol Cl, and the atomic weight or equivalent of 35·5. It is a very heavy gas, nearly 2½ times heavier than air, its specific gravity being 2470 (air = 1000); it is soluble in cold water to the extent of two volumes of C. in one of water, and yields a solution resembling the gas in color, odor, and other properties. The principal properties of C. are those of a bleacher of cotton and linen (see BLEACHING), and a most powerful disinfectant (q. v.). The gas can be condensed by pressure and cold into a transparent dark greenish-yellow limpid liquid, with a specific gravity of 1330 (HO = 1000), which also possesses bleaching properties, and a most powerful odor. On the animal system C. acts, in very minute quantity, by producing a sensation of warmth in the respiratory passages, and increasing the expectoration; in large quantity, by causing spasm of the glottis, violent cough, and a feeling of suffocation. The workmen in chemical manufactories, who get accustomed to the C. in small quantity, are generally stout—at least, lay on fat—but complain of acidity in the stomach, which they correct by taking chalk, and also suffer from the corrosion of their teeth, which are eaten away to stumps The antidotes to the evil effects of the introduction of C. into the lungs are the inhalation of the vapor of water, alcohol, ether, or chloroform; but the two latter should never be resorted to except under medical supervision.

C. unites with the metals and many other substances to form an extensive class of salts known as *chlorides*.

CHLO'RITE (Gr. *chloros*, green), an abundant mineral, consisting of silica, alumina, magnesia, and protoxide of iron, in somewhat variable proportions. It is of a green color, rarely occurs crystallized in hexagonal crystals, sometimes foliated like talc. It is rather soft, and is easily broken or scratched with a knife. Before the blowpipe, it is with difficulty fused on thin edges. It is readily distinguished from talc by yielding water in a closed tube.

CHLO'RITE-SCHIST, or CHLORITE-SLATE, a green slaty rock, in which chlorite is abundant in foliated plates, usually blended with minute grains of quartz, and sometimes with felspar or mica.

CHLO'RODYNE is a patent or quack medicine of considerable popularity, invented by a Dr. Collis Browne, but largely imitated by various chemists. It contains opium, chloroform, prussic acid, and probably Indian hemp, and is flavored with sugar and peppermint. As it is apt to separate into two liquids on standing, it should never be taken unless it has previously been well shaken; and as, in taking a dose of chlorodyne, the patient swallows an unknown quantity of three or four of the deadliest poisons with which we are acquainted, it is always advisable to begin with small doses. It is unquestionably a compound which sometimes succeeds in allaying pain and inducing sleep, when opiates have failed; but whether a physician is justified in recommending a remedy with the composition of which he is unacquainted, is a doubtful question. Ten or fifteen drops is the average dose.

CHLO'ROFORM, or the TERCHLO'RIDE OF FO'RMYLE (C_2HCl_3), was originally discovered by Soubeiran, and experimented upon by Dumas, and was long known only to scientific chemists as a rare organic body, possessing interest from being one of a series of organic substances, but not known to possess any properties likely to call it into use, or even likely to let it be known by name to the general public. The remarkable power, however, which it possesses of producing anæsthesia, has led to the preparation of C. on a very extensive scale. The materials employed are alcohol, water, and bleaching powder, and the proportions are four parts of bleaching powder, to which sufficient water is added to make a thin paste, and thereafter one part of spirits of wine; the whole is introduced into a capacious retort, which must not be more than half filled, and heat being applied, the C., accompanied by water and a little alcohol, distils over. As the C. is heavier than water, and is not readily miscible therewith, two layers of liquid are obtained in the receiver—the upper being water and alcohol, and the lower being chloroform. The upper liquid being cautiously poured off, the C. is agitated with fused carbonate of potash, which abstracts the remaining traces of water, and on subsequent redistillation the C. is obtained pure and ready for use.

C. is a highly limpid, mobile, colorless liquid, which is very volatile, has a characteristic and pleasant odor, and an agreeable sweetish taste. It has a specific gravity of nearly 1500 (water = 1000), being thus half as heavy again as water, and boils at 140° F. It is not inflammable in the ordinary sense of the term, as it will not take fire when a light is brought down upon it; but when thrown on red-hot coals, it burns with a green flame, evolving much smoke. It is slightly soluble in water, but more readily mixes with alcohol and ether. It dissolves camphor, amber, copal, and other resins, wax, caoutchouc, black and red sealing wax, iodine and bromine, as well as strychnine and other alkaloids. Its purity may be determined by placing some on the palm of the hand, and allowing it to evaporate, when no alcoholic or other odorous substance should be even momentarily recognized; and by agitation with oil of vitriol, when, on settling, the C. should readily swim on the surface of the vitriol, and the two layers of liquid remain colorless. The employment of C. as an anæsthetic has already been considered under ANÆSTHESIA; but it may be here repeated, that C. is a substance that cannot be too cautiously dealt with, and that it should never be administered except in the presence and by the sanction of a medical practitioner. When skilfully given, it is among the safest of all anæsthetics, and the greatest boon that chemistry has bestowed on suffering humanity.

CHLO'ROPHYLL (Gr. *chloros*, green, and *phyllon*, a leaf), the substance to which the leaves and other parts of plants owe their green color. It is somewhat analogous to wax, is soluble in alcohol and ether, but insoluble in water, and floats in the fluid of the cells, in the form of minute granules. Light is indispensable to its formation, and hence arises the familiar phenomenon of Blanching (q. v.), either from accidental causes, or by the art of the gardener. Young leaves do not exhibit so deep a green as those which have been longer exposed to the light; and the green of a leaf generally deepens till it begins to change into the tints of autumn. *Hydra viridis*, and other minute animals, appear to owe their green color to a substance analogous to chlorophyll.

CHLO'ROPS. See CORN-FLY and WHEAT-FLY.

CHLORO'SIS (Gr. *chloros*, pale green), a peculiar form of anæmia or bloodlessness, common in youngwomen, and connected with the disorders incident to the critical period of life. It has been called the *green sickness*, from the peculiar dingy greenish-yellow hue of the complexion; the green color, however, is not always characteristic. The disease is attended with very great debility, and often with breathlessness, palpitation, and other distressing, or even alarming symptoms. When there is no organic disease present, however, C. may be pronounced curable in a large proportion of cases.

The principal means to be employed are air, exercise, often salt-water baths, the use of iron, with a nutritious and rather stimulating diet, and purgatives if required; together with such special remedies as are adapted for restoring deficient secretions, and bringing the entire female system of organs into a natural condition.

CHLORO'SIS, a diseased state of plants, in which a sickly green or greenish-yellow color takes the place of the natural lively hue. Sometimes only a particular shoot is affected by it, but very generally the whole plant; and it seems to depend upon causes which render the plant altogether unhealthy, the pallid appearance being merely symptomatic, and not only the formation of chlorophyll, but all the functions of vegetable life being languidly and imperfectly carried on. Bad seed, damp soil, and cold wet weather, appear to be the most common causes of chlorosis. Plants affected by this disease are often to be seen among crops generally healthy; but whole crops of grain, potatoes, &c., sometimes perish from it, or are much diminished in value. Fruit-trees also suffer from it.

CHOCARD, or CHOQUARD (*Pyrrhocorax*), a genus of birds of the Crow family (*Corvidæ*), differing from the Choughs in having a shorter bill, which, however, is arched like theirs, but resembling them in their habits. The only European species is the Alpine C., also called Alpine Chough, and Alpine Crow (*P. Pyrrhocorax*). It is about the size of a jackdaw, of a brilliant black, with yellowish bill and red feet.

CHOCKS are pieces of wood employed on ship-board to aid in the support of various articles. Amongst them are anchor-chocks, rudder-chocks, boat-chocks, stow-wood chocks, and chocks to support the ends of the beams.

CHO'CO, a bay and province of New Granada, in South America. —1. The bay, forming part of the Gulf of Darien, receives the Atrato (q. v.), a stream of note in connection with inter-oceanic

communication. Its lat. and long. are about 3° 30′ N., and 77° 30′ W.—2. The province forms the west portion of the department of Cauca (q. v.).

CHO'COLATE is made from the seeds of *Theobroma Cacao* (see Cocoa), reduced to a fine paste in a heated iron mortar, or by a machine, and mixed with pounded sugar and spices, as cinnamon, cloves, cardamom, vanilla, &c. The paste is then poured into moulds of white iron, in which it is allowed to cool and harden. C. is sometimes made without spices, but it is then more generally called Cocoa. The paste is sometimes mixed with flour, and with Carrageen or with Iceland Moss; and for medicinal purposes with cinchona, &c. C. is used as a beverage, and for this purpose is dissolved in hot water or milk. Sometimes the yolk of an egg is added, and sometimes it is dissolved in soup or wine. It is also employed in making certain liqueurs. In a pure state, it soon satisfies the appetite, and is very nourishing; when it contains spices, it is also stimulating.

Good C. is externally smooth, firm, and shining—not gritty in the fracture—easily soluble, aromatic; not viscid after having been liquefied and cooled, but oily on the surface, and leaves no sediment of foreign substances. C. is adulterated in many ways, by mixing it with rice-meal, oatmeal, flour, potato-starch, roasted hazel-nuts or almonds, and with benzoin, storax, &c., in place of vanilla. The Mexicans, from time immemorial, were accustomed to prepare a beverage from roasted and pounded cocoa, dissolved in water, and mixed with maize-meal and spices. This they called Chocolatl (*choco*, cocoa, and *latl*, water). From the Americans, the Spaniards derived an acquaintance with C., and by them it was introduced into Europe in 1520. C. is used in South America, Spain, and Italy, more than in other parts of the world, although it is used to a considerable extent in Germany. Its use in Britain has given place in a great measure to that of the simpler cocoa.

CHOCOLATE ROOT. See Geum.

CHOIR (Lat. *chorus*). In its literal sense, the C. is the portion of the church devoted to the singers; and in all descriptions which concern the ritual it is so limited, including only the space from the western door or screen to the end of the stalls, whilst the part from the stalls eastward to the high-altar is called the presbytery. But in ordinary language, and even as used by architects, it denotes the entire space which is enclosed for the performance of the principal part of the service. In this sense, it includes the C. proper and the presbytery, and corresponds to the chancel in parish churches. Where the church is cruciform, and the term is confined to the eastern limb, it comes to be entirely different from the C. in the ritual sense, or the stall-place, which in such a building is commonly situated either under the tower or in the nave. In large churches, the aisle generally runs along each side of the C., and frequently passes across the east end of it; an arrangement which is very common in the larger churches of the continent which have polygonal or semicircular terminations.—C. is also the name given to the singers of the choral service.

CHOIR-SCREEN, or CHOIR-WALL, the screen or wall which divides the choir and presbytery from the side aisles. It is often very richly ornamented.

CHOISEUL-AMBOISE, Etienne François, Duc de, minister of Louis XV., was born June 18, 1719, educated by the Jesuits, and on the completion of his studies, entered the army. He fought bravely in the Austrian Wars of Succession; but only after he had attracted the fancy of the king's mistress, Madame Pompadour, did fortune also really favor him. Through the influence of Madame Pompadour, he was made lieutenant-general in 1748, ambassador to the courts of Rome and Vienna in 1756, and Duc de Choiseul in 1758. C. now became instrumental in bringing about a family league of the Bourbon monarchs in Europe; and in 1763, at the close of the war so disastrous to the French arms, he obtained, by his prudence and dexterity, milder terms for his nation than had been expected.

This made him very popular, as did also his successful attempt to overthrow the Jesuits. In 1764, Madame Pompadour died, but the power of C. continued unabated. He conceived, and almost carried out, a plan for the formal emancipation of the Gallican Church from papal influence, paid great attention to the improvement of the army and navy, developed the trade and industry both of the nation and of the colonies, and opened up anew an intercourse with India, whose native princes were assisted by French officers in their endeavors to expel the British from the peninsula. He had spies in every European court, and so ruled all diplomatic and political cabals, that the Empress of Russia, who dreaded him, called him *Le Cocher de l' Europe* ('The Driver of Europe'). But the rise of Madame Dubarry, who succeeded Madame Pompadour in the royal affections, gradually alienated Louis from his able minister, and in 1770 he retired to his magnificent estate of Chanteloup, where he lived in princely splendor. After the accession of Louis XVI., C. received permission to return to Paris. He was often consulted, but never recovered his official position. He died May 7, 1785.

CHO'KE-CHERRY, a name given to a certain nearly allied species of Cherry (q. v.), of the Bird-cherry section of the genus or sub-genus, natives of North America, having small fruit in racemes, and the fruit at first rather agreeable, but afterwards astringent in the mouth. Some confusion has long existed as to the different kinds, and their botanical names (*Prunus* or *Cerasus Virginiana*, *serotina*, and *borealis*) are not more determinate than the popular ones. Perhaps they ought to be regarded as mere varieties rather than distinct-species. They have a considerable resemblance to the Portugal Laurel, although the leaves are deciduous. The bark is used as a febrifuge and tonic, under the name of *Wild Cherry Bark;* and by distilling it with water, a volatile oil is obtained from it associated with hydrocyanic acid, called *Oil of Wild Cherry*. This bark allays nervous irritation, and is particularly suitable as a first tonic in cases of recovery from fever or inflammation.

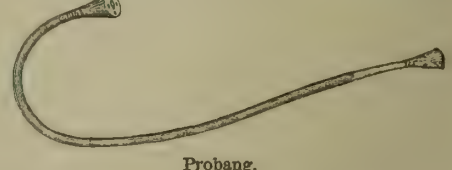
CHO'KE-DAMP. See Carbonic Acid.

CHOKING, the obstruction of the gullet, or of the passage leading to it, by morsels of food imperfectly chewed, or other substances accidently swallowed. The consequences of C. in the human subject are serious, and will be best considered in connection with the parts concerned. See Pharynx and Œsophagus. What follows relates to the C. of cattle.

Causes.—These may be classified under two heads: 1. Those that depend on the material swallowed; and 2. Those that depend on the animal swallowing. Under the first head we find sharp-pointed objects which become fixed into or entangled in the membrane lining the throat and gullet; solid masses too large to pass on to the stomach; dry farinaceous materials which clog in the passage. The second class of causes consists in inflammation of the throat, or irritation of the organs of deglutition; constrictions of the passage, as in crib-biting horses; ulceration of the œsophagus, which is apt to run after C., and is the cause of a relapse; lastly, without any disease of the deglutating organs, an animal may be choked by eating too greedily, and imperfectly masticating or salivating its food.

Symptoms.—These vary according to the position of the obstruction. If high up in the pharynx, the animal cannot swallow, evinces great distress, and attempts to cough up the object. Saliva drivels from the mouth, the animal chews, and makes an occasional ineffectual effort to swallow. The breathing is very greatly disturbed. In some cases a large lump of food has become fixed in the larynx or upper part of the windpipe, and has suddenly suffocated the animal. When the obstruction is in the course of the gullet down the neck, the symptoms are very similar, though less urgent, and there is additionally the local sign of swelling, with the peculiar hardness or softness of the substance indicating its nature. When an animal is choked by a substance lodging in the gullet within the chest, the symptoms are more mysterious, and likely to mislead. The animal swallows; a considerable quantity of liquid may enter the gullet, but it is suddenly regurgitated or thrown up, as in the act of vomiting. The distress is great: and in the course of three or four days, unless the animal is relieved, it dies of prostration. In the ox, sheep, and goat, the most alarming symptoms, in any case of C., arise from the paunch becoming distended by gas. This condition will be treated under the head Hoven.

Treatment.—Remove the obstruction with the hand, when you can. Cause the animal to swallow the substance, if possible, by



Probang.

giving it water or oil. Carefully push the offending agent down by a probang, if it is possible to effect this, and if withdrawal by the mouth is impracticable. In some cases, the gullet has to be cut into by a qualified surgeon. After a case of C., keep the animal on soft food, and attend to its general health, in order to avoid a relapse, which is of frequent occurrence in cattle.

CHO'LERA, a Greek term used in the Hippocratic writings, but of indeterminate etymology, being derived perhaps from *chole*, bile, or from *cholera*, a water-spout or gutter. It is now universally employed in medicine as indicating one of two or three forms of disease, characterized by vomiting and purging, followed by great prostration of strength, amounting in severe cases to fatal collapse. The variety called *cholera sicca* (dry C.) by ancient writers (in which collapse and death take place without discharges) is comparatively rarely observed. The milder forms of

C. occur almost every summer and autumn, even in temperate latitudes, and are hence termed by some—in reference to this country, and by way of contrast—British or Summer C.; while the more devastating and fatal forms of the disease are generally supposed to originate only in tropical countries—especially in India—and thence to be propagated epidemically over vast populations, and in a somewhat regular geographical course, reaching this country usually through Persia, the steppes of Tartary, Russia, and the Baltic, at the same time extending to Egypt, Turkey, and the south of Europe. These very fatal forms of the disease are commonly called Asiatic, Oriental, or Epidemic C.; sometimes Cholera Morbus, or Pestilential Cholera. The milder forms are sometimes also called Bilious C.; and the severer, Spasmodic C., form the character of the symptoms in each. Some writers of great authority are inclined to consider the two forms as one disease, varying in individual cases and according to season. It is certain that it is not always possible to distinguish the one form from the other in particular instances; but the marked differences between the mortality of groups of cases of British C., on the one hand, and of Oriental or Asiatic C. on the other, renders it probable that there is something in the latter disease which amounts to a distinction in kind. Whether in the milder or severer form, C. is usually ushered in by a period of premonitory symptoms, when the more distinctive characters of the disease are not established, the case resembling one of common diarrhœa (q. v.) or looseness of the bowels. At this stage, it is very apt to be neglected, and unfortunately, in the severer epidemic forms of the disease, this is the only stage much under control. Whenever therefore, there is a reasonable suspicion that Epidemic C. is threatened, every person attacked with diarrhœa should make a point of placing himself under medical advice, and, if possible, of escaping from any situation in which epidemic disease is known to be prevalent. He should also be more particularly attentive to diet, and especially to the purity of the water he drinks, and to its absolute freedom from contamination by animal matters filtering through the soil, or thrown into water-courses by sewers, &c. If water cannot be had in a pure state, it should be boiled before being used for drink, or indeed for any domestic purpose.

Many cases of C., and several local epidemics, have been traced in the most positive manner to organic impurities of the drinking-water; and no single cause of the disease has been established by so much evidence as this. Hence, in all probability, arises the well-known preference of C. for low situations, and particularly for the low-lying flats on the banks of rivers, especially where the inhabitants are supplied with water from streams polluted by sewerage, and wells into which the contents of drains are permitted to filter from a superior elevation. The researches of the French and German Scientific Commissions, sent to Egypt during the severe epidemic of 1883, seem to prove that C. is due to the presence and growth of a specific bacillus or bacterium (see GERM THEORY).

It is hardly within the scope of a work such as this to present a minute description of fully developed C. in its severer or Asiatic variety. It is truly an appalling pestilence,* too easily recognized by a few leading features. After some hours or days of simple relaxation of the bowels, vomiting commences, and occurs again and again, accompanied by frequent and extremely copious discharges downwards, at first of matters colored with bile as usual, but in the end of colorless and turbid fluid resembling water in which rice has been boiled. These discharges (often to the extent of gallons of liquid), succeeding each other with the most alarming rapidity, act as a drain upon the fluids of the body generally; and by the changes they effect upon the blood, contribute to bring about the state called *collapse*. In this condition, the patient lies motionless and apathetic, except when tormented by cramps, which are of frequent occurrence; the surface is cold; the finger-ends, lips, and tip of the nose become livid; the eyes are deeply sunk in the sockets, and often bloodshot; the tongue is clammy; the breath without any sensible warmth when caught on the hand; the pulse is suppressed at the wrist, the breathing extremely slow and feeble, the heart just audible through the stethoscope. Purging and vomiting have ceased; even the urinary secretion is dried at its source. In fact, all the vital processes are nearly brought to a stand, and unless reaction comes, a few minutes, or at most a few hours, suffice to bring life to a close. Reaction in the most favorable cases is gradual and without accident; it is not unfrequently, however, accompanied by fever, closely resembling typhus, and constituting, at least in the temperate zone, one of the chief dangers of the progress of cholera.

Medicine is almost powerless against C., except in the earliest stages, in which the treatment usually pursued in diarrhœa (q. v.) has sometimes been found useful. Very remarkable temporary restorative effects have been found to follow the injection into the veins of dilute solutions of saline matter, resembling as nearly as possible the salts of the blood, which are drained away in the discharges. Unhappily, these experiments have as yet only very imperfectly succeeded. The patient is restored to life, as it were, from the very brink of the grave; but he revives only for a few hours, to fall back into his former condition.

The true medicine of C., so far as we yet know, is preventive medicine. The measures to be adopted have been partly pointed out above; in addition, it may be said that personal cleanliness is of the first importance; and that all unnecessary contact with the sick should be avoided, as the disease is probably to some extent contagious, though by no means in the highest degree. In short, all the precautions are to be taken which are recommended in the case of epidemic disease (q. v.).

CHOLE'STERINE is one of those bodies which are termed by chemists lipoids, or non-saponifiable fats. It was originally discovered in gall-stones, but is now recognized as an ordinary constituent (although occurring in very minute quantity) of bile, blood, and the tissue of the brain. It likewise occurs in pus, the contents of cysts, and other morbid fluid products.

It separates from its solutions in glistening nacreous scales, which, when examined under the microscope, appear as very thin rhombic tablets, whose obtuse angles are 100° 30′, and whose acute angles are 79° 30′. Different formulæ have been assigned for its composition, the one generally accepted being $C_{27}H_{22}O$. It is not always very easy of detection in animal fluids, but if, by its insolubility in water, acids, and alkalies, and its solubility in hot alcohol and ether, it has been recognized as a fatty substance, it may be readily distinguished from all similar substances by the measurement of the angles of its rhombic tablets. The best method of preparing C. is by boiling gall-stones containing it in alcohol, and filtering the solution while hot. From this hot filtered solution it crystallizes as the fluid cools.

Chemists have obtained substances known as *cholesterilins* and *cholesterones* from the decomposition of cholesterine.

CHOLET, a town of France, in the department of Maine-et-Loire, on the right bank of the Maine, 32 miles south-west of Angers. Here, during the Vendean war, two actions were fought in 1793, in both of which the royalists were defeated. In the first, they lost their brave general Bonchamps; and the second drove them across the Loire, thus virtually deciding the war against them. It has manufactures of fine woollen and mixed fabrics, and leather, and a trade in cattle. Pop. (1876) 12,335.

CHOLU'LA, a once flourishing, but now decayed, town of Mexico, 60 miles to the east-south-east of the capital, and 15 to the west-north-west of La Puebla. Cortes found in it 20,000 houses, and as many more in the suburbs, and also 400 temples. Now the place contains only about 10,000 inhabitants. Its most remarkable memorial of aboriginal times is a pyramid of clay and brick, surmounted on the top by a chapel of Spanish origin. Its height is 177 feet, while the side of its base measures 480 yards. C. stands on the table-land of Anahuac, at an elevation of 6912 feet above the level of the sea.

CHO'NDA, a town of Gwalior, 18 miles to the north-west of the fort of the latter name, in lat. 26° 27′ N., and long. 78° E. It claims notice merely as the scene of a decisive victory gained by Sir Hugh, afterwards Lord Gough, over the Mahrattas, on 29th December 1843.

CHO'NDRINE. See GELATINE.

CHONDROPTERY'GII. See CARTILAGINOUS FISHES.

CHO'NETES, a genus of fossil brachiopodous mollusca, nearly allied to the well-known genus *Productus*. It is characterized by its transversely-oblong shell, and by having the long margin of the ventral valve armed with a series of tubular spines. Twenty-nine species have been described from the Palæozoic formations.

CHO'NOS ARCHIPELAGO, a group of islands off the W. coast of Patagonia, lat. 44°—46° S., long. 74°—75° W. With the exception of a few of the most westerly, all are bare and scantily peopled, though several are of considerable extent.

CHOPIN, FRÉDÈRIC, a distinguished Polish pianist and musical composer. He was born at Zelazowa-wola, near Warsaw, in 1810, and studied music at Warsaw under Professor Joseph Elsner. An exile after the revolution of 1830, he took up his residence in Paris, where he lived admired both professionally and in society. His health, always delicate, broke down in 1837, when he went for a time to Majorca, from which he afterwards returned, benefited by the change. After again suffering much from illness and depression of spirits, he visited England and Scotland in 1848, and in London was welcomed with enthusiasm in public and private. He never recovered from the fatigues of this journey, but died in Paris, 17th October 1849, and was buried, by his desire, beside Bellini, in the cemetary of Père-la-Chaise. His compositions, restricted to pianoforte music, are in high esteem among musicians, and consist chiefly of preludes, nocturnos, polonaises, mazurkas, and valses, with a few concertos and sonatas. They are pervaded by a sensitive, restless, and highly poetic fancy, and abound in subtle ideas, graceful and original harmonic effects, and rich ornamentation. The so-called polonaises, mazurkas, and valses are

* The epidemic of 1848—1849 carried off 53,293 persons in England and Wales: and that of 1854, 20,097 persons. The next visitation was in 1866. In Egypt, in 1883, the C. carried off 55,000 persons. Probably twice as many deaths were not registered.

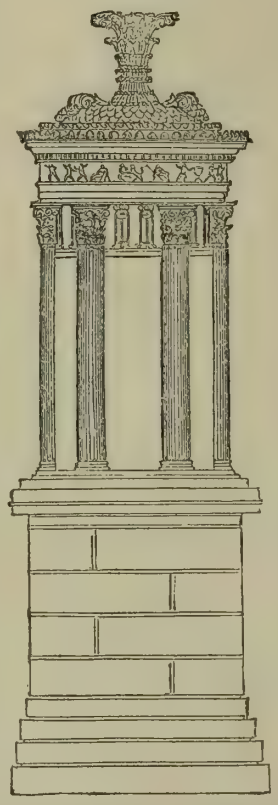
not dance music, but dreamy compositions suggestive of the rhythm and character of these dances, in which the peculiarities of Polish national music are blended with French elegance and taste.

CHO'PIN (Scotch, *chappin*), the name of a Scotch liquid measure equivalent to the English quart.

CHO'PINE (Spanish, *chapin*), a high clog, or slipper, deriving its name, as is supposed, from the sound *chap, chop*, made by the wearers in walking. Chopines were of Eastern origin, but were introduced into England from Venice during the reign of Elizabeth. They were worn by ladies under the shoes, and were usually made of wood covered with leather, often of various colors, and frequently painted and gilded. Some of them were as much as half a yard high; and in Venice, where they were universally worn, their height distinguished the quality of the lady. The C. is mentioned by Shakspeare in *Hamlet*. The accompanying representation of a C. is copied from Douce's *Illustrations of Shakspeare*.

Chopine.

CHORA'GIC MONUMENTS. The choragus or person at Athens who, on behalf of his tribe, had supported the chorus (q. v.), and who, in competition with the other tribes, had exhibited the best musical or theatrical performance, received a tripod for a prize; but he had the expense of consecrating it, and of building the monument on which it was placed. There was at Athens a whole street formed by these monuments, called the 'Street of the Tripods.' The figure represents the monument of Lysicrates, popularly known as the 'Lantern of Demosthenes.'

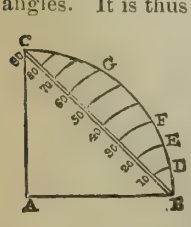

Choragic Monument of Lysicrates in Athens, restored.

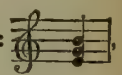
CHO'RAL MUSIC, the ancient music of the church. Music in parts for different voices. See SACRED MUSIC.

CHORAL SERVICE, the musical service of the English Church, celebrated by a full complement of clergymen and choristers in a cathedral church, and when all those parts of the service are sung as ordered in the rubrics.

CHORA'LE, a musical term adopted from the German, means a melody to which sacred hymns or psalms are sung in public worship by the whole congregation in unison. The melody of the C. moves in notes of a slow and strictly measured progression, and of a solemn and dignified character that disposes the mind to devotion. Although the term C. is now always applied to the music of the Protestant Church, it belonged to the Christian Church at all times, as melodies still in use can be traced with certainty to have been sung by the congregations in the first centuries of Christianity. Among these is the song of praise by St. Ambrose, still retained in the Lutheran Church, to the words 'Herr Gott, dich loben wir.' The C. is intimately connected with the history of music, as vocal music was the only kind used in worship until far on in the middle ages. The C. is precisely what our psalm-tune is, or rather what it formerly was, and ought again to become. The pure, simple C. has, in a great degree, been cast aside in the British Isles, and its place occupied by tunes of a comparatively puerile style, which are frequently only adaptations of operatic songs and other profane pieces.

CHORD. The C. of an arc of a curve is a straight line joining its two extremeties. A SCALE OF CHORDS is used in laying off angles. It is thus constructed: Let AB be the radius of the circle to which the scale is to be adapted. With center A and radius AB describe a quadrant BEC. Divide the quadrantal arc BEC into nine equal parts BD, DE, &c. This may be done by taking a radius equal to AB, and from the centers B and C cutting the arc in G and F. As the radius is always equal to the chord of 60° or ⅔ of a quadrant, the arc CB is thus divided into three equal parts, BF, FG, GC, and each of these parts may then be trisected by trial, as no direct method is known. Draw the chord of the quadrant BC; from B as a center, and the chord of BD as a radius, describe an arc cutting BC at 10; with the chord of BE as a radius, describe an arc cutting BC in 20; with the chord of BF, describe an arc cutting BC in 30; and in a similar manner, find the divisions 40, 50, 60, 70, 80. Then the arcs BD, BE, BF, being arcs of 10°, 20°, 30°, &c., respectively, the distances from B, to 10, 20, 30, &c., are the chords of arcs of 10°, 20°, 30°, &c.; so that BC is a scale of chords for every 10°, from 0° to 90°. To lay down or measure angles with such a scale, the arc of measurement must be described with the chord of 60°.



CHORD, in Music, is the simultaneous and harmonious union of different sounds, at first intuitively recognized by the ear, and afterwards reduced to a science by the invention of the laws or rules of harmony. See HARMONY. Chords may consist of from two to five parts. Absolute chords of two parts are produced only by thirds or sevenths. Chords of more than two parts are either fundamental chords or inversions of them, and are divided into concords and discords. The union of sounds in all chords will be found, on analyzing their component parts, to be an admixture of major and minor thirds. The common chord, or *Trias harmonica perfecta*, is the basis of all harmony, and consists of a bass note, or prime, with its third and fifth above, thus: . These three sounds are at the distance of a third from each other. When the lowest third is the greater third, as above, the C. is a major chord; but when the lowest third is the lesser, thus:  , the C. is called a minor chord. A chord of two minor thirds combined is called diminished, as the interval from the lowest note to the highest is less than a perfect fifth, thus:

The common C. admits of two inversions, according as one or other of its notes is made the bass, or lowest note of the C., thus:

Fundamental Chord. 1st inversion. 2d inversion.

By adding another third above the common C., a C. of four parts is produced, which is called the chord of the seventh, because the highest note is a seventh above the bass. When the C. of the seventh is produced on the fifth of the scale, it is then called the dominant seventh, which is the most perfect species of the C. It then consists of a major third, perfect fifth, and seventh, the minor, which is the next harmonic produced by nature, above the fifth. The C. of the seventh may also be formed on any of the major or minor scale taken as a bass note, which produces the varieties of major, minor, and diminished sevenths, thus:

Dominant 7th. Major 7th. Minor 7th. Diminished 7th.

The C. of the seventh admits of three inversions, according as the notes above the fundamental note are used as bass notes. From its nature, it requires a resolution, and is therefore always followed by a common C. whose fundamental bass is a fifth below that of the seventh. For the C. of the ninth, see HARMONY. The first proper arranged system of chords is by Rameau, in 1720, which has from time to time been extended and improved by Marpurg, Kirenberger, G. Weber, F. Schneider, Marx, and the late Professor S. W. Dehn of Berlin.

CHORE'A (Gr. *choreia*, a dancing or jumping), a disease popularly called St. Vitus's Dance, and consisting of a tendency to involuntary and irregular muscular contractions of the limbs and face, the mind and the functions of the brain generally being quite unaffected. The spasms of C. differ from those of most other convulsive affections in being unaccompanied either by pain or by rigidity; being, in fact, momentary jerking movements, indicating rather a want of control of the will over the muscles, than any real excess of their contractions. In some cases the disease resembles merely an exaggeration of the restlessness and 'fidgetiness' common among children; in others, it goes so far as to be a very serious malady, and may even threaten life. Fatal cases, however, are fortunately very rare, and in the large majority of instances the disease yields readily to treatment carefully pursued, or disappears spontaneously as the patient grows up. C. is a dis-

ease much more common among children of six years old, and upwards, than at any other period of life: it is also more common among female children than among males. The treatment generally pursued is the use of metallic tonics, such as zinc, copper, iron, and arsenic (the last, perhaps, the best), sometimes preceded or accompanied by purgatives. Exercise in the open air is also to be recommended; and gymnastics afford material aid in the cure. It is to be observed that the name St. Vitus's Dance (Dance of St. Weit) was applied originally in Germany to a different form of disease from that above referred to—one closely approaching in its characters the epidemic 'dancing mania,' which, in Italy, was called Tarantism (q. v.).

CHO'RLEY, a town in Lancashire, on a hill on the Chor, 9 miles south-south-east of Preston. It has an ancient parish church, supposed to be of Norman origin, and manufactures of cotton-yarn, jaconets, muslins, fancy goods, calicoes, and ginghams. In the vicinity are several coal-mines, a lead-mine, besides mines and quarries of iron, alum, slates, millstones, &c. Pop. (1881) 19,472.

CHO'RUS, among the ancients, meant a band of singers and dancers employed on festive occasions of great pomp, and also in the performance of tragedy and comedy on the stage. In the time of the Attic tragedy, the C. consisted of a group of persons, male and female, who remained on the stage during the whole performance as spectators or rather as witnesses. When a pause took place in the acting, the C. either sang or spoke verses having reference to the subject represented, which served to increase the impression or sensation produced by the performers. At times, the C. seemed to take part with or against the persons in the drama, by advice, comfort, exhortation, or dissuasion. In early times, the C. was very large, sometimes consisting of upwards of fifty persons, but afterwards it was much reduced. Its leader was termed the Coryphæus. The charge of organizing it was considered a great honor among the citizens of Athens. The person appointed for this purpose was called the *choragus*.

The honor was very expensive, as the choragus had to pay all the expenses incurred in training the members of the C. to perform their parts efficiently. They were, besides, fed and lodged by him during the training-time, and he had also to provide for them masks and dresses. At times, the C. was divided, and spoke or sang antiphonally. These divisions moved from side to side of the stage, from which movement originated the naming of the single songs or stanzas, such as Strophe, Antistrophe, and Epode. How the musical element of the ancient C. was constituted or composed, is not known with any certainty. Possibly, it was only a kind of rhythmical declamation, and doubtless very simple. It was accommpanied by flutes in unison. With the decline of the ancient tragedy, the C. also fell into disuse; and only lately has there been an attempt to produce the same on the stage in the manner of the ancients, as, for example, in Schiller's *Bride of Messina*. The music which has been set in modern times to some of the Greek tragedies, does not give the least idea of the original music.

In modern times, by C. is understood the union of singers or musicians for the joint performance of a musical work. C. is also the name given to a musical composition for numerous voices, either with or without accompaniment, and intended to express the united feelings of a multitude. The musical C. is the only artistic means by which a simultaneous movement or sentiment of a multitude can be represented in the drama, the language or text being always of a simple rhythm, permitting only of a limited movement suited to the combination of a multitude. It is, however, not always necessary that every part of the C. should manifest the same feeling or sentiment. Two or more parts of the C. may act against each other, as suits the purport of the drama. Double, triple, and quadruple chorusus are found in the old Italian compositions for the church. In modern times, the C. is much used, and with great effect, in operas, especially those of Meyerbeer and Wagner. In the oratorio, the C. is of the greatest importance, and the numbers now employed to sing the C. far exceed anything attempted a century ago; but this is not always an advantage, for the *tempi* must necessarily be taken much more slowly, which has a sluggish effect; while increase in the number of voices does not always produce a greater power of sound. The C. of thirty-five well-trained voices from the pope's chapel, who sang at the coronation of Napoleon I., in the cathedral of Notre Dame, Paris, produced a far greater and more wonderful effect when they entered singing the *Tu es Petrus*, than another C. of hundreds of voices and eighty harps, that had been assembled and trained for the same occasion, in expectation of surpassing all that man could imagine. The greater the number, the greater is the difficulty in obtaining unity—C., in organ-building, is the name given to stops of the mixture species, some of which contain 2, 3, 4, 5, 6, or more pipes to each note, tuned at consonant intervals in relation to the fundamental stops.

CHOSE IN ACTION, in the law of England, is that kind of property which consists not in possession, but in legal right to possess. As this right can, in general, be vindicated and made available only by means of an action, the property to which it relates, whether real or personal, is called a thing (*res* or *chose*) in action, to distinguish it from a thing already in possession. Money due upon bonds and bills, goods bought and not yet delivered, are examples of choses in action, as is also the right to compensation for damage occasioned by breach of contract. 'By the strict rule of the ancient common law, no chose in action could be assigned or granted over, because it was thought to be a great encouragement to litigiousness, if a man were allowed to make over to a stranger his right of going to law. [See CHAMPERTY.] But this nicety is now not so far regarded as to render such a transaction really ineffectual. It is, on the contrary, in substance, a valid and constant practice; though, in compliance with the ancient principle, the form of assigning a chose in action is in the nature of a declaration of trust, and an agreement to permit the assignee to make use of the name of the assigner, in in order to recover possession. . . . The king is an exception to this general rule, for he might always either grant or receive a chose in action by assignment; and our courts of *equity*, making the rule itself give way to the expediency, in a commercial point of view, of facilitating the transfer of property, allow the assignment of a chose in action as freely and directly as the *law* does that of a chose in possession.'—Stephen's *Commentaries*, ii. p. 45. One would imagine that the more convenient and philosophical arrangement would be, by the interposition of the legislature, to make law conform at once to equity and expediency.

CHO'TA NAGPO'RE, or NAGPORE THE LESS, one of the lower provinces of Bengal, containing five British collectorates, besides seven tributary minor states. The area of the British divisions is 28,482 square miles, and in 1871 the pop. was 3,419,591, consisting chiefly of aboriginal tribes who are little removed from barbarians. The country is for the most part wild and hilly, consisting of an undulating plateau 3000 feet above the sea. Its chief products are coal, jute, tea, and indigo; iron is also found. From the elevation of the tract, the temperature varies considerably, ranging in winter from 32° to 62°, and in summer from 78° to 98°.

CHOUANS were bands of insurgent Royalists, who, during the French Revolution, organized a reactionary movement in Brittany. They obtained their name from their leader, Jean Cottereau. This person, who had been a smuggler, went by the name of Chouan—a corruption, it is said, of *chat-huant* ('screech-owl')—because, while he and his accomplices were engaged in their nocturnal work, they were wont to be warned of their danger by some one on the watch imitating the cry of this bird.

At the period of the revolt, however, he followed the humble occupation of a clog-maker. The first indications of an anti-revolutionary spirit in Brittany manifested themselves in the beginning of 1791, when several trees of liberty were destroyed at night, and other more serious outrages committed. These disturbances were fomented by seditious priests. In 1792, an insurrection was planned by the Marquis de la Rouarie, with the sanction and approval of the two brothers of Louis XVI. The agents of the marquis entered into communications with Jean Cottereau—well known for the reckless audacity of his character—and other smugglers; but having the misfortune to be arrested, the carrying out of the insurrection devolved upon the latter. The *Chouanerie*, as the insurrection was called, at first disgraced itself, both by the drunken license and the cruelty which marked it. After several successful exploits of the guerrilla sort, Jean Cottereau perished in an engagement which took place on the 28th July 1794, near the wood of Misdon, the theater of his first efforts. Before this, however, other and more illustrious leaders had appeared in Brittany to direct the movement, the chief of whom were Georges Cadoudal (q. v.) and Charette. Through their endeavors it was more widely extended, and for a time seemed likely to imperil the security of France, but was suppressed towards the close of 1799. Petty *spurts* of insurrection, however, broke out till about 1803, when the *Chouanerie* ceased for awhile. In 1814–1815, it again made its appearance on both banks of the Loire; and after the July revolution, was once more excited by the Duchess of Berry on behalf of the Duke of Bordeaux, but crushed by the energetic measures taken by M. Thiers.

CHOUGH (*Fregilus*), a genus of birds of the crow family (*Corvidæ*), but approaching to the characters and appearance of the starlings (*Sturnidæ*). The length of the bill has induced some naturalists, among whom was Cuvier, to place them beside the hoopoes but this is now generally regarded as an error, they agree with crows in having their nostrils covered with stiff bristles directed forward, and in their habits. The beak is longer than the head, strong, arched, and pointed. The tail is slightly rounded.

The only European species is the common C., sometimes called the Cornish C., or Red-legged Crow (*F. graculus*), a widely dis-

tributed but very local bird, inhabiting the Swiss Alps, the high mountains of Spain and Greece, of India, and of Persia, the south of Siberia, the north of Africa, and some parts of the British seacoasts; but almost exclusively confined to situations where there are high cliffs. In these it generally makes its nest; sometimes, however, in ruined towers. Its long hooked claws enable it to cling easily to a rough rock, but it seems unwilling even to set its

Chough.

feet on turf. It lives in societies like the rook. It feeds on insects, berries, grubs, and grain. It is easily tamed, becomes very familiar and forward, and exhibits in the highest degree the curiosity, the pilfering disposition, and the delight in brilliant or glittering objects, which also characterize others of the crow family. —Other species of C. are known, natives of Australia, Java, &c. Some naturalists unite the chocards and the choughs into one genus.

CHOYA. See CHAY ROOT.

CHRISM (Gr. *chrisma*, ointment) is the name given to the oil consecrated on Holy Thursday, in the Roman Catholic and Greek Churches, by the bishop, and used in baptism, confirmation, orders, and extreme unction. There are two kinds of C.—the one, a mixture of oil and balsam, is used in baptism, confirmation, and orders; the other, which is merely plain oil, is used in extreme unction.

CHRI'SOME, the name of the white vesture laid by the priest on the child in former times at baptism, to signify its innocence. It was generaly presented by the mother as an offering to the church, but if the child died before the mother was 'churched' again, it was used as a shroud. By a common abuse of words, C. came to be applied to the child itself. A C. child is a child in a C. cloth. As late as Jeremy Taylor (*Holy Dying*, c. i., s. 2), we have the following: 'Every morning creeps out of a dark cloud, leaving behind it an ignorance and silence deep as midnight, and undiscerned as are the phantasms that make a chrisome child to smile.'

CHRIST, a title of our Saviour (see JESUS), now in general use almost as a name or as part of his name. It is originally Greek, signifies *anointed*, and corresponds exactly in meaning and use with the Hebrew word MESSIAH (q. v.); so that this title given to Jesus of Nazareth, is an acknowledgment of him as the Saviour long promised to the house of Jacob and to the human race. As prophets, priests, and kings were anointed on being called to their several offices (1 Kings i. 34, 39; 1 Sam. xvi. 13; Exod. xxix. 7), so the Saviour was anointed as at once prophet, priest, and king; the Holy Spirit, often represented under this figure, being given to him to qualify his human nature for all that belonged to his mediatorial office and work.

The whole system of Christianity depends on the doctrine of the PERSON OF CHRIST. An essential difference necessarily exists on almost every point between the systems of doctrine maintained by those who do and by those who do not acknowledge a union of the divine and human natures in his person. Some of the early heretics maintained an opinion, which has long ceased to have any supporters, that the body of C. was not a real body, but a mere visionary appearance. See DOCETÆ and GNOSTICS. The opposite extreme is that of Socinians, by whom C. is regarded as a mere man; whilst Arians (q. v.) regard him as in his *pre-existence*—i. e., before his *incarnation*—the highest of all created beings; and according to the generally received doctrine of Christians, he is 'God and man in two distinct natures and one person.' This doctrine, of course, bears a most intimate relation to that of the TRINITY (q. v.); and all who hold the divinity of Jesus Christ, regard him as the incarnate Second Person of the Godhead. The proof of the whole doctrine may almost be said to consist simply in a proof of the *divinity* of C.; his real *humanity*, although equally important, being no longer disputed. And this proof is found, not so much in particular texts which directly assert the divinity of C.—although such texts are important—as in the multitude of texts which imply it, and admit of no reasonable or natural explanation apart from it; and in showing that certain doctrines are taught in Scripture which cannot be maintained without this.

The ancient Apollinarians, Eutychians, Monophysites, &c., regarded C. as having only one nature—a *compound* of the divine and human; but such a notion as that C. had only a human body, the divine nature supplying the place of a soul, is held to be subversive of the whole Christian system; and his human nature, to be real, must be viewed as consisting both of a true body and a true soul. His human nature never existed, however, apart from his divine nature, and was 'conceived by the power of the Holy Ghost.'

Closely connected with this subject is that of the *humiliation* and consequent *exaltation* of C., in his character of mediator between God and man; a subject, to the former branch of which belongs the whole doctrine of the *work* of C. for the redemption of sinners, including the great doctrine of ATONEMENT (q. v.). To the latter belongs the doctrine of the reward of his work, in his sitting at the right hand of God, and having all things put under his feet; not only exercising dominion as king in his church, but over all things for the advancement of the salvation of his church, and of every member of it; while also he sends forth the Holy Spirit to apply to men the blessings which, as the reward of his work, He has mediatorially obtained for them; and still continuing to act as a priest, makes continual INTERCESSION (q. v.), founded upon his work and sacrifice.

CHRIST, ORDER OF, IN PORTUGAL. When the Templars were expelled from France, and their property confiscated by Philippe le Bel, with the sanction of Pope Clement V., they were received into Portugal, and their order revived in 1317, under the title of 'the Order of Our Lord Jesus Christ.' With some difficulty, Pope John XXII. was induced to sanction the new order. The Knights of the order of Christ joined the Portuguese in all their crusades against the infidel, and also in their African and Indian expeditions, receiving in compensation continual additions to their own possessions. The grand prior of the order was invested by Pope Calixtus III. with power equal to that of a bishop; and, as an encouragement to adventure, the knights were promised all

Badge of the Portuguese Order of Christ.

Star of the Portuguese Order of Christ.

the countries which they might discover, to be held under the protection of Portugal. At length, their wealth and power excited the jealousy of the kings of Portugal; their future acquisitions, and, subsequently, even their actual possessions, were declared to be crown possessions, and the offices of administrator and grand-master were transferred to the crown. A fine cloister belonging to the order is still to be seen at Tomar, to which place the seat of the order was transferred from Castro-Marino in 1366. Noble descent, and three years' military service against the infidel were required for admission. The members took the three monkish vows of chastity, poverty, and obedience, till the pope released them from the first two, on the condition of their applying the third part of their revenues to support of Tomar cloister, the priests of which were bound by the three vows. This cloister is now a theological institution for the instruction of the priests of the order.

It is said that the order still possesses 26 villages and farms, and 434 prebends. It is very numerous consisting of 6 knights of the Grand Cross, 450 commanders, and an unlimited number of knights. Catholics of noble descent alone are admitted, and foreigners are excluded from participation in the revenues, being

exempted in return from its rules. The star and badge of a Knight Grand Cross are represented in the illustration.

CHRIST, THE PAPAL ORDER OF. This is a branch of the Portuguese order, created by Pope John XXII. It has only one

Badge of the Papal Order of Christ.

class. The decoration and star are represented in the illustration.

CHRIST, PICTURES OF. To represent the form and countenance of C. in a manner that shall even approximate to the latent ideal in the minds of men, is unquestionably the most sublime and the most difficult work which an artist can undertake.

It is the highest pictorial effort of the creative faculty. From a very early period in the history of the church, we can trace the growth of the endeavor. At first, indeed, the horror entertained for the idols of the pagans, must have inspired Christians with an aversion to images or pictures of the Saviour. Gradually, however, as paganism disappeared, and time removed C. further from his people, this feeling would subside, and the longing would arise to possess some representation of him on which the eye might rest with pious delight. When Christian art originated we cannot precisely say; it is usually dated from the time of Constantine. Nevertheless—as Lord Lindsay remarks, in his *Sketches of the History of Christian Art* (Lond. 1847)—'it would be more correct to say that it then first emerged above ground; its earliest efforts must be sought for in the catacombs.' In these subterranean excavations, forming a maze of unknown extent and labyrinthine intricacy, to which the Roman Christians had recourse in the days

Supposed earliest Picture of Chirst:
From a Ceiling in the Catacombs of St. Calixtus at Rome.

of persecution, are to be found the first traces of Christian sculpture and painting. The *sarcophagi* of the martyrs and confessors, of the heroes and heroines, of the bishops, and, in general, of those of higher mark and renown, were painted over with the symbols and devices of Christianity. The parables were the chief source from which these sepulchral artists drew their symbols. C. is painted as the good shepherd in the midst of his flock, or, with 'pastoral pipe,' seeking the lost sheep, or returning with it on his shoulders. Sometimes he figures as an ideal youth in the bloom of his years, sometimes as a bearded man in the prime of life, sometimes as Orpheus surrounded by wild beasts enrapt by the melody of his lyre. Such pictures, however, were only *symbolical*, and did not satisfy the religious craving for a *portrait*. The age of Constantine marks the transition from the symbolical to the *pseudo-historical* picture.

We now find C. represented in the midst of his disciples, or in the act of performing a miracle; but it is not till about the close of the 4th c. that we actually encounter that type of countenance which with certain modifications, continued to rule the conceptions of artists during the whole of the middle ages. To vindicate this type, myths, at a later period, sprang into existence; and we read of a portrait of C. possessed by King Abgarus of Edessa, and imprinted on a handkerchief, and of another miraculously obtained by St. Veronica at the Crucifixion; but there is as little foundation for these legends as for that which attributes to the evangelist Luke such a picture. The Emperor Alexander Severus (230 A.D.) is said to have possessed in his palace an image of Christ. An antique mosaic, probably of the 3d c., which exists in the *Museo Christiano* of the Vatican—where are to be found also some specimens of the frescoes of the catacombs—gives an idea of the manner in which the heathen artists expressed their notion of Christ. He is depicted as a bearded philosopher in profile. A letter which Lentulus, the predecessor of Pilate, is declared to have written to the Roman senate, but which is evidently apocryphal, attributes to C. a figure and countenance of manly beauty. Towards the middle of the 8th c., John of Damascus gives a description which he pretends to have gathered from more ancient authors. According to him, C. was tall, had beautiful eyes, but the eyebrows meeting; a regular nose, flowing locks, a black beard, and a sandy or straw-colored complexion, like his mother. Among the most ancient representations of C. which profess to be portraits, are the two paintings in the Calixtine and Pontine catacombs near Rome, and which are given in Arighi's *Roma Subterranea Nova*. The Saviour is there represented with an oval visage, a straight nose, arched eyebrows, and high forehead. The expression is earnest and mild; the hair is parted on the forehead, and falls over the shoulders in waving locks; the beard is short and scattered. These two busts agree with the apocryphal letter of Lentulus, and the artist or artists who executed them, may possible have employed it as a model. The majority of the Byzantine and Italian painters, down to the age of Michael Angelo and Raphael, adhered to this type.

CHRIST or CRIS CROSS ROW, the alphabet arranged in the form of a cross, for the use of children; and so printed, in old 'horn' books, or primers. The letter A was at the top, and Z at the foot of the cross.

CHRI'STCHURCH, a parliamentary and municipal borough and seaport on the English Channel, in Hampshire, at the head of the estuary formed by the Avon and Stour, 24 m. S. W. of Southampton. It has manufactures of fusee chains for clocks and watches, and of hosiery. It has also a salmon-fishery.

The priory church, one of the most interesting and magnificent of English ecclesiastical structures, dates from the reign of William Rufus, and was restored in 1861. The borough comprises two favorite watering-places, Mudeford and Bournemouth. There are traces here of a Roman temple of Mars. Pop. (1871) 15,415; (1881) 28,537. It returns one member to parliament.—C. Bay has a double tide every 12 hours.

CHRISTCHURCH, capital of the province of Canterbury, in New Zealand, situated on the river Avon, about 8 miles from the sea. Its port is Littleton, with which it is connected by a railway, and it is in railway communication with the north and south. It is the center of a great grazing district, and has also flourishing manufactories. There is a large export trade, chiefly in timber and wool. The city possesses numerous fine public buildings, churches, theater, &c. Pop. (1881) 15,214; with Sydenham and the suburbs 30,719.

CHRIST-CHURCH, THE CATHEDRAL OF, (Oxford). This great society has had three distinct foundations. In 1526, Cardinal Wolsey obtained from Clement VII. a bull for the suppression of 22 monasteries, the site of one of which he selected as the site of a new college, to be called Cardinal College, and which he intended to endow on a scale of magnificence beyond that of any other foundation in Oxford. On the fall of Wolsey in 1529, the whole establishment came into the hands of King Henry VIII. In 1532, that prince refounded it under the name of King Henry VIII.'s College, and in 1546, he once more re-established the college, under the name of 'Christ-Church Cathedral in Oxford, or the Foundation of King Henry VIII., with a dean and 8 canons, 60 students, 40 school-boys, clerks, choristers,' &c. This foundation is now subsisting, though it has undergone considerable modifications. To none of the canonries were any duties assigned by King Henry VIII. From time to time, however, the canonries have been annexed to various university professorships, more particularly one to the professorship of divinity, by King James I.; one to the professorship of Hebrew, by King Charles I.; and one to the professorships of ecclesiastical history and pastoral theology respectively, by Queen Victoria.

Several changes were introduced by the commissioners appointed under 17 and 18 Vict. c. 81. There is now only one sinecure-enjoying canon. When he is off the list, no one may hold a canonary save a professor, the archdeacon, or the sub-dean. The studentships are now 80 in number, and are, as before,

divided into junior and senior studentships, differing considerably as to emolument. All these are now open, the old system of appointment by nomination having been abolished. About three junior students are elected every year in Lent term, one in every three for excellence in mathematics or physical science; and besides these, three are sent up yearly from Westminster.

The senior studentships are also open, with the usual limitation of independent income. Of these, however, only a third can be held by laymen. The studentships were very poor; but an improvement in this respect had been included among the recent changes. Some valuable exhibitions, however, and 90 benefices, are in the gift of the society. In 1881, there were about 1200 names on the college books. No statutes were given to C., owing to the death of the king having taken place shortly after the final foundation of the college. It was, in consequence, entirely governed by the orders of the dean and chapter, to the total exclusion of the tutors. To this separation of the governing from the teaching body, as well as to the small value of the studentships, may be ascribed, in great measure, the inconsiderable degree of success in the schools, which, for many years past, brought no small discredit on this magnificent society.

CHRI'STENING, a term often used as equivalent to Baptism (q. v.). It is disliked by some, and of course liked by others, as favoring the doctrine of baptismal regeneration; being, indeed, according to its derivation, expressive of the notion that a person is *made a Christian* in baptism. But, like many other terms, it is frequently employed without reference to its origin, and without any intention of conveying the opinion which it might be strictly held to imply.

CHRI'STIAN II., king of Denmark, Norway, and Sweden, born at Vyborg, in the island of Funen, 2d July 1481. He ascended the throne of Denmark in 1513. Shortly after his marriage in 1515, with a sister of the Emperor Charles V., a young Norwegian peasant-girl, with whom C. was in love, died, or, as it was believed, was murdered. That natural ferocity, for which C. was surnamed the *Angry*, burst forth most furiously on this occasion. He caused the governor of the castle, Torben Oxe (see DYVEKE), to be beheaded. He afterwards declared open war against Sweden, took Stockholm through fraud, and had himself crowned king. But the cruel vengeance and treachery of C. after this event excited the indignation of that country, which, headed by Gustavus Wasa (q. v.), succeeded in driving out the Danes, liberating itself from the yoke of the House of Kalmar, and finally electing Gustavus Wasa (1523) to the throne. In Denmark, too, the aristocracy had risen, and an insurrection in Jütland following, C. found himself forced to flee for refuge to the Netherlands, and his uncle Fredrick I. (q. v.), the introducer of the Reformation into Denmark, elected king in his place. Encouraged, however, by the Catholic party in the Netherlands, and assisted by Charles V., C. landed successfully in Norway in 1531; but at the battle of Aggerhuus in 1532, he was totally defeated, and made prisoner in the castle at Sonderburg, from which he was liberated after twelve years of confinement. He died 28th January 1559.

CHRISTIAN IV., king of Denmark and Norway, and Duke of Schleswig-Holstein, born in Zealand, 12th April 1577, and elected successor to the throne in 1580. He assumed the scepter in 1593. From 1610 he carried on a successful war, known as the Kalmarian war, against Charles IX. of Sweden, and his successor, Gustavus Adolphus, which ended in an advantageous peace in 1613. As leader of the Protestants in the Thirty Years' War, C. was not successful. His labors for the improvement of his country, in which he was indefatigable, were, however, most beneficial. He strengthened its maritime power; extended its commerce as far as the East Indies, where he obtained the first possessions; and by restrictions upon the Hanse towns, greatly increased the inland trade of the country. His legislative and financial reforms, together with his love and patronage of the arts and sciencies, gained for him the esteem of his people, especially of the learned. He died in 1648.

CHRISTIAN VII., king of Denmark, son of Frederick V. and Louisa of England, born 29th January 1749. He succeeded to the throne of his father 14th January 1766, and in the same year married Caroline Matilda, sister of George III. of England. The dissipations of his early life had enfeebled his energies, and rendered him unfit for government. The management of the state was, in consequence, seized by his ministers, with Count Bernstorff, who had possessed the entire confidence of the king's father, at their head. Bernstorff, however, was soon forced to retreat before Struensee (q. v.), who exercised unbounded influence over the king and his imprudent young queen. But innovations of a despotic tendency, and insults offered to the national feeling, soon drew upon this minister the hatred of the nation. The queen-dowager, seeing this, made it an occasion for satisfying her ambitious nature, by attaching herself to the malcontents; and in 1772 she succeeded, with the assistance of her son, Frederick (b. 1754, d. 1805), in persuading the vacillating king to draw up an order of arrest for Struensee and the young queen. Bernstorff was recalled from Hamburg. The king, who was now incapacitated by mental disease, governed only nominally. In 1784, his son, Frederick VI. (q. v.), came to the head of the government, as joint regent with the queen-mother. C. died 13th March 1808.

CHRISTIAN BURIAL. See BURIAL and FELO DE SE.

CHRISTIAN CHARITY, KNIGHTS OF THE ORDER OF, in France. King Henry III. having instituted the order of the Holy Ghost for princes and persons of distinction, founded the order of C. C., for the support of maimed officers and soldiers, who had done good service in the wars. He assigned revenues to the order, drawn from all the hospitals in the kingdom.

The knights wore on the left breast an anchored cross embroidered on white taffety or satin, with a border of blue silk, and in the middle of the cross a lozenge of sky blue charged with a *fleur de lis or*. The completion of the institution was reserved for Henry IV., who placed it under the charge of the marshals and colonels of France; and by means of it, many of those who had served their country faithfully were enabled to spend the latter portion of their lives in peace, and above want. The order formed the germ of that noble hospital the *Invalides*, which was founded by Louis XIV., and which served as a model for our own hospitals of Chelsea and Greenwich. When the Invalides was founded, the order of C. C. was superseded.

CHRISTIAN CONNECTION, a denomination of Christians which originated about the beginning of the 19th c. in the United States of America, and is diffused over all the states. The name was assumed in avowed dislike to the acknowledgment of any human authority and to sectarian distinctions, and all doctrinal terms of communion were rejected, the Bible being adopted as the only rule of faith, and personal piety made the test of qualification for membership. The Connection soon came to consist, however, almost exclusively of persons denying the divinity of Christ.

CHRISTIAN KNOWLEDGE, SOCIETY FOR PROMOTING, one of the great religious associations connected with the Church of England, and the oldest of them all. It was founded in 1698, although it did not receive its present name till 1701; and had for its object: '1. To promote and encourage the erecting of charity schools in all parts of England and Wales. 2. To disperse, both at home and abroad, Bibles and tracts of religion; and, in general, to advance the honor of God, and the good of mankind, by promoting Christian knowledge, both at home and in other parts of the world, by the best methods that should offer.' These objects it has never ceased to pursue, chiefly directing its efforts to the British dominions; partaking at once of the nature of an educational association, a Missionary Society, a Bible Society, and a Religious Tract Society; and notwithstanding the operations of other great societies in these several departments of Christian benevolence, its revenue amounts to about £100,000 a year. The profit on the bookselling department alone in 1880–81 was over £6000. The Protestant missionaries who labored in the south of India in last century, were supported chiefly by this society, which has also established many Christian schools.

CHRISTIAN NAME. See NAME.

CHRISTIA'NIA, capital of Norway, is situated in the province of Aggerhuus, in a beautiful open valley on the northern side of the Christiania Fiord. Pop. (1875) 77,041. C. is the seat of the Norwegian government, the superior courts, and the *Storthing*. Besides the suburbs of Pipervigen, Hammarsborg, Vaterland, and Groenland, the town consists of C. properly so called (which was laid out by Christian IV. in 1614, in the form of a regular parallelogram of 1000 paces in length and breadth); the Old Town or Opslo, where the bishop resides; and the citadel Aggerhuus, from which the broad straight streets of the town can be fired upon. The most important public buildings are the royal palace, the bank and exchange, the house of representatives or Storting, the governor's palace, and the cathedral. To these may be added the university, the only one in Norway, which was opened in 1813, and possesses a staff of 41 ordinary, and 6 extraordinary professors. About 800 students attend it annually. This institution contains, besides various scientific collections, a library of about 150,000 books, a botanical garden, and an observatory (in 59° 54′ 42″ N. lat., and 10° 50′ E. long.). The latter was opened in 1833. C. has also some good schools and learned societies, of which the 'Society for Northern Antiquities' is famous. The manufactures of C. are cotton, oil, paper, soap, and bricks. There are also numerous distilleries and corn-mills. It exports in considerable quantities wood, iron, anchovies, and glass-ware. Nearly 2000 vessels annually enter the port (which, however, is covered with ice for four months). It has a regular steam-boat communication with Gottenburg, Copenhagen, Keil, Hull, and Leith. C., by means of its bay, is connected with Drammen (pop. 18,838), famous for its extensive trade in timber, &c. The scenery of the whole bay is unsurpassed in beauty.

CHRISTIA'NITY. It is proposed in the present article to give a very brief outline of the system of the Christian religion, and of the evidences by which its truth is established. The principal parts, both of the system and evidences of C., will be found noticed under separate heads.

C. comes to us with a claim to be received as of divine origin. It is no product of the human mind, but has for its author the Being whom it sets before us as the object of worship. It is consequently altogether exclusive; it claims to be deemed the only true religion—'the truth'—and admits of no compromise or alliance with any other system.

C. cannot be viewed as distinct from the religion of the Jews and of the patriarchs; it is the same religion accommodated to new circumstances; there has been a change of *dispensation* only. In studying either the system or the evidences of C., we are compelled continually to revert from the New Testament to the Old, and must in some measure trace the history of the true or revealed religion through the previous and preparatory dispensations.

The whole system of C. may be regarded as having its foundation in the doctrine of the Existence of one God. See GOD. Next to this may be placed the doctrine of the Fall (q. v.) of Man. Man is represented as involved in misery by sin (q. v.)—*original* and *actual*—and every individual of the human race as incapacitated for the service and fellowship of God, obnoxious to the displeasure of God, and liable to punishment in the future and eternal state of being. See PUNISHMENT, FUTURE. And here we may regard the doctrine of the ATONEMENT (q. v.) as next claiming our attention—a doctrine taught in all the sacrifices (see SACRIFICE) of the patriarchal and Jewish dispensations, as well as by the words of inspired teachers. Man being utterly incapable of effecting his own deliverance from sin and misery, God sent his Son to save sinners, to deliver them from hell, to make them holy, and partakers of the eternal joy and glory of heaven.

By those who regard Christ as a mere creature, *atonement* or *reconciliation* with God is made to depend on the repentance of man as its immediate cause; whilst the life and death of Christ are represented as merely an example to us of obedience, virtue, and piety in the most trying circumstances; the doctrines of a propitiatory sacrifice, a substitutionary obedience, and an imputed righteousness, with all that form part of the same system, falling completely and even necessarily to the ground. These doctrines, however, are all consistently maintained in connection with the doctrine of the Trinity and the generally received doctrine as to the person of Christ. See CHRIST and TRINITY. The very incarnation (q. v.) of the Son of God is regarded as a glorious display of the divine condescension, and a wonderful exaltation of human nature: whilst a personal enjoyment of the highest dignity and bliss of which humanity is capable in favor and fellowship of God for ever, is to be attained by faith in Jesus Christ. See FAITH and JUSTIFICATION.

The indissoluble connection between faith and salvation arises from the divine appointment, but secures a moral harmony, as it provides for bringing into operation—in accordance with the intellectual and moral nature of man—of most powerful and excellent motives for all that is morally good, the partakers of salvation being thus fitted for the fellowship of Him into whose favor they are received; and as it prevents the possibility of any of them taking to themselves, or giving to others, the glory of that salvation which they really owe to Christ, and which they must therefore ascribe to Christ, as God is a God of truth, and truth must reign in the kingdom of heaven.

Salvation is ascribed by all Christians to the grace of God. The mission of Christ was an act of supreme grace; and all must be ascribed to grace for which we are indebted to Christ. The doctrine of grace, however, is a part of the system of C. on which important differences subsist, especially as to the relation of the grace of God to individual men.

Such are the differences concerning ELECTION (q. v.), and concerning the origin of faith, and man's ability or inability to believe of himself. But by Christians generally, the personal relation of the believer to Christ, and his faith in Christ, are ascribed to the Holy Ghost or Spirit of God, the third person of the Godhead, and so to the grace of God. See ARMINIUS, CALVINISM, and PELAGIUS.

In the view of all who hold the doctrine of the Trinity, the doctrines concerning the Spirit of God form a very important part of the Christian system. To the agency of this person of the Godhead, besides all that is ascribed to Him concerning the human nature of Christ, we are indebted for all that is spiritually good in man; He, in the economy of grace, being sent by God, on the intercession of Christ, to communicate the blessings purchased by Christ in his obedience and death. See HOLY GHOST.

Salvation begins on earth; and whenever a man believes in Christ, he is a partaker of it—is in a state of salvation. It forms an essential part of the Calvinistic system, that he who is in a state of salvation always remains so, and that the salvation begun on earth is in every case made perfect in heaven. See PERSEVERANCE OF SAINTS. Thus salvation is viewed as beginning in REGENERATION (q. v.), and as carried on in SANCTIFICATION (q. v.), and all its joys as connected with the progress of sanctification. Faith in Jesus Christ cannot be unaccompanied with repentance, and repentance is always renewed when the exercise of faith is renewed. For although all believers are *saints* or *holy*, as set apart to God, and in contrast to what they previously were, yet there is none in this life free from temptation and sin; the successful tempter of our first parents, who assailed our Saviour with temptation and was defeated, being still the active enemy of men, against whom believers in Jesus Christ are called to contend, to watch, and to pray. See DEVIL. The sense of responsibility belongs to human nature; and the doctrine of a Judgment (q. v.) to come may be considered as to a certain extent a doctrine of natural religion, as may also that of the Immortality (q. v.) of the Soul; but the clear and distinct enunciation of these doctrines belongs to the Christian revelation, to which belongs entirely the doctrine of the Resurrection (q. v.) of the Dead.

Of the moral part of C., which has already been referred to, it may be sufficient here to state, that it is as harmonious with the doctrinal as it is inseparable from it; that it is founded upon the attributes of God, and is perfectly illustrated in the character of Jesus Christ; and that it is divisible into two great parts—one, of the *love of God*, and the other, of the *love of man*, or of ourselves and our neighbors. See LAW, MORAL.

The *means of grace*, or of the attainment of the blessings of salvation, form an important part of the Christian system. Of these the WORD OF GOD—or divine revelation contained in the Bible (q. v.)—first claims attention, as the means of *conversion* to Christ, and of *edification* in Christ, the instrument by which salvation is both begun and carried on in men. The ordinances of God's worship are among the means of grace. Thus Prayer (q. v.) is one of the chief means of grace. The Sacraments (q. v.) are means of grace, concerning the precise use of which, and their relative importance as compared with the other means, considerable difference of opinion prevails among Christians. The same remark applies also to the combination of Christians into an organized body or community, the Church (q. v.), with its own laws or system of church-government (q. v.) and church-discipline (q. v.).

We have endeavored to sketch the outline of the system of C., as much as possible according to the general belief of Christians, merely indicating the points on which the chief differences of opinion exist. Some of the principal controversies will be found noticed under separate heads.

The truth of C. is established by many different *Evidences*, distinct and independent, but mutually corroborative. It appeals to reason, and demands to have its claims examined and admitted. Nor is there any *faith* where there is not a mental conviction arrived at by a process of sound reasoning.

The evidences of C. are very generally divided into two great classes, *internal* and *external*—the former consisting of those which are found in the nature of the Christian system itself, and in its adaptation to the nature and wants of man; the latter, of those which are derived from other sources. The boundary between the two classes, however, is by no means so distinct in reality as it appears in the definition of the terms. Of the multitude of books which have been written on the subject of the evidences of C., some are devoted mainly to one of these classes, and some to the other; whilst some are occupied with the development of particular evidences or arguments, and some with the refutation of objections, and in particular of what may be called a preliminary objection—that a divine revelation can never be established by sufficient evidence at all. See REVELATION.

The evidence of Miracles (q. v.) and the evidence of Prophecy (q. v.), two of the principal branches of the external evidences of C., will be found noticed in separate articles. Another argument, which has been much elaborated—for example, in Paley's *Evidences*—is derived from the character and sufferings of the apostles and other first preachers of C.; their high moral worth, considered along with their great earnestness and devotedness; the absence of all possibility of selfish or base motives; and at the same time, their perfect opportunity of knowing the truth of the facts which they proclaimed. A subsidiary argument is found in the admission of the great facts regarding Jesus of Nazareth, by the early opponents of Christianity.

A most important and valuable argument is found in the perfect coherence of all the parts of the Christian system, and in the agreement, as to the religion which they teach, of all the books of Scripture, notwithstanding the widely different dates of their composition, and their very different nature in other respects. See BIBLE. The relation of the Jewish ceremonies to the doctrines of C. supplies another argument of this kind, capable of being developed in a multitude of particulars. The minor coincidences between the different books of Scripture have been pointed out with happy effect in the *Horæ Paulinæ* of Paley, and in other works. The character of our Saviour supplies an argument of

great power: the impossibility of the invention of such a character, and of the history in which it is exhibited, by any effort of human genius, is also urged as corroborative; and the inconsistency of the morality displayed, with the supposition of imposture, has been dwelt upon with the same view. The excellency, both of the doctrinal and moral part of the system of C., its elevating and purifying tendency, the agreement of its doctrine with the fact of man's sinfulness and misery, and the suitable provision which it makes for his most deeply felt wants, are principal branches of the internal evidence of its truth. The effects of C., where it has prevailed, supply a confirmatory argument in its favor, which has formed the subject of works of great learning and interest.

CHRI'STIANSAND, the principal town of the province or *stift* of that name in Norway, is situated at the mouth of the Torridalself, in the bay of Christiansand. Pop. (1875) 12,137. C. is the residence of a bishop and high-bailiff or stift-amtmand, and possesses a branch of the Norwegian Bank, a gymnasium, and several charitable foundations. The manufactures are leather, tobacco, cotton, &c. Ship-building forms also a considerable branch of its industry. The town, which was built in 1641 by Christian IV., has an excellent harbor, divided into two parts by the island of Oddern. A destructive fire took plack here in 1880. C. exports wood, lobsters, and salmon in large quantities. The town and harbor are protected by several fortifications. To the west of C. lies the harbor of Ny-Hollesund.

CHRI'STIANSFELD, a settlement of Moravian brothers, in the northern part of Schleswig, was founded in 1772. It consists of 64 houses and about 700 inhabitants. The houses, which are well built, and cheerful in appearance, are arranged in two parallel streets, with the church upon a green plot in the middle. The settlement is represented by the inspectors or chiefs appointed by the directors of the fraternity, and the representatives elected by the members of the sect. The manufactures are linen, soap, cotton, leather, &c.

CHRI'STIANSTAD, the strongly fortified capital of a province of the same name in the south of Sweden. It is situated on the Helge, about 9 miles from the Baltic, and 265 south-west of Stockholm. C. is the residence of a governor, and the seat of a court of justice. It is a beautifully built town, and possesses an arsenal, a school, a magnificent church, and a senate-house. Pop. (1880) 9203, employed chiefly in the manufacture of woollen goods, leather, gloves, &c. There is also some trade in wood, pitch, potash, &c. The town, which was founded by Christian IV., has suffered many sieges. The province of Christianstad has an area of 2400 miles; pop. (1880) 230,619.

CHRI'STIANSTED, the chief town of the Danish island of St. Croix, in the West Indies. It stands on the north-east coast of the island, and has an excellent harbor, which is defended by a fort and a battery. Here resides the governor-general of the Danish West Indies. The number of its inhabitants is 5700.

CHRISTI'NA, queen of Sweden, only child of the great Gustavus Adolphus, was born December 1626, and succeeded her father in 1632, when only six years old. Distinguished equally by beauty and the possession of a lively imagination, a good memory, and uncommon intelligence, she received the education rather of a man than of a woman; and to this may in part be attributed the many eccentricities of her life. During her minority, the kingdom was governed by the five highest officers of the state, the principal being Chancellor Oxenstiern. In 1644, she assumed the reins of power, and, in 1650, was crowned with the title of *king*. She had previously declared her cousin, Charles Gustavus, her successor. For four years thereafter, she ruled the kingdom with vigor, and was remarkable for her patronage of learned and scientific men. In 1654, however, at the age of 28, weary of the personal restraint which royalty imposed on her, she abdicated in favor of her cousin, reserving to herself sufficient revenues, entire independence, and supreme authority over her suite and household. Leaving Sweden, she proceeded to Brussels, where she embraced the Roman Catholic religion. She afterwards went to Rome, which she entered on horseback, in the costume of an Amazon, with great pomp. Confirmed by Pope Alexander VII., she adopted the surname of Alessandra. In 1656, she visited Paris; and the following year, on a second residence there, she caused her grand equerry, Monaldeschi, who had enjoyed her entire confidence, to be executed in her own household for treason. In 1658 she returned to Rome, and, in 1660, the death of the king, her cousin, caused her to hasten to Sweden; but, failing in her attempt to be re-instated on the throne, she again left the country. In 1666, she aspired to the crown of Poland, but was unnoticed by the Poles. The remainder of her life was spent at Rome in artistic and scientific pursuits. Besides founding an academy, she collected valuable MSS., medals, and paintings, and died April 19, 1689. Much of her conduct favors the idea that at times she was scarcely sane.

CHRISTINA, queen of Spain. See MARIA CHRISTINA.

CHRI'STISON, SIR ROBERT, D.C.L., an eminent physician, son of Alexander Christison, Professor of Humanity in the university of Edinburgh, was born at Edinburgh, July 18, 1797; was educated at the High School of his native place, and, in 1811, became a student at the university there. After graduating in 1819, he proceeded to London and Paris; and, in the French capital, studied toxicology under the celebrated Orfila, a department of medical science in which in Britain his name has become eminent. Commencing the practice of medicine at Edinburgh, he was, in 1822, appointed Professor of Medical Jurisprudence in the university of that city, and, in 1832, was promoted to the chair of Materia Medica. Besides contributing papers on various subjects to medical journals, C. is author of a *Treatise on Poisons*, published in 1829, recognized as a standard work on the subject; *Biographical Sketch of Edward Turner, M.D.*, 1837; being an address delivered before the Harveian Society of Edinburgh; a treatise *On Granular Degeneration of the Kidneys*, 1839; and *The Dispensatory, a Commentary on the Pharmacopœias of Great Britain*, 1842. Twice President of the Royal College of Physicians, Edinburg, and Ordinary Physician to the Queen in Scotland, in 1871 he was created a baronet. In 1877 Sir Robert retired from professorial and other public work. He died Jan. 27, 1882.

CHRI'STMAS, the day on which the nativity of the Saviour is observed. The institution of this festival is attributed by the spurious Decretals to Telesphorus, who flourished in the reign of Antoninus Pius (138—161 A.D.), but the first certain traces of it are found about the time of the Emperor Commodus (180—192 A.D.). In the reign of Diocletian (284—305 A.D.), while that Ruler was keeping court at Nicomedia, he learned that a multitude of Christians were assembled in the city to celebrate the birthday of Jesus, and having ordered the church-doors to be closed, he set fire to the building, and all the worshipers perished in the flames. It does not appear, however, that there was any uniformity in the period of observing the nativity among the early churches; some held the festival in the month of May or April, others in January. It is, nevertheless, almost certain that the 25th of December *cannot* be the nativity of the Saviour, for it is then the height of the rainy season in Judea, and shepherds could hardly be watching their flocks by night in the plains.

C. not only became the parent of many later festivals, such as those of the Virgin, but especially from the 5th to the 8th c., gathered round it, as it were, several other festivals, partly old and partly new, so that what may be termed a *Christmas Cycle* sprang up, which surpassed all other groups of Christian holidays in the manifold richness of its festal usages, and furthered, more than any other, the completion of the orderly and systematic distribution of church festivals over the whole year. Not casually or arbitrarily was the festival of the Nativity celebrated on the 25th of December.

Among the causes that co-operated in fixing this period as the proper one, perhaps the most powerful was, that almost all the heathen nations regarded the winter-solstice as a most important point of the year, as the beginning of the renewed life and activity of the powers of nature, and of the gods, who were originally merely the symbolical personifications of these. In more northerly countries, this fact must have made itself peculiarly palpable —hence the Celts and Germans, from the oldest times, celebrated the season with the greatest festivities. At the winter-solstice, the Germans held their great Yule-feast (see YULE), in commemoration of the return of the fiery sun-wheel; and believed that, during the twelve nights reaching from the 25th December to the 6th of January, they could trace the personal movements and interferences on earth of their great deities, Odin, Berchta, &c. Many of the beliefs and usages of the old Germans, and also of the Romans, relating to this matter, passed over from heathenism to Christianity, and have partly survived to the present day. But the church also sought to combat and banish—and it was to a large extent successful—the deep-rooted heathen feeling, by adding—for the purification of the heathen customs and feasts which it retained—its grandly devised liturgy, besides dramatic representations of the birth of Christ and the first events of his life. Hence sprang the so-called 'Manger-songs,' and a multitude of C. carols, as well as C. dramas, which, at certain times and places, degenerated into farces or Fools' Feasts (q. v.). Hence also originated, at a later period, the Christ-trees, or C.-trees, adorned with lights and gifts, the custom of reciprocal presents, and of special C. meats and dishes, such as C. cakes, dumplings, &c. Of late it has become usual for friends to forward to one another, by post, gaily illuminated Christmas cards, bearing Christmas greetings.

In the Roman Catholic Church, three masses are performed at C.—one at midnight, one at daybreak, and one in the morning. The day is also celebrated by the Anglo-Catholic Church—special psalms are sung, a special preface is made in the Communion Service, and the Athanasian Creed is said or sung. The Lutheran Church, on the continent, likewise observes C.; but the Presbyterian churches in Scotland, and the whole of the English dissenters, reject it, in its religious aspect, as a 'human invention,' and

as 'savoring of papistical will-worship,' although, in England dissenters as well as churchmen keep it as a social holiday, on which there is a complete cessation from all business. But within the last hundred years, the festivities once appropriate to C. have much fallen off. These at one time lasted with more or less brilliancy till Candlemas, and with great spirit till Twelfth-day; but now a meeting in the evening, composed, when possible, of the various branches and members of a family, is all that distinguishes the day above others.

CHRISTMAS BOX, a small money-gift to persons in an inferior condition on the day after Christmas, which is hence popularly called *Boxing-day*. The term, and also the custom, are essentially English, though the making of presents at this season and at the new year is of great antiquity. A number of interesting particulars concerning the C. B. will be found in Brand's *Popular Antiquities*. Here, we need refer only to the usage in its later aspect. Within the memory of middle-aged persons, the practice of giving Christmas boxes, or petty presents, to apprentices, domestic servants, and tradesmen, had become a serious social nuisance, more particularly in London, where every old custom seems to linger, and is most difficult to be got rid of. Householders felt under an obligation to give money to the apprentices in the shops where they dealt, also to various inferior parish officers, including scavengers and lamplighters; while shopkeepers, on the other hand, were equally impelled to make presents to the male and female servants of their customers. Thus, as referred to in *Christmas*, a poem:

> 'Gladly, the boy, with Christmas Box in hand,
> Throughout the town his devious route pursues;
> And, of his master's customers, implores
> The yearly mite; often his cash he shakes;
> The which, perchance, of coppers few consist.
> Whose dulcet jingle fills his little soul
> With joy.'

At length the C. B. system became such an intolerable grievance, that tradesmen stuck up notices in their windows that no Christmas boxes would be given; and at the same time, the public authorities issued remonstrances to the same effect. At Christmas 1836, the Secretary of State for Foreign Affairs issued a circular to the different embassies, requesting a discontinuance of the customary gifts to the messengers of the Foreign department, and other government servants. Since this period, the practice has greatly decreased, doubtless to the improvement of the self-respect of the parties interested.

CHRISTMAS CAROLS. The word carol (Ital. *carola*, and Fr. *carole*, a round dance—probably from Lat. *corolla;* Welsh, *coroli*, to reel, to dance; the name is then applied to the music or song accompanying such a dance: *carillon* is probably allied) signifies a song of joy. The practice of singing carols, or, at all events, sacred music, in celebration of the nativity of Christ as early as the 2d c., is considered as proved by the circumstance that a large sarcophagus belonging to that period has sculptered upon it a representation of a Christian family joining in choral praise for this purpose. A century or two after this, however, the C. C. seem to have sadly degenerated, and become, in fact, so indecent, that the clergy found it necessary to forbid them.

Under the Anglo-Saxon kings, merriment and piety were pleasantly combined in English life, a peculiarity that affected the C. C. of that period not a little; but by the 13th c. the jocosity had unhappily lapsed into what would now be considered profanity. The oldest printed collection of English C. C. bears the date of 1521. The majority of these, though written by men of learning—priests and teachers—exhibit a lamentable ignorance of the character of the two most prominent persons in the carols—Mary and Jesus. In 1525 was kept the 'still Christmas,' on account of the illness of King Henry; but with this exception, the sacred season appears to have been regularly celebrated with joyous music and songs during the Tudor period. In 1562, C. C. of a more solemn nature were introduced. By the Puritan parliament, Christmas was abolished altogether, and holly and ivy were made seditious badges; and in 1630 the Psalms, arranged as carols, were advertised. After the Restoration, the C. C. again exhibited a hearty, cheerful, and even a jovial character. Those with which the dawn of Christmas is now announced in England are generally religious, though not universally so. In France, the carols, at this season used to be much less sacred than gay. Often, indeed, they were grossly Bacchanalian.

See an interesting paper in the *Athenæum* for December 20, 1856; also Sandy's *Christmas Carols*, 8vo., 1833; Sylvester's *Christmas Carols and Ballads*.

CHRISTMAS ROSE. See HELLEBORE.

CHRISTO'LOGY is the doctrine of the Person of Christ. The word itself is to be found, once or so, in the divines of the 17th c. (see Dean Trench on the *Study of Words*), but the department of scientific theology which it now represents is almost entirely the growth of modern, and particularly of German inquiry. As yet, it can hardly be said that the word C. is accredited in Great Britain, but the same differences of opinion which led to its adoption in Germany, are beginning to manifest themselves here also. There are only three methods of apprehending the doctrine of the Person of Christ. First, there is the *Rationalistic* method. This consists in representing the development of the Messianic idea in Jewish history as purely natural, and conditioned by purely human and historical influences—in short, as a subjective or self-originated notion, to which there was no correspondent Divine Reality. Second, there is, what, for want of a better word, we may call the *Spiritualistic* method (that of theologians like Neander, Rothe, &c.).

This consists in representing the development of the Messianic idea in Jewish history as both natural and supernatural; that is to say, it asserts the existence of a Divine Objective Reality ('the Eternal Son of God') as the basis of the subjective idea in the minds of the Jews, and regards the growth of that idea, and the influence of historical circumstances, as the result of a supernatural Providence, which culminated in the revelation 'of the mystery of godliness, God manifest in the flesh.' Third, there is the *Dogmatic* method, which is the one accepted by the common order of theologians. This consists in representing the doctrine of the Person of Christ as *symbolically* known to the spiritually-minded among God's people from the earliest ages. 'Abraham saw his (Christ's) day afar off.' This is interpreted to signify that, by the grace of prophetic illumination, the righteous men of old were enabled to foresee in a mysterious and inexplicable manner the atonement of Christ, as it happened in history. Admitting with the Spiritualistic theologians, that the Messianic idea among the Jews underwent, in some sense, a historical development, the dogmatic Christologists differ, in general, from the former by attributing to the higher minds such a knowledge of the *work* of Christ, as logically involves a knowledge of his person and character. The entire absence, however, of any *personal* traits of Christ in the Old Testament, such as might be expected of those who had seen him even with the eye of faith, has induced many orthodox theologians to shrink from making any statement in regard to what may have been the doctrine of the Person of Christ among the ancient Jews.

CHRISTOPHE, HENRI, king of Hayti, born October 6, 1767, was at one period a slave and tavern-cook in Cape Town, St. Domingo, and afterwards overseer of a plantation. In 1790, he joined the black insurgents against the French, and, from his gigantic stature, energy, and courage, soon became a leader among them. By Toussaint Louverture, he was appointed brigadier-general, and employed to suppress an insurrection headed by Moyse, or Moses, his nephew. C. captured the latter, and on his execution, succeeded him as governor of the northern province of French St. Domingo. In 1802, he gallantly defended Cape Town when General Leclerc arrived there with a French army destined for the reduction of the blacks, and effected his retreat with 3000 men, after having burned the greater part of the town. The perfidious seizure of Toussaint, he amply revenged, and during the short-lived government of Dessalines, who was slain by a military conspiracy in October 1806, C. was general-in-chief of the Haytian army. In February 1807, he was appointed President of Hayti for life.

A republic being, about the same time, organized at Port-au-Prince, with Petion at its head, civil war commenced between them. On March 28, 1811, C. was proclaimed *king* of Hayti, by the name of Henri I., and solemnly crowned, June 2, 1812. In 1814, he and Petion suspended hostilities, and by his power and skill, C. was enabled to counteract the attempts made by France to regain its authority in the island. His avarice and cruelty led to an insurrection, which was aided by General Boyer, who had succeeded Petion in 1818; and the rebellion having spread to Cape Town, C.'s deposition was proclaimed, at the head of the troops, by the Duke of Marmalade, one of the first dignitaries in the kingdom. Deserted by his body-guard and all his nobles, he shot himself, October 8, 1820. He left a code of laws, which he called the 'Code Henri,' in imitation of Code Napoleon.

CHRI'STOPHER, HERB. See ACTÆA.

CHRISTOPHER, ST., a saint of the Roman Catholic and Greek churches. He is supposed to have suffered martyrdom about the middle of the 3d century. According to vulgar legend, C., whose name was originally *Adokimos* (the Unrighteous), was a native of Palestine, Syria, or Lycia, and a person of prodigious bulk and strength. His height was 12 feet. So proud was he of his gigantic frame, that he would serve only the mightiest princes. Having attached himself to one, who went for the greatest of his day, C. stayed with him for a short time, but soon discovered that his master was terribly afraid of the devil, in consequence of which, C., with fearless consistency, passed into the service of the latter. One day, however, when the devil and he chanced to be walking through a wood, they came across an image of Christ. His new master exhibited such perturbation and alarm at the sight, that C. entirely lost confidence in him, and resolved to find out the Sav-

iour, and follow him. For a long time he searched in vain, but finally he fell in with a hermit, who showed him Christ and baptized him. C. despised the customary penances, and in consequence, it was imposed on him to carry Christian pilgrims on his shoulders over a stream which had no bridge. One day, a little child came to the stream; C. took it on his shoulders, but soon began to sink under the weight of his burden. The child was Christ himself, and to prove it, he commanded C. to stick his staff into the ground. He did so, and next morning it had blossomed into a palm-tree bearing fruit. This miracle converted thousands to Christanity. C.'s success excited the enmity of Dagnus, the prefect of that region, who put him in prison scourged him with red-hot rods, put a burning helmet on his head, and clapped him on a burning stool. C. still remained uninjured. Multitudes of poisoned arrows were now discharged against him, but they rebounded from his charmed body, and one even wounded the prefect himself in the eye. C. pitied his tormentor, a .d freely offered his head to the executioner, that the prefect might be healed by the blood which should flow from it. This was done, and, as a matter of course, Dagnus and his family became Christians. The Greek Church celebrates his festival on the 9th of May, the Roman Catholic, on the 25th of July.

St. C. was greatly invoked in times of pestilence, or when people were digging for treasures, to frighten away the spirits who watched over them. The formula used was called a *Christopher's Prayer*. He was also the patron of an Order of Moderation, founded in Austria in 1517, for the purpose of checking excessive drinking and swearing, and which was called the Order of St. Christopher.

CHRISTOPHER'S, St., or popularly, *St. Kitts*, an island near the north-east bend of the great arch of the Antilles, 46 miles to the west of Antigua, and 2 miles to the north of Nevis. With a very unequal breadth, it is 20 miles long from south-east to north-west, containing about 44,000 acres, and (1881) 29,137 inhabitants. It belongs to Great Britain, and has a legislature of its own, with an executive immediately subordinate to the governor-in-chief of the Leeward group, residing in Antigua. In 1880, the revenue of the colony was £32,000, having been only £3638 in 1834; so that, under the system of free labor, it had increased nearly nine-fold in 46 years. During the same interval, the imports had risen in value from £63,018 to £168,000, and the exports from £105,267 to £186,000. The staple exports are sugar, rum, and molasses. The debt of the island in the year 1880 amounted to £3700. Education is in a promising condition. In the year 1876 the average attendance at school was 1525; 2 schools obtained a first-class, 4 schools a second-class, and 14 schools a third-class certificate. The total class and capitation grants which were earned amounted to £577.

The chief towns, both of them seaports with open roadsteads, are Basse-Terre, defended by Fort Smith, and Sandy Point, protected by Fort Charles and Brimstone Hill. Of Fort Smith, the exact lat. and long. are 17° 17′ 7″ N., and 62° 48′ W. The mean annual temperature of these places, and of the coast generally, is about 80° F.; but the mornings and evenings, even of the hottest days, are agreeably cool. The length of the island is traversed by a well-wooded ridge of volcanic origin, which has in its center a crater; and towards the west extremity of the range, rises the nearly perpendicular crag of Mount Misery, with an altitude of 3711 feet above the level of the sea. Over the adjacent slopes, which gradually descend to the water's edge, this central range sends down several streams—almost every plantation, in fact, receiving its rivulet in the rainy season. The springs, though numerous are yet mostly brackish; and indeed the southern extremity of the island presents a number of salt ponds.

St. Kitts, appropriately named by the natives 'The Fertile Isle,' was discovered by Columbus in 1493, and colonized by the English in 1623, who were almost immediately joined by some French adventurers. After treacherously exterminating the Caribs, the French and English, often quarrelling, occupied the island, till, in 1713, the Treaty of Utrecht gave the whole to England. In 1782, during the war of American independence, St. Kitts was captured by the French, but restored. On July 31, 1865, a terrific fire took place at Basse-Terre.

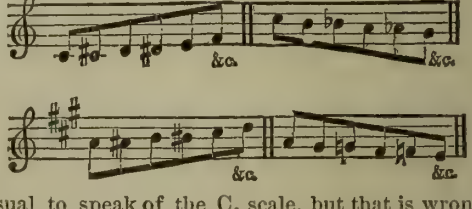
CHRIST'S COLLEGE, Cambridge, was originally founded by Henry VI., under the name of God's House, and was intended by him to consist of a master, 12 fellows, and 47 scholars. In 1505, however, there were only three fellows besides the master, when Lady Margaret, Countess of Richmond and Derby, mother of Henry VII., 'counting herself, as of the Lancaster line, heir to all Henry VI.'s godly intentions,' made up the full number, and endowed the college liberally, changing its name to Christ's College. Edward VI. added one fellow, and three scholars; and Sir John Finch and Sir Thomas Baines increased the number of fellows to fifteen. C. C. possesses many rich benefactions for the encouragement of students, amongst which are specially to be noticed four studentships founded by Christopher Tancred, worth £107 per annum, and tenable for three years after taking the degree of B.A. A student is elected annually before coming into residence. Amongst the illustrious men connected with this college may be noted Bishop Latimer, John Milton, and Ralph Cudworth, author of the *Intellectual System*.

CHRIST'S HOSPITAL, Newgate Street, London, was founded on the site of the Greyfriars' Monastery, by Edward VI., June 26, 1553, as a hospital for orphans and foundlings. It is usually called the 'Blue Coat School,' on account of the dress worn by the boys. This consists of a blue woollen gown or coat with a narrow red-leather girdle round the waist, yellow breeches, and yellow stockings, a clergyman's bands at the neck, and a small blue worsted cap, but this last they seldom wear, and are generally seen going about bareheaded—such has been the costume of the boys since the foundation of the school in the reign of Edward VI.; the persistency in it through successive generations, affording a curious instance of the unchangeableness in some of the English usages. No boy is admitted before seven years of age, or after ten, and none can remain after fifteen, with the exception of 'King's boys' (i. e., those who attend the mathematical school founded by Charles II. in 1672) and 'Grecians' (i. e., the highest class of scholars in the hospital), of whom 8 are sent on various scholarships to the universities of Oxford and Cambridge. Altogether, about 800 boys can be admitted. The right of presentation is vested in the managing governors. These are the lord mayor of London, the aldermen, and 12 common councilmen. Besides these, all noblemen and gentlemen who benefit the hospital to the extent of £400 are governors. The managing governors are the patrons of several churches, chiefly in Surrey and Essex. In 1880 (when changes in the institution were contemplated) the gross annual income was £70,907—mostly from legacies subsequent to the foundation. King Charles II. enriched it by £7000, with an additional annuity of £370, 10*s*. for the purpose of educating yearly ten boys for the sea-service. Most of the building perished in the Great Fire of 1666; but, through the generosity of the corporation of London and of wealthy Englishmen, it was soon rebuilt, under the superintendence of Sir Christopher Wren.

In the course of time, the new hospital fell into decay, and in 1825, a third structure was erected by Mr. Shaw. The great hall of the hospital is a magnificent room, second only to that of Westminster. C. H. is essentially a classical institution, Latin and Greek being the basis of education; but, to satisfy the wants arising from the changed condition of society, the modern languages, drawing, &c., are also taught. In 1683, the governors built a preparatory school at Hertford, where the children are trained till they are old enough to enter the hospital. The *girls*, however, remain permanently here. It can receive about 400 of both sexes. Dependent schools in Newgate Street accommodate 1200 children. Several eminent persons have been educated at C. H., such as Camden, Stillingfleet, Coleridge, and Lamb.

CHRIST'S THORN. See Jujube and Paliurus.

CHROMA'TIC, in Music, is a term applied to a series of notes at the distance of a semitone from each other. Such a series is produced by dividing the whole tones of the diatonic scale into semitones, so that with the two diatonic semitones, already in the natural scale, the octave is divided into twelve semitones. The word C. is from the Greek, and means colored. Ascending C. passages are formed by the whole tones of the diatonic scale being raised or elevated by a sharp or a natural, according to key, and descending passages by their being lowered by a flat or a natural, thus:



It is usual to speak of the C. scale, but that is wrong, as it is only a melodious progression of semitones, certain notes of which belong to, and form the diatonic scale, showing that the foundation of the system of music does not rest on a C. basis, but on the natural diatonic progression of sounds.

CHROMATIC, in Optics. See Achromatic.

CHROMA'TICS is that part of the science of Optics (q. v.) which explains the properties of the colors of light and of natural bodies. Before 1666, when Sir Isaac Newton began to investigate this subject, the notions which prevailed respecting the nature of colors were purely fanciful. Till Descartes' time, indeed, it seems not to have been conceived that color had anything to do with light. As examples of the notions prevalent at very early times, we may cite those propounded by Pythagoras and Zeno.

According to the former, color was the superficies of bodies; according to the latter, it was 'the first configuration of matter'—whatever that may be. It is now settled that white light is not homogeneous, but consists of rays of different colors, endued with different degrees of refrangibility, and that the different colors of bodies arise from their reflecting this or that kind of rays most copiously. According to this, a body that appears red reflects red rays in greater abundance than the others; and one that appears black reflects none of the rays—in other words, absorbs all the light that falls upon it. The analysis of a beam of the sun's light by a prism was the experiment by which Newton demonstrated his great optical discovery of the unequal refrangibility of the variously colored rays, and laid the foundations for the above theory of color. The reader will find an account of this experiment, and of the most interesting phenomena presented by the spectrum, under the article SPECTRUM. Newton concluded from his experiments that white light is composed of seven colors, which he called the primary colors—viz., red, orange, yellow, green, blue, indigo, and violet, and that all other shades of color arise from the admixture of these different proportions. Sir David Brewster, on the other hand, conceives that he has established that the primary colors are only three in number, red, yellow, and blue. This result he obtained by examining the rays of the spectrum through different absorbing media—a mode of experiment now admitted to be fallacious in principle. Professor Maxwell, by direct examination of the rays, concludes that the three primary colors are red, green, and blue. Recently, a theory has been propounded that all the colors are the results of the admixture of white light and of shade or darkness; but as yet no attempt has been made to support this theory by direct experiment on the sun's rays. It is rested on results obtained by combining by motion certain proportions of white and black pigments on a revolving card. See the articles LIGHT, DISPERSION, and NEWTON'S RINGS.

CHRO'MATYPE, (Gr. *chrome*, color; *typos*, impression), a photographic process, thus described by its discoverer, Mr. R. Hunt. One drachm of sulphate of copper is dissolved in one ounce of distilled water, to which is added half an ounce of a saturated solution of bichromate of potash; this solution is applied to the surface of the paper, and when dry it is fit for use, and may be kept for any length of time without spoiling. When exposed to sunshine, the first change is to a dull brown, and if checked in this stage of the process, we get a negative picture; but if the action of light is continued, the browning gives way, and a positive yellow picture on a white ground is obtained. In either case, if the paper, when removed from sunshine, is washed over with a solution of nitrate of silver, a very beautiful positive picture results.

In practice, it will be found advantageous to allow the bleaching action to go on to some extent; the picture resulting from this will be clearer and more defined than that obtained when the action is checked at the brown stage. To fix these pictures, it is necessary to remove the nitrate of silver, which is done by washing them in pure water. If the water contains any chlorides, the picture suffers, and long soaking in such water obliterates it—or if a few grains of common salt be added, the apparent destruction is rapid. The picture is, however, capable of restoration, all that is necessary being, to expose it to sunshine for a quarter of an hour, when it revives; but instead of being of a red color, it assumes a lilac tint, the shades of color depending upon the quantity of salt used to decompose the chromate of silver which forms the shadow parts of the picture. Mr. Bingham suggested the substitution of sulphate of nickel for sulphate of copper, as yielding a higher degree of sensitiveness and greater definition. Neither process has been much used.

CHRO'MIUM (*chrome*, color) is a metal, so called from the many colored compounds it produces. It was discovered by Vanquelin in 1797. C. occurs naturally as the chromate of lead (PbO,CrO_3), and the chromite of iron, *chrome iron ore* (FeO,Cr_2O_3), at Unst and Fetlar in the Shetlands, and Portsoy in Banffshire, &c. The metal has been obtained in powder and in scales, but as a metal it possesses no interest. The principal compound of C. is the bichromate of potash, obtained by heating chrome iron ore in powder with one-fourth of its weight of nitre, and then digesting in water, which dissolves out the chromate of potash (KO,CrO_3), a yellow salt, and when this is acted upon by sulphuric acid, it is converted into bichromate of potash ($KO,2CrO_3$), readily crystallizes in orange-red crystals, which is soluble in water, and is largely used by the dyer and calico-printer. If this salt be added to a solution of lead, an abundant yellow precipitate occurs of chromate of lead (PbO,CrO_3), or *chrome yellow*, which is used largely by the painter as a yellow pigment. A sesquioxide of C. (Cr_2O_3), *chrome green*, possessing a bright green color, which renders it useful in enamel-painting, and being innocuous, it is now introduced into paper-hangings instead of the highly dangerous arsenical green pigment. The bichromate of potash is employed in conjunction with sulphuric acid as an agent in bleaching palm-oil and other oils and fats.

CHRO'NICLE (from *chronos*, time), denotes a history in which events are treated in the order of time. A C. is understood to differ from annals in being more connected and full, the latter merely recording individual occurrences under the successive years or other dates. Most of our older histories were called chronicles, such as the *Saxon Chronicle*, *Holinshed's Chronicle*. The term is seldom applied to a modern book, but frequently to a newspaper—as, for instance, *The Morning Chronicle*.

CHRO'NOGRAM, or CHRO'NOGRAPH (Gr. *chronos*, time, and *gramma*, a letter or *grapho*, I write), a whimsical device of the later Romans, resuscitated during the *renaissance* period, by which a date is given by selecting certain letters amongst those which form an inscription, and printing them larger than the others. The principle will be understood from the following C., made from the name of George Villiers, first Duke of Buckingham:

GEORGIVS. DVX. BVCKINGAMIÆ.

The date MDCXVVVIII (1628) is that of the year in which the duke was murdered by Felton, at Portsmouth. See Hilton's *Chronograms* (1882).

CHRO'NOGRAPH. Different forms of time-measures, or time-recorders, under this designation, have been invented within a recent period. *Benson's* chronograph is intended to measure intervals of time down to tenths of a second, for use at horse-races and other occasions where a seconds watch is not exactly suited. It has an ordinary quick train lever movement, carrying hands which move over a dial. One of these is a seconds hand, very peculiarly made. This seconds hand is double, consisting of two distinct hands, one superposed on the other. The outer end of the lowermost hand has a small cup with a minute hole at the bottom; while the corresponding end of the uppermost hand is bent over so exactly as to reach this puncture. The little cup is filled with ink, having a consistency between that of writing fluid and printer's ink. Suppose that a horse-race is about to take place. The observer keeps a steady look-out for the fall of the starter's flag, or whatever the signal may be; he gives a pull to a cord or string connected with the mechanism peculiar to the instrument; by this movement, the outer and bent end of the upper seconds hand dips down through the ink-cup in the lower hand, and through the puncture to the dial. A small black spot or mark is thus made upon the dial-plate; and this is repeated as each horse passes the winning-post. A record may thus be obtained to about tenths of a second.

Strange's chronograph is designed for a more scientific purpose, and constructed with more careful details. The object is to measure extremely short intervals of time, for the determination of longitudes in great trigonometrical surveys. The observer, when a particular star traverses the field of his telescope, touches a small ivory key; and on the instant, a dot or mark appears on a sheet of paper coiled round a barrel. The instrument being connected with an astronomical clock, there is a dot made for every beat of the pendulum; and as these dots are a considerable space apart (considerable, that is, for the refined instruments of the present day), it is possible to determine so wonderfully minute an interval as one hundreth of a second.

In the very elaborate galvanic chronographs made by the Messrs. Dent for astronomical purposes, the lapse of every second in the minute, save the 60th, is pricked on a cylinder covered with paper; and the touching of a stud by an observer causes an observation-pricker also to puncture the cylinder. By measuring the relation of the latter mark to the preceding one, the time can be calculated to the $\frac{1}{100}$th of a second, and a record is kept for reference. (See description in *Nature*, vol. xxiii.)

Young's *recording* chronograph was designed to mark the instant of observation in hours, minutes, seconds, and hundredths of a second, in *printed* characters, and in a form suitable for preservation and reduction.

Chronographs connected with electric and magnetic apparatus are used for determining the velocity of projectiles. Many forms have been devised by Noble, Bashforth, Navez, Le Boulengé, and other inventors. The most general arrangement consists in causing the bullet to pass through a series of screens; the rupture of each screen breaks for a moment the continuity of an electric current, sets in action an electro-magnetic apparatus, and makes a permanent mark or record.

CHRONO'LOGY is the science of the divisions of time. It has two main branches—Mathematical C., and Historical Chronology. Mathematical C. is engaged with such of the units for the measurement of time as begin and end with the period of complete evolution of recurring celestial phenomena. See articles CALENDAR, YEAR, MONTH, DAY, and CYCLE, where the chief points in mathematical C. are explained. Historical C. uses these units among others to measure the distance in point of time between events, and to fix their *dates*. As in geography and navigation,

longitude is measured from some arbitrary line, such as the meridian through Greenwich, so in historical C., *dates* are fixed by giving their distance from some arbitrary point of time, usually chosen because of some remarkable occurrence which signalized it. Such a fixed point, or *epoch*, forms the beginning of an *Era*. It is thus that *dates* have been aptly said to be to events in history what the latitude and longitude of places are to the places in geography and navigation. The mathematical, or, to speak more properly, the astronomical units of time above referred to have not been, as has been already hinted, the only units used in historical chronology. In early times, the more accurate methods of mathematics were unknown, and such vague periods as 'a generation,' or the lifetime of leading persons in a nation, such as the priestesses of Juno, or of the kings, were assumed as units in historical chronology. The great variety of eras, too, in ancient times confuses the student of chronology. Thus the era of the Greeks began with the year of the first Olympiad, or that in which Corœbus was victor; being the first celebration of the games at which the victor's name was recorded, and which is calculated to correspond to the year 776 B.C. From this epoch, the Greeks measured time by Olympiads or periods of four years. Thus, the 3d year of the 12th Olympiad would be the year 729 B.C.

The Roman era was reckoned from the founding of the city, being either 752 or 753 B.C. The Roman practice of dating events from the building of the city, seems to be the first instance of the method of reckoning time from a fixed point by single years. It thus forms one of the great stages in chronology. Of other eras we shall merely mention the Mohammedan, which commences with the flight of Mohammed, 622 A.D., and which is called the *Hedjrah* (q. v.). The Roman and Greek methods of measuring time continued to be in use long after the birth of Christ; the Olympiads, indeed, appear to have been employed in Europe down to the 304th Olympiad, or 440 A.D. From 312 A.D., however, the public mode of computation throughout the Roman empire was by indictions, which were periods of 15 years, beginning with that year (see INDICTION); and this mode was at one time almost universally followed in the west. In France, it was not altogether discontinued till the end of the 15th century. The Christian era is said to have been first proposed in the year 527 A.D., and is now universally used in Christendom. Part of the business of C. is to determine the relationships of the different eras, so as to enable one to express, in the language appropriate to one mode of computation, the date of an event recorded in another. Owing to the birth of Christ being a comparatively recent event, the Christian era is attended by this inconvenience, that we must count backwards from it for the dates of occurences prior to it. To obviate this, various comprehensive periods, such as the Julian and Louisian Periods have been invented, which have the merit of being applicable to most events lying within the limits of history.

Various systems of C., such as the Chinese, Babylonian, Egyptian, Indian, and Chaldæan, are worthy of attention. Accounts of the periods which these nations respectively assign to their histories, will be found under the heads CHINESE EMPIRE, BABYLON, &c. Of *Sacred* C. there have been various systems. In these the epochs are the Creation of the World, and the Flood; but the chief copies of the Bible do not agree as to the dates of these events. While the Hebrew text reckons 4000 years from the creation to the birth of Christ, and to the flood 1656 years, the Samaritan makes the former much longer, though it counts from the creation to the flood only 1307 years. The Septuagint version differs from both. It removes the creation of the world to 6000 years before Christ, and 2250 years before the flood. These differences have never been reconciled. It is now, however, universally admitted, that the creation of the world is not to be regarded as having occurred even so recently as 6000 B.C. The modern understanding of the first chapter of Genesis leaves the period of the creation quite indefinite, and one scheme of interpretation stretches out the days of creation into periods of indefinite length. Of the *Newtonian* C., all that can be said here is, that it was an attempt, now generally admitted not to have been very successful, to rectify the obvious blunders of ancient chronologers, by determining certain epochs by means partly of astronomical calculations, and partly of the critical examination of such chronicles as measured time by reigns and generations. By a very fine argument, the soundness of which has since been doubted, Newton set down the date of the Argonautic expedition as being 43 years after the death of Solomon, or 937 B.C.

CHRONO'METER, or time-measures, is the name given principally to such time-keepers as are used for determining the longitude at sea. The mechanism is essentially the same as that of a common watch; only the size is generally greater, and additional precautions are taken to secure regularity under changes of temperature and other deranging influences. See WATCH, HOROLOGY.

CHRO'NOSCOPE, an instrument contrived by Sir Charles Wheatstone to measure the duration of certain short-lived luminous phenomena, such as the electric spark, of which the eye itself can be no judge, owing to the persistence of impressions of light on the eye after the cause of sensation has ceased. The phenomenon is observed by reflection in a mirror, in such rapid motion that the image of the luminous object would appear to describe a circle, supposing the luminosity to endure long enough. Should the phenomenon be instantaneous, the image will appear as a mere point; should it last for an appreciable time, the image will form an arc, greater or less, of the circle. The electric spark is found by this test to have no duration.

CHRU'DIM, a town of Bohemia, beautifully situated on a small river, about 62 miles south-east of Prague. It is walled, has a noble collegiate church, a high school and Capuchin convent, manufactures of cloth, and very important horse-markets. Pop. (1880) 11,886.

CHRY'SALIS, or CHRY'SALID, a name originally Greek, and strictly belonging to those *pupæ* of butterflies which are adorned with golden spots, but extended to the pupæ of lepidopterous insects generally, and even of other orders of insects. The chrysalids of lepidopterous insects are enclosed in a somewhat horny membranous case; sometimes very angular, sometimes nearly round; generally pointed at the abdominal end, sometimes at both ends; and before the caterpillar undergoes its transformation into this state, it often spins for itself a silken cocoon, with which earth and other foreign substances are sometimes mixed, so as to increase its size, and within which the chrysalid is concealed. Chrysalids are often suspended by cords, and generally remain nearly at rest; some have the power of burying themselves in the earth; others are bound by a single silken thread which passes round their middle (see cut); some twirl themselves round when touched, or when the stalk or leaf to which they are suspended is touched; and in general, they give signs of life, when disturbed, by violent contortions of the abdominal part. See INSECTS; PUPA; LEPIDOPTERA; BUTTERFLY, HAWK-MOTH, MOTH, and SILKWORM.

Chrysalids.
a, Orange-tip Butterfly; *b*, Black-veined White Butterfly; *c*, Swallow-tailed Butterfly; *d*, Purple Emperor; *e*, Silver-washed Fritillary; *f*, Duke of Burgundy Fritillary.

CHRYSA'NTHEMUM (Gr. gold-flower), a genus of plants of the natural order *Compositæ*, sub-order *Corymbiferæ*; having a hemispherical or nearly flat involucre, with imbricated scales, which are membranous at the margin, a naked receptacle, the florets of the disk tubular and hermaphrodite, those of the ray strap-shaped and female, the fruit destitute of pappus. The species of this genus are annuals, perennials, or shrubby; and all have leafy stems. They are natives chiefly of the temperate parts of the old world. *C. leucanthemum*, the OX-EYE, or OX-EYE DAISY, is abundant in fields, meadows, and grassy places of woods, in most parts of Europe. It has large flowers, with white ray and yellow disk. It is often a troublesome weed among hay and in pastures; being perennial, and having a creeping brittle root-stock, it is not easily extirpated. It is common in Britain, which has only one other native species, *C. segetum*, CORN MARIGOLD, a frequent weed in cornfields—although rare in the neighborhood of Edinburgh—an annual, with large deep yellow flowers. It is dealt with like annual weeds in general, by pulling it when young.—*C. carinatum*, an annual species with white ray and dark-red disk, the scales of the involucre keeled, a native of Barbary, is frequently cultivated in green-houses or—where the climate permits—in flower-gardens. The favorite species of the gardener is, however, *C. Indicum*, the CHINESE or INDIAN C., a native of China, Cochin-China, and Japan; which has long been cultivated in its native countries as

Chrysanthemum.

an ornamental plant, and of which there are many varieties. Its colors are also very various—red, lilac, rose-color, white, yellow, orange, or two colors combined. It flowers in autumn and winter. It is easy of cultivation, succeeds best in a light rich soil, is easily propagated by cuttings, suckers, or parting the roots, but requires the green-house in Britain. It was introduced in 1789. It is reckoned among florists' flowers.

CHRYSELEPHA'NTINE (Gr.; from *chrysos*, gold, and *elephas*, ivory), the art of making images of gold and ivory, was extensively practised amongst the Greeks. Winckelmann has calculated that about 100 statues of this kind are mentioned by the ancients. The colossal works executed by Phidias at Athens, in the time of Pericles, are the most famous of this class, the greatest being the Pallas of the Parthenon.

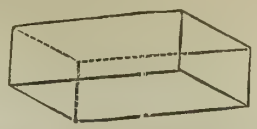
It was 26 cubits high, and represented the goddess in armor, covered with a long robe. The famous Olympian Jupiter of Phidias, executed in the same materials, was also a world-wide wonder. The combination of gold and ivory was chiefly used in temple statues; and though the execution of the more famous works of this class belongs to an advanced period of art, the use of various materials in the same statue was very ancient, and probably borrowed from the custom of adorning the wooden images of the earliest time with the precious metals. Sometimes, too, the head the arms and hands, and the feet were of marble, whilst the rest was of wood covered with thin plates of gold. These were called Acrolites (*akrolithoi*). See SCULPTURE.

CHRYSI'PPUS, an eminent Stoic philosopher, was born about 280 B.C., at Soli in Cilicia. He came to Athens when still a youth, and eagerly addicted himself to philosophical pursuits. His principal master was Cleanthes, although he is said to have also studied under the academic teachers, Arcesilaus and Lacydes, and learned from them what were the objections urged by sceptics against the doctrines of the Stoics. He had the reputation of being the keenest disputant of his age, and was happily described as 'the knife for the academic knots.' In fact, his logic was held to be so convincing, that the people were wont to say: 'If the gods make use of dialectic, it can only be that of Chrysippus.' It is also related of him, that he told Cleanthes he merely wanted to know the principles of his system, as he intended to find arguments for them himself; and this story appears to indicate his true position in philosophy. He was not the creator of a new system, but the expounder of an old. C.s' industry was very great. He seldom wrote less than 500 lines a day, and is said to have composed more than 700 works. Many of these, however, were compilations, and were not characterized by great beauty of style. Only a variety of fragments remain, which have been edited by Petersen (*Philosophiæ Chrysippeæ Fundamenta*, Altona and Hamburg, 1827).

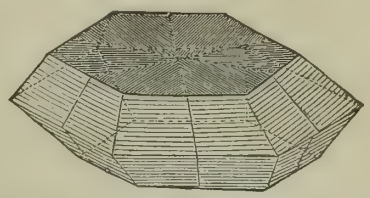
CHRY'SIS, a Linnæan genus of hymenopterous insects, now constituting a family *Chrysidæ*, allied to the *Ichneumonidæ*, and forming a connecting-link between them and the bees, wasps, &c. The French call them *Guêpes dorées* (gilded wasps), and they sometimes receive the English names of *Golden-tailed* and *Ruby-tailed Flies*. They delight in sunshine, and may be seen poised in the air—the motion of their wings being so rapid as to render the body alone of the insect visible.

CHRYSOBALANA'CEÆ, or CHRYSOBALANEÆ, according to some botanists, a distinct natural order of plants; according to others, a suborder of ROSACEÆ (q. v.). They are distinguished from the other plants usually included in the order Rosaceæ by their irregular petals, and by having the stamens also irregular, either in size or position; the ovary stalked, its stalk adhering on one side to the calyx, the style proceeding from its base. The fruit is a drupe of one or two cells. The species are trees or shrubs, natives generally of tropical and sub-tropical regions. About 50 species are known. The fruit of many is eatable, as the COCOA PLUMS (q. v.) of the West Indies (*Chrysobalanus*), the fruit of *Parinarium excelsum* in Sierra Leone, and that of *Moquilea grandiflora* in Brazil. The kernels of some resemble sweet-almonds, as those of *Parinarium campestre* and *P. montanum*. A useful oil is expressed from the seeds of *Prinsepia utilis*, a spiny plant, common in some parts of the Himalaya Mountains, and which is also planted for hedges in the Khasia Hills, at an elevation of 5725 feet above the sea; whilst in Sikkim, it is only found where the elevation is above 8000 feet. This plant would in all probability succeed well in Britain, and an attempt should certainly be made to introduce it.

CHRY'SOBERYL, a gem almost as hard as sapphire, and the finer specimens of which are very beautiful, particularly those which exhibit an opalescent play of light. Lapidaries sometimes call it oriental or opalescent chrysolite. It is of a green color, inclining to yellow, semi-transparent, or almost transparent, and has double refraction. It occurs crystallized in six-sided prisms; often in macles, or twin crystals. It is found in granite, in sandstone, and in alluvial soil; in Ceylon, Pegu, Siberia, Brazil, and



Right rhomboidal prism: primary form of Chrysoberyl.



A crystal composed of six twins, grouped together laterally, which in transmitted light appears red. From Siberia.

Connecticut. It is composed of alumina, glucina, and a little protoxide of iron; the alumina being about 80 per cent. of the whole.

CHRYSOCO'LLA, or COPPER-GREEN (Gr. gold-glue), an ore of copper, found in Cornwall and in many parts of the world, but particularly in Wisconsin and Missouri, where it is so abundant as to be worked for copper. As a pigment, it was much used by the ancients.

CHRY'SOLITE (Gr. golden-stone), a mineral composed of silica, magnesia, and protoxide of iron; of a fine green color, with vitreous lustre; transparent, and having double refraction; in hardness, about equal to quartz; and with conchoidal fracture. It often crystallizes in four-sided or six-sided prisms, variously modified. Very fine specimens are brought from Egypt and from some parts of the east, also from Brazil. C. is used by jewelers as an ornamental stone, but is not highly valued. *Olivine*, which occurs generally massive, in grains and roundish pieces, and is frequent in volcanic countries, and found in the igneous rocks of some parts of Scotland—as on Arthur's Seat—is regarded as a coarse variety of chrysolite.—The Chrysoberyl (q. v.) is sometimes called C. by jewelers.

CHRYSOLO'RAS, MANUEL, a learned Greek of Constantinople, was born in the middle of the 14th century. He is regarded as the first who transplanted Greek literature into Italy. About the year 1391, the Byzantine emperor, John Palæologus, sent C. to England and Italy to entreat assistance against the Turks. This mission made C. known in Italy, and, in 1397, he left his native land and went to Florence, where, as teacher of Greek literature, he was highly esteemed and admired. Leonardo Bruno, Poggius, Philelphus, Guarinus of Verona, and other eminent scholars were pupils of his. He was afterwards employed in public services—especially in mediating a union of the Greek with the Roman Church—by Pope Gregory XII. In 1413, C. went with John XXII. to the council of Constance, where he died 1415. Besides theological works, his *Erotemata*, or 'Accidence of the Greek Language' (Venice, 1484), has been preserved.—Manuel C. must be distinguished from his nephew, JOHN CHRYSOLORAS, who also went to Italy and gave lessons in Greek.

CHRYSOMELA and CHRYSOMELINÆ. See GOLDEN BEETLE.

CHRYSOPHYLLUM. See SAPOTACEÆ, MONESIA BARK, and STAR APPLE.

CHRY'SOPRASE is merely a variety of chalcedony, but is valued far above common chalcedony as an ornamental stone; so that a stone of this kind, fit for mounting in a ring, is worth from £10 to £20. It is of a fine apple-green color in choice specimens, but inferior ones exhibit other shades of green, and it is sometimes spotted with yellowish-brown. It is often set in a circlet of diamonds or pearls. Unfortunately, it is apt to lose its color through time, particularly if kept in a warm place; but dampness is favorable to its preservation, and it is therefore sometimes kept in damp cotton. It is found in Lower Silesia—where the search for it was particularly encouraged by Frederick the Great—and in Vermont. The inferior specimens are made into brooches, necklaces, &c.; and those still coarser, into snuff-boxes, seals, cups, &c.—The C. of the ancients was a stone of yellowish-green color, but it is not certain what it was.

CHRY'SOPS. See CLEG.

CHRY'SOSTOM, JOHN (Gr. *Chrysostomos*, golden-mouth; so named from the splendor of his eloquence), was born at Antioch in 347 A.D. His mother Anthusa was a pious woman, wholly devoted to her son, who grew up under her loving instructions into

an earnest, gentle, and serious youth, passing through, as Neander significantly observes, none of those wild, dark struggles with sinful passions which left an ineffaceable impress on the soul of Augustine, and gave a sombre coloring to his whole theology. He studied oratory under Libanius, a heathen rhetorician; soon excelled his teacher; and, after devoting some time to the study of philosophy, retired to a solitary place in Syria, and there read the Holy Scriptures. The ascetic severity of his life and studies brought on an illness which forced him to return to Antioch, where he was ordained deacon by Bishop Meletius in 381, and presbyter by Bishop Flavianus in 386. The eloquence, earnestness, and practical tone of his preaching excited the attention of Jews, heathens, and heretics, and secured for him the reputation of the chief orator of the Eastern Church. In 397, the eunuch Eutropius, minister of the Emperor Arcadius, who had been struck by the bold and brilliant preaching of C., elevated him to the episcopate of Constantinople. C. immediately began to restrict the episcopal expenditure in which his predecessors had indulged, and bestowed so large a portion of his revenues on hospitals and other charities, that he gained the surname of 'John the Almoner.' He also endeavored to reform the lives of the clergy, and sent missionaries into Scythia, Persia, Palestine, and other lands. His faithful discharge of his duties, especially in reproof of vices, excited the enmity of the patriarch Theophilus and of the Empress Eudoxia, who succeeded in deposing and banishing him from the capital. He was soon recalled, to be banished again soon afterwards. He now went to Nicæa, in Bithynia; but was from thence removed to the little town of Cucusus, in the desert parts of the Taurus Mountains. Even here his zeal was not abated. He labored for the conversion of the Persians and Goths in the neighborhood, and wrote the seventeen letters (or rather moral essays) to Olympias, to whom he also addressed a treatise on the proposition—'None can hurt the man who will not hurt himself.' The emperor, enraged by the general sympathy expressed towards C. by all true Christians, gave orders that he should be more remotely banished to a desolate tract on the Euxine, at the very verge of the Eastern Roman empire. Accordingly, the old man was made to travel on foot, and with his bare head exposed to a burning sun. This cruelty proved fatal. C. died on the way at Comanum, in Pontus, September 14, 407 A.D., blessing God with his dying lips. The news of his death excited much sorrow among all pious Christians, for C. was a man who drew the hearts of his fellows after him; a lovable, manly Christian, hating lies, worldliness, hypocrisy, and all manner of untruthfulness, with that honest warmth of temper which all vigorous people relish.

A sect sprang up after his death, or martyrdom as they conceived it, called *Johannists*, who refused to acknowledge his successors; nor did they return to the general communion till 438, when the Archbishop Proclus prevailed on the Emperor Theodosius II. to bring back the body of the saint to Constantinople, where it was solemnly interred, the emperor himself publicly imploring the pardon of Heaven for the crime of his parents, Arcadius and Eudoxia. The Greek Church celebrates the festival of C. on the 13th of November; the Roman, on the 27th of January. In his *Homilies* (Thomas Aquinas said he would not give in exchange those on St. Matthew for the whole city of Paris) C. displays superior power of exegesis. In general, he rejects the allegorical system of interpretation, and adheres to the grammatical, basing his doctrines and sentiments on a rational apprehension of the letter of Scripture. He is, however, far from being a bibliolater. He recognized the presence of a human element in the Bible as well as a divine; and instead of attempting, by forced and artificial hypotheses, to reconcile what he thought irreconcilable in Scripture statements, he frankly admitted the existence of contradictions, and shaped his theory of inspiration accordingly. But his greatest and noblest excellence lay in that power, springing from the fervor and holiness of his heart, by which the consciences of the proud, the worldly, and the profligate were awakened, and all were made to feel the reality of the gospel message. The surname C. was first applied sometime after his death, and, as it is supposed, by the sixth œcumenical council in 680. C.'s works are very numerous, and consist of, 1st, *Homilies*, on parts of Scripture and points of doctrine; 2d, *Commentaries*, on the whole Bible (part of which has perished); 3d, *Epistles*, addressed to various people; 4th, *Treatises*, on different subjects (such as Providence, the Priesthood, &c.); and 5th, *Liturgies*. Of these the most valuable, as well as the most studied, are the *Homilies*, which are held to be superior to everything of the kind in ancient Christian literature.

The most correct Greek edition of C.'s works is that by Henry Savil (8 vols., Eton, 1613); and the most complete Greek and Latin edition is that by Montfaucon (13 vols., Par. 1718—1738; republished in 1834—1840). The best authority in regard to C. is Neander, who, besides treating of his life and labors in his *Kirchengeschichte*, published a life of this eminent Father.

CHRYSOTYPE (Gr. *chrysos*, gold; *typos*, impression), a photographic process invented by Sir John Herschel, and depending for its success on the reduction of a persalt of iron to the state of protosalt by the action of light, and the subsequent precipitation of metallic gold upon this protosalt of iron. The process is conducted as follows: Good paper is immersed in a solution of ammoniocitrate of iron of such a strength as to dry into a good yellow color, without any tinge of brown in it. It is then exposed to light under a negative until a faint impression is obtained.

A neutral solution of chloride of gold is then brushed over the paper, when the picture immediately appears, and is rapidly developed to a purple tint. It should then be freely washed in several changes of water, fixed with a weak solution of iodide of potassium, again thoroughly washed, and dried. The action of the iodide of potassium is to convert any unaltered chloride of gold into a soluble double iodide of gold and potassium, thus rendering the picture permanent.

CHUB (*Leuciscus Cephalus*), a fish of the family *Cyprinidæ*, of the same genus with the roach, dace, bleak, minnow, &c. See LEUCISCUS. The color is bluish-black on the upper parts, passing into silvery white on the belly; the cheeks are gill-covers rich golden yellow. The C. rarely attains a weight exceeding 5 lbs. It is plentiful in many of the rivers of England, and occurs in

Chub.

some of those of the south-west of Scotland. In the rivers of Cumberland it bears the name of *Skelly*, supposed to have reference to the size of its scales; but the Schelly of Ullswater Lake is the Gwyniad, and the C. is there called the *Chevin*. It is found in many rivers of the continent of Europe; being the *Jentling* or *Bratfisch* of the Danube, and the *Jese* of the Oder. It spawns in April and May. It is not in great esteem for the table.

The C. rises well at a fly, and takes freely a variety of baits. The same baits and the same means of fishing may be employed as for the barbel and bream. The C. is very fond, moreover, of slugs, grasshoppers, cockchafers, and humble-bees. The latter two are to be used either naturally, by means of dibbing or dapping, or, being imitated, may be used artificially, and cast as a fly. The best flies for the C. are large red, black, and brown palmers, with the hackles laid on thickly. The best places to fly-fish for C. are close under over-hanging boughs at the sides of streams, or against piles, or other places where they can get some shelter, for the C. is somewhat shy and easily alarmed. He is a bold riser, and when he comes at a fly seldom fails to hook himself. Of all the baits for bottom-fishing, he prefers greaves, cheese, and worms; and the fatter the bait the better he likes it. He will occasionally run at a minnow, and is often taken on a spinning bait. The C. spawns in May, and comes into condition again by the end of June or early in July; bites best, and is in the best condition for bottom-fishing, in October and November. When first hooked, he makes a great dash, but he very soon gives in. Some years ago, the scales of the C. were in much request, in common with those of the bleak, for artificial pearl-makers.

CHUBB, THOMAS, an English rationalist, who wrote on religious questions during the first half of the last century, was born at East Harnham, in Wiltshire, in 1679. He received but a meagre education in youth, and after an apprenticeship to a leather glove and breeches maker in Salisbury, he became a tallow-chandler, in which business he continued to the end of his life. His first work, published in 1715, was entitled *Supremacy of God the Father Vindicated*. Besides this, he wrote a multitude of treatises on other religious subjects. Among these may be mentioned: *A Discourse on Reason, as a sufficient Guide in matters of Religion; On Sincerity; On Future Judgment and Eternal Punishment; Inquiry about Inspiration of the New Testament*; and *Doctrine of Vicarious Suffering and Intercession Refuted*. C. died in 1746.

CHUCUI'TO, or CHUQUITO, a town of Bolivia, in the dep. of Puno, and 100 miles east-north-east of Arequipa, on the west shore of Lake Titicaca, at the mouth of a stream flowing from the Andes. It was formerly of much greater size and importance than it is at present, having had, it is said, at the beginning of the 18th c., the incredible number of 300,000 inhabitants. Its present pop. is only about 5000. In the province of the same name, of which it is the capital, there are mines of silver and gold, and interesting antiquarian remains.

CHUCK-WILL'S-WIDOW (*Antrostomus Carolinensis*), a bird of the Goatsucker family (*Caprimulgidæ*), a native of the southern parts of the United States. It has received its singular name from its note, which resembles these words or syllables articulated with great distinctness, and is repeated like that of the cuckoo, or of its own congener, the Whip-poor-will (q. v.).

CHU-LAN. See CHLORANTHACEÆ.

CHUMBU'L, a river rising in the Vindhyan Mountains, which form the southern limit of the basin of the Ganges. Its source, at a height of 2019 feet above the sea, is in lat. 22° 26′ N., and long. 75° 45′ E. During a generally north-east course of 570 miles, it receives many tributaries on both sides, till, in lat. 26° 30′ N., and long. 79° 19′ E., it enters the Jumna from the right, with such a volume of water, that, when itself flooded, it has been known to raise the united stream 7 or 8 feet in twelve hours. The C. is remarkable, here and there, for the wildness of its current and the pictuesque character of its banks.

CHU'NAM, the Indian name for a very fine kind of quick-lime made from calcined shells or from very pure limestone, and used for chewing with Betel (q. v.) and for plaster. Both recent and fossil shells are used for making chunam. Extensive beds of fossil shells employed for this purpose occur in the south of India, particularly in low marshy situations near the sea-coast. The shells used are in the first place very carefully cleaned; they are then calcined in kilns, with wood charcoal. When chunam is be used for plaster, it is mixed with fine river-sand, and thoroughly beaten up with water. A little *jaggery* (coarse sugar) is also added. When very beautiful work is desired, three coats of chunam are given to the wall, and the result is a plaster almost equal to marble in its polish and beauty. The third coat is applied in the form of a very fine paste, consisting of four parts of lime and one of fine white sand, beaten up with whites of eggs, sour-milk, and *ghee* (butter). After it has been rubbed on with a wooden rubber, the surface is washed with a cream of pure lime, and is rubbed with a polished piece of quartz or rock crystal. During this process, the wall is sprinkled with powder of pot-stone, and the rubbing is continued until the wall is quite dry, every trace of moisture being finally removed by a cloth. Chunam is an important article of trade in India.

CHUNARGU'RH, or CHUNAR, a fortified town on the right bank of the Ganges, 16 miles to the south-west of Benares, and in the division of that name. It is in the district of Mirzapore, and lieut.-governorship of the North-west Provinces. The population of the town in 1871 amounted to 10,154. The fortress which occupies the summit of a sand-stone rock, contains the commandant's house, the hospital, the prison, and an ancient palace, with a deeply excavated well of indifferent water. The river in front is navigable at all seasons for vessels of from 50 to 60 tons.

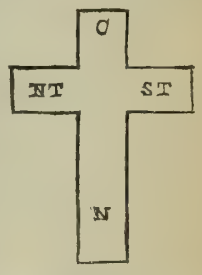
CHUQUISA'CA, or SU'CRE, the largest city of the state of Bolivia, in lat. 19° 20′ S., and long. 65° 30′ W. It is situated on a table-land about 9000 feet above the sea, and has a pleasant climate. The town is well built, has a cathedral of great magnificence, a university, a college of arts and sciences, and a mining-school. C. was founded in 1538 by Pedro Auzures, an officer of Pizarro's, on the site of an old Peruvian town called 'Choque Chaka,' or 'Bridge of Gold,' 'the treasures of the Incas having passed through it on their way to Cuzco.' At one time, C. bore the name of La-Plata, on account of the rich silver mines in its vicinity. Population, 12,000. C. gives name to a territory containing 220,000 whites, besides many native Indians. It has five silver mines in operation; and in it are magnificent ruins of unknown origin. The second name is derived from the general, who, in December 1824, fought and won the last great battle for colonial independence at Ayacucho.

CHUR (Fr. *Coire*, anct. *Curia Rhætorum*), a town of Switzerland, capital of the Grisons, in the valley of the Upper Rhine, in a fertile plain about 2000 feet above the sea, and surrounded by high mountains, 60 miles south-east of Zurich, on the Plessur, about a mile from its junction with the Rhine. It is of importance as standing on the great road to Italy by the Splügen and Bernardin passes, and thus possessing a considerable transit trade. C. stands on uneven ground, has narrow streets, and is divided into a high and low town. The bishop's palace, and the quarter around it, inhabited by the Roman Catholics, occupy the summit of an eminence, and are separated from the rest by walls and battlements, closed by double gates. In the same quarter stand the old cathedral, a round, arched or Byzantine edifice, founded in the 8th c.; the Church of St. Lucius or the *Dom*, a curious example of early-pointed Gothic, including fragments of earlier buildings. It contains singular old carving, paintings, and statues, and also it is said the bones of St. Lucius, who was a British king. Behind the episcopal palace is a kind of ravine lined with vineyards. In the lower town there are also some very ancient buildings. Romansch is still spoken in the vicinity; a newspaper in this dialect is published in the town; and a considerable collection of Romansch literature is to be found in the library of the cantonal schools. There are several new roads leading in different directions through the Grisons; and a railway connects the town with Zurich and other places. There are manufactures of zinc wares and cutting tools. Pop. (1880) 8889, of whom above 2000 are Catholics.

CHURCH, a word which signifies either a place of Christian worship, or a collective body of Christian people. It is, in all probability, derived from the Greek adjective *kyriakos* (from *kyrios*, lord), the place of worship having been called *the Lord's house*—and the worshipers *the Lord's people*. The Scottish *kirk*, the German *kirche*, &c., are merely different forms of it.

Under the terms APSE and BASILICA (q. v.), we have already explained that the earliest ecclesiastical structures of the Christians were copied or adapted not from the heathen or Jewish temple, as might have been anticipated, but from that peculiar combination of a hall of justice and a market-place to which the name basilica was given by the ancients. The reason of this selection is probably to be found, not so much in the spirit of opposition which no doubt existed between Christians and heathens, as in the essentially different conceptions which they formed of the character and objects of public worship. The rites of heathendom were performed exclusively by the priest, the people remaining without the temple; and the temple itself, which was lighted only from the door, or by the few lamps which burned around the image of the god, was regarded not as a receptacle for worshipers, but as the abode of the deity.

The dark mysterious character which thus belonged to it, rendered it equally unsuitable for the performance of liturgical services in which the people were to participate, and for the delivery of those public addresses which from the beginning were employed as a means of Christian teaching and exhortation. To such purposes the prætor's court-room, with its surroundings, were readily adapted, by the few simple alterations which we have described in the articles referred to. But the basilica, as thus altered, was a mere utilitarian structure. It served the purposes of Christian worship, but there was nothing in its form which responded to the feelings of Christian worshipers or tended to awaken Christian sentiments. Now, the Cross (q. v.) had been used by Christians from a very early period to indicate their allegiance to the author of their salvation and the object of their faith; and gradually it had become the distinctive emblem of Christianity. Nothing, then, could be more natural than that when it became desirable to give distinctively Christian characteristics to what hitherto had been a heathen structure, this should be effected by such a modification of its form as should convert it into a representation of this sacred emblem. Nor did this alteration lead to any very extensive change on the form of the C , as it had hitherto existed. The basilica, as we have already explained, not unfrequently had side entrances, either in place of, or in addition to, that from the end. All that was requisite, then, to convert the simple parallelogram of which it consisted into a cross, was, that at each side of the building these entrances, in place of direct communications with the exterior, should be converted into passages, or arms running out at right angles, and more or less prolonged, according as the object was to attain the form of a Greek or of a Latin cross (see CROSS). If the C. was to be in the form of a Greek cross, the arms were made of the same length with the other two portions into which they divided the building; whereas if the cross was to be a Latin one, the portion of the building which ran towards the west was made considerably longer than either of the others. In either case, the arms running at right angles to the C., and directly opposite to each other, cut it across, and thus obtained the name of *transepts*.



Church:
C = Choir; N.T. = North Transept; S.T. = South Transept; N. = Nave.

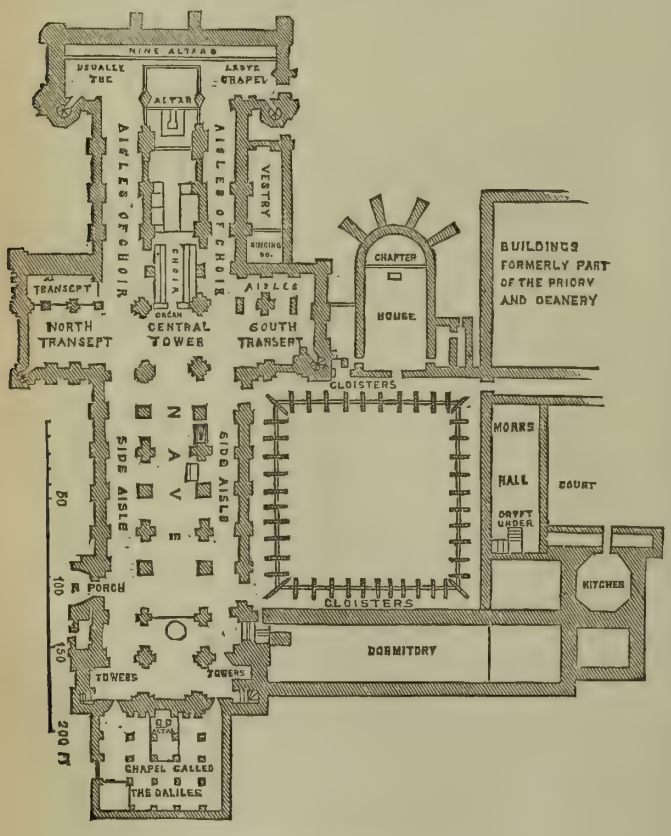
The external form of the C. being thus indicated, we now proceed to explain its internal arrangements, and to enumerate the various adjuncts which in cathedrals and others of the larger churches frequently sprang up around it.

Over the point at which the arms or transepts intersect the body of the cross, a central tower or spire is very frequently erected. From this central tower, or, if the tower or towers are situated elsewhere, from this central point, the portion of the building which runs westward, to where the Galilee or entrance chapel, or, in other instances, the great entrance-door is situated, is called the Nave (from *navis*, a ship), whilst the portion which runs eastward to where the altar, or high-altar, if there be several, is placed, is called the Choir.

In the larger and more complete churches, the nave, and frequently also the choir, are divided longitudinally by two rows of pillars into three portions, the portion at each side being generally somewhat narrower and less lofty than that in the center. These side portions are called the aisles of the nave, or of the choir, as the case may be. In some churches, the aisles are continued along the transepts, thus running round the whole C.; in others, there are double aisles to the nave, or to both nave and choir, or even to nave, choir, and transept. Behind, or to the east of the choir, is situated the Ladye's Chapel, or Chapel of the Virgin, with some-

times a number of altars; and it is not unusual for side chapels to be placed at different places along the aisles. These usually contain the tombs of the founder, and of other benefactors to, or dignitaries connected with, the church. The extent to which these adjuncts exist depends on the size and importance of the C., and they are scarcely ever alike in two churches, either in number, form, or position. Vestries for the use of the priests and choristers generally exist in connection with the choir. Along the sides of the choir are ranged richly ornamented seats or stalls, usually of carved oak, surmounted with tracery, arches, and pinnacles; and amongst these seats, in the case of a bishop's church, the highest and most conspicuous is the so-called *cathedra*, or seat of the bishop, from which the cathedral takes its name. The larger English cathedral and abbey-churches have usually a chapter-house attached to them, which is of various forms, most commonly octagonal, and is often one of the richest and most beautiful portions of the whole edifice. On the continent, chapter-houses are not so common, the Chapter (q. v.) being usually held in the cathedral itself, or in one of the chapels attached to it. Cloisters (q. v.) are also frequent, and not unusually the sides of those which are furthest removed from the C. or chapter-house, are enclosed by other buildings connected with the establishment, such as a library, and places of residence for some of the officials of the cathedral. It is here that, in Roman Catholic churches, the hall, dormitories, and kitchens for the monks are commonly placed. Beneath the C. there is frequently a Crypt (q. v.). In some cathedral churches, the crypt is in reality a second underground C. of great size and beauty. The Baptistery (q. v.) is another adjunct to the C., though frequently forming a building altogether detached. Most of the parts of the C. which we have mentioned may be traced on the annexed ground-plan of Durham Cathedral; see also plans of the cathedral of Salisbury and Amiens at GOTHIC ARCHITECTURE. The position of the nave, choir, or chancel, aisles, and transepts are nearly invariable, but the other portions vary, and are scarcely alike in two churches.

Churches are of five classes—metropolitan, cathedral, collegiate, conventual, and parish churches—and of these the first are, generally speaking, the most, and the last the least elaborate. In ordinary language, any building set apart for religious ordinances



Ground-plan of Durham Cathedral.

is called a church, though when of a minor kind it is more usually designated a chapel. After a long period of neglect and poverty of taste, the building of churches in a superior style, emulative of the older styles of architecture, has greatly revived, not only as regards the Church of England, but the Church of Scotland and nearly all dissenting bodies.

As applied to a collective body of Christian people, the word C. is the translation and equivalent of the Greek word *ecclesia* (Lat. *ecclesia*, Fr. *église*), used in the New Testament. It is common among Protestants to distinguish between the *visible* and the *invisible* C.—the invisible C. consisting of all those who are savingly or spiritually united to Christ, that is, of all true believers; the visible C. consisting of all who profess the religion of Jesus Christ. Roman Catholics do not in the same manner acknowledge the distinction between the visible and the invisible C., but regard a connection with the hierarchy, and consequent participation of ordinances, as establishing a connection with the true C. and with Christ. Protestants regard the C. as subsisting from age to age, in virtue of the authority of Christ, and through the faith of individual believers and their confession of him: Roman Catholics regard the apostolical succession of the hierarchy, and the regular administration of the sacraments, as essential to the continued existence of that *Catholic* or universal C. which Christ planted on the earth, and the existence of which he has promised to maintain throughout all ages. Protestants, in general, regard the C. of Rome and the Greek C. as forming part of the visible C. of Christ; but Roman Catholics are not accustomed to make a corresponding admission with respect to the Protestant churches. From the hierarchical principle of the C. of Rome, and of the Greek C., results an employment of the term C. to designate the hierarchy alone, which is contrary to the principles of the Reformation, although a tendency to it may be observed in some Protestant churches.

It has been usual for Protestants to designate by the term C. the collective body of Christians in a particular country, distinguished by the name of that country; the greater number of Protestants (Episcopalians and Presbyterians) believing that such a portion of the universal C. may warrantably be associated under a common government; and in countries where religious liberty exists, diversities of opinion on points of doctrine and C. government have given rise to the existence of separate Christian associations, distinguished by names generally indicative of some of the peculiarities which characterize them; but this, however much they may differ on many points, do not in general hesitate to recognize each other as belonging to the universal and visible C. of Christ, whilst they retain in common the same great first principles of the Christian faith, and particularly the belief in one God and in the three persons of the Godhead, the incarnation of the Son of God, the atonement by Jesus Christ, and the work of the Holy Spirit. The term C., however, is regarded by Independents (q. v.) or Congregationalists, as more strictly applicable to those who are united as worshipers in a particular place of worship, partaking of the Lord's Supper together, and exercising discipline and C. government among themselves.

CHURCH, STATES OF THE. See PAPAL STATES.

CHURCH-DISCIPLINE (*Disciplina ecclesiastica*) includes all the means employed by the Christian Church, besides the ministration of word and sacraments, to secure on the part of its office-bearers and members a faithful adherence to their profession and a corresponding blamelessness of life. It rests upon the authority of Christ, and at the same time necessarily arises, in some form of it, out of the very constitution of the church as a society. Among the early Christians, it soon assumed forms of great severity towards offenders, especially towards the *Lapsed* (q. v.). At a later period, the discipline of the church was chiefly exercised with respect to persons accused of heresy and schism. The penances of the Church of Rome have long formed an important part of its discipline, and therewith its *Indulgences* (q. v.) are closely connected, as well as its doctrine and rule of *Auricular Confession* (see CONFESSION). In the Protestant churches, public confession of sins by which public scandal has been given, and submission to public rebuke, are sometimes required. Practices more analogous to those of the primitive church were established in many churches after the Reformation, but in general have fallen greatly, or entirely, into disuse.

The power of exclusion from the Lord's Supper, and from the rights and privileges of church membership, is, however, generally retained and exercised, until, by profession of repentance, and by reformation of life, the cause of such exclusion is removed; and ministers or other office-bearers are, upon offence given in their doctrine or conduct, suspended from their functions, or altogether deposed from their office. The exercise of C. D. belongs more or less exclusively to a hierarchy, or to the office-bearers assembled in church-courts, or to the members of each congregation, according as the church is Episcopalian, Presbyterian, or Independent in its church-government. There is an an increasing tendency among Christians in general, to scrutinize closely the claim of right to exercise C. D., and the limits within which it may be exercised.

CHURCH GOVERNMENT. The Christian Church, like every other society, must have a certain constitution and rules according to which its affairs are administered. It is disputed, however,

among Christians, how far this constitution has been defined, or these rules prescribed by divine authority, and how far they have been left to the discretion of men. The form of C. G. depends primarily on the idea entertained of the constitution of the church. Congregationalists, or Independents (q. v.), accordingly place all C. G. in the hands of the members of the congregation and the office-bearers whom they have elected. This theory of C. G. is maintained by many Baptists and others, who, for various reasons, assume different denominations.—Episcopalians and Presbyterians agree that many congregations are to be united under a common government; but this, according to Presbyterians, is properly carried on by ministers and elders of these congregations meeting for this purpose on a footing of equality; whilst, according to Episcopalians, it is more or less absolutely in the hands of bishops, who are superior to the mere pastors of congregations. See EPISCOPACY and PRESBYTERIANISM.

CHURCH HISTORY, or ECCLESIASTICAL HISTORY. The history of the Christian religion and church forms one of the most important parts of the general history of mankind, and is intimately connected not only with the political history of the world, but with the history of philosophy, of literature, and of civilization. The sources and authorities are extremely various, and their due appreciation often requires as much judgment as their exploration requires toil. C. H. is either general—embracing a view of the affairs of the church in the whole world from the beginning to the present day—or particular, relating to some particular country, or time, or portion of the church. By some authors, it has been treated chiefly with regard to the outward affairs of the church; and by others, with reference to doctrine, morals, and the evidences of spiritual life; whilst others still have devoted their attention chiefly to the forms of worship, the constitution of the church, and other things generally comprehended under the name of Ecclesiastical Antiquities.

All these, of course, have important relations to each other. The earliest writers of C. H. were in general mere chroniclers, following the order of time; in the great work of the Magdeburg Centuriators, a method was adopted, of which there had been previous examples, and which afterwards became frequent, of treating each century separately, the centuries being subdivided according to convenience of subjects; but arrangements less mechanical and arbitrary have been adopted by the most eminent modern authors. With much diversity on minor points, there is a general agreement in dividing the whole history of the church into three great periods; the first, from our Saviour to the time of Constantine; the second, from that time to the Reformation; and the third, from the Reformation to the present day.

The earliest facts of C. H. are to be learned only from the New Testament, after which, however, the epistles and other writings of the apostolic and other primitive fathers, afford sources of information, unfortunately very scanty; Hegesippus, who wrote about the middle of the 2d c., has transmitted to us some very imperfect memorials of these early times; but the first proper ecclesiastical history is that of Eusebius of Cæsarea (324). This work was continued to the 5th c. by Socrates Scholasticus, Hermias Sozomenus, and Theodoret. Similar compilations were executed by Lactantius, Epiphanius, Hieronymus, Theodoret of Cyrus, Philostorgius, and Zosimus. In the 6th c., the chief ecclesiastical historians are—Theodorus Lector, Evagrius, and Nicephorus Callistius; in the 8th, the Venerable Bede and Paul Warnefried; in the 9th, Theophanes Confessor, Claudius of Turin, Haymo of Halberstadt, Scotus Erigena, and Hinkmar of Rheims; in the 12th and 13th, Photius, Simeon Metaphrastes, Theophylact, Matthew Paris, Albert of Strasburg, and Ptolemy of Lucca; in the 15th Laurentius Valla is the most conspicuous name. Protestant writers were the first to treat C. H. in a critical and scientific manner. This was natural, for their position as apparent schismatics compelled them to vindicate historically the changes which they had wrought in the character of the church. Hence their writings were of an apologetic and polemical cast. The first work of this kind was the *Magdeburg Centuries* (q. v.), published by Matthias Flacius. Special histories of the Reformation were composed by Sleidan and Seckendorf. In the 17th c., Calixtus distinguished himself in this department, and after him Thom. Illig, Adam Rechenberg, and Thomasius. The new life that awoke in Germany towards the middle of the 18th c., produced a multitude of church-historians, of whom we can only afford to mention Arnold, C. M. Pfaff, Mosheim, Semler, and J. Matt. Schröckh; while in still more recent times, Marheineke, Danz, Neander, Gieseler, and Hagenbach, have achieved the highest distinction in the same sphere of labor.

But others besides the Lutheran divines have rendered valuable services to church history. The Reformed Church boasts the eminent names of Du Moulin, Joh. Dallæus, Blondel, Hottinger, Spanheim, Turretin, Venema, Jablonski, and recently, D'Aubigné; while among Englishmen, Usher, Pearson, Bingham, Lardner, and recently, Milman and Maurice, have won a distinguished place. Scotland has few names, the chief being Calderwood, Woodrow, M'Crie, and recently Cunningham. In the Roman Catholic Church, since the period of the Reformation, ecclesiastical historians have rarely manifested a dispassionate and philosophic spirit. They have appeared mainly in the character of defenders of the papacy. The greatest names in C. H. in Catholic France are Tillemont, Bossuet, Bayle, Du Pin, Thomassin, and Fleury. Among the Italians may be mentioned Orsi, Saccharelli, Pallavicini, Guicciardini, and Muratori; and among the Roman Catholics of Germany, Dannenmayr, Count Stolberg, Ritter, Hortig, and Döllinger. The method of F. C. Baur (q. v.), developed by him specially with regard to the first three centuries of the Christian church, has deeply influenced all subsequent writing of church history. Recently the best works have been monographs and histories of limited periods.

CHURCH RATES, in England, a tax or assessment laid on the parishioners and occupiers of land within a parish, by a majority of their own body in vestry assembled, for the purpose of upholding and repairing the fabric of the church and the belfry, the bells, seats, and ornaments, the churchyard fence, and the expenses (other than those of maintaining the minister) incident to the celebration of divine service. The parishioners are convened for this purpose by the Church-wardens (q. v.). The Chancel (q. v.) being regarded as belonging peculiarly to the clergy, the expense of maintaining it is laid on the rector or vicar, though custom frequently lays this burden also on the parishioners, as in London and elsewhere.

The C. R. were anciently a charge on the tithes of the parish, which were divided into three portions: one for the structure of the church, one for the poor, and the third for the ministers of the church. This distribution is said to have originated with Pope Gregory, who enjoined St. Augustine thus to divide such voluntary offerings as might be made to his missionary church in England. A canon of Archbishop Ælfric in 970, and an act of the Wittenagemote in 1014, in Ethelred's time have been quoted in proof of the recognition of this rule by our Saxon fathers. It seems to have been their custom, also, to devote to the repair of each church a portion of the fines paid for offences committed within the district attached to it; and every bishop was bound to contribute to the repair of his own church from his own means.

A third of the tithes thus originally devoted to the repairs of churches, continued to be applied to that purpose under the Normans, down to the middle of the 13th c.; and the manner in which this burden came to be shifted to the parishioners, has been a subject of much discussion among legal antiquaries. Lord, then Sir John, Campbell, who published a pamphlet on the subject in 1837, is of opinion that the contributions of the parishioners were at first purely voluntary, and that the custom growing, it at last assumed the form of an obligation, and was enforced by ecclesiastical censures. The care of the fabric of the church, and the due administration of its offices, are laid upon the ministers and the church-wardens conjointly, and the latter may be proceeded against by citation, in the ecclesiastical courts, should they neglect these duties. But there is no legal mode of compelling the parishioners as a body to provide the rate; and this circumstance has occasioned much difficulty in imposing the tax in parishes in which dissent is prevalent, and led to many churches falling into a partially ruinous condition. The proper criterion foe the amount of C. R. is a valuation of the property within the parish, grounded on the rent that a tenant would be willing to pay for it. Glebe land, the possessions of the crown in the actual occupation of the sovereign, and places of public worship, are not liable for C. R.; but there is no other exception as regards immovable property, and in some parishes, custom even extends it to stock in trade. It has been often decided in the courts that a retrospective church-rate—i. e., a rate for expenses previously incurred—cannot be validly imposed. Much difficulty has been experienced in recovering the rates imposed by the parish on individuals refusing to pay. Previous to 53 Geo. III. c. 127, the only mode was by suit in the ecclesiastical court. That statute, however, in all cases under £10, empowered the justices of the peace of the county where the church was situated, on complaint of the church-wardens, to inquire into the merits of the case, and order payment. Against the decision of the justices, an appeal lies to the quarter-sessions. In 1868 an end was put to all parochial contentions by enacting that no suit or proceeding should thereafter be allowed in any court to enforce or compel payment of a church-rate, except where a local act authorized this rate. But except so far as related to the compulsory payment of these rates, the church-wardens might, as before, make, assess, receive, and deal with such rates. In each district parish, the inhabitants may treat their own church as if it were their parish church, and make and receive rates for the repair of the same. A body of trustees may now be appointed in each parish to receive contributions for ecclesiastical purposes in the parish. The result of this act of 31 and 32 V. c. 109, is thus not to abolish church-rates, but rather to convert them

into voluntary payments; allowing, as it does, all faithful adherents of the church to contribute, as before, to the repairs of their own churches. In Scotland the burden of upholding the parish churches is by custom imposed on the heritors of the parish; and where the parish is partly within burgh and partly in the country, the expense must be borne by heritors and proprietors of houses, in proportion to their real rent. See SCOTLAND, CHURCH OF; see also DISSENTERS, and PARISH.

Though very little is said on the subject in Scotland, the question is still on the same footing as it used to be in England; and an Episcopalian heritor would have as much reason for refusing to pay the customary parish burdens as the English Dissenter had for refusing to pay church rates. In Ireland, church rates were abolished in 1823.

CHURCH ROAD. See under the article HIGHWAY.

CHU'RCH-WARDENS, in England, are ecclesiastical officers, elected sometimes by the parishioners and ministers jointly, sometimes by the minister alone, and sometimes by the parishioners alone, for the purpose of protecting the edifice of the church, superintending the celebration of public worship, and to form and execute other parochial regulations. They are generally two in number. See CHURCH-RATES, PARISH, VESTRY.

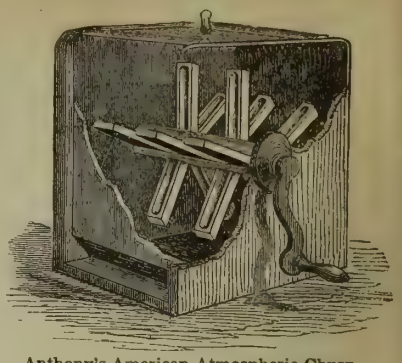
CHU'RCHILL, CHARLES, an English poet, now remembered almost as much for his profligacy as for his poetry, was born at Westminster, where his father was a curate, in 1731. He was educated at Westminster School, and in his 17th year made a clandestine marriage. In 1756 he was ordained, and two years afterwards, succeeded his father as curate of St. John's, Westminster. Soon after his transference here, he fell into habits very ill-becoming his clerical character. In 1761, he published (at his own risk, the booksellers having refused him five guineas for it) *The Rosciad*, a satire on theatrical managers and performers, which displayed much critical acumen, clever sarcasm, and no little humor, and enjoyed such an immense success, that C., who on its publication had withheld his name, was soon delighted to avow himself author. In the same year appeared *The Apology*, a bitter satire on some of his critics, which added alike to his purse and his notoriety. He now totally neglected the duties of his office, was a constant attender at theaters, and altogether led a most dissolute life. His parishioners were scandalized, and his dean remonstrated, whereupon C., to show his utter contempt for the ministerial profession, appeared in a blue coat, gold-laced hat and waist-coat, and large ruffles. He was obliged, however, to resign his preferment, which pecuniary sacrifice was little, as his works brought him considerable sums. He further displayed the complete licentiousness of his nature by separating from his wife, and seducing the daughter of a tradesman in Westminster, and by endeavoring to excuse his vices in a poem called *Night*, on the ground that avowed profligacy was more harmless than profligacy practiced in concealment. The boon-companion of as great a debauchee as himself—Wilkes—he contributed to the pages of the *North Briton*; among other things, *The Prophecy of Famine*, *A Scots Pastoral*, one of the best of his satires.

Among his other works, all more or less satirical, are the *Epistle to Hogarth*, *The Author*, *The Candidate*, *The Ghost*, *Gotham*, *The Duellist*, &c., of which *The Author* is the best. He died November 4, 1764, while on a visit to Wilkes at Boulogne. C.'s thorough reprobacy has naturally led to an unjust depreciation of his poetical abilities. See *Poetical Works*, by Took (1867), with *Life* by Hannay.

CHURCHING OF WOMEN, a religious usage prevailing in the Christian Church from an early period, of women, on their recovery after child-bearing, going to church to give thanks. It appears to have been borrowed from the Jewish law (Lev. xii. 6). In the church of the early ages, it was accompanied with various rites; and in the Church of Rome and Greek Church, it is imperative. In the Church of England, also, a service for the C. of W. finds a place in the Liturgy. By the Presbyterian and Independent church of Britain, it is rejected, as having no scripture warrant.

CHU'RCHYARD. See BURIAL, CEMETERY.

CHURN, a machine for agitating milk or cream for the production of butter. The principle of the operation is considered in the article on Butter. Of the great variety of forms that have been given to the machine, it is very difficult to determine which deserves the preference. It is obvious that the more thorough and uniform the agitation, the more completely will the butter be separated from the milk. The consistency and color of the butter are also elements in judging of the relative merits of churns. The temperature of the air and the milk affect the butter in these respects. During summer, that of the milk should not exceed 62°, and in very hot weather may be under 60°. During cold weather, the milk should be about 2° higher when put into the churn. The speed at which the operation is performed also influences the result. Trials instituted to test the relative merits of churns have failed to settle which is the best form for actual use in the dairy; for the same machine under different conditions does not always yield the same result. The oldest form is the upright or *plunge* churn. There is a general prejudice in favor of this form of C., on the ground that the butter is more completely separated and of better quality. Its great defect is that the operation, being generally performed by hand, is fatiguing.



Anthony's American Atmospheric Churn.

Recent improvements have chiefly aimed at ease in working, and a saving of time. The original *barrel* C., with a rotatory motion, like a grindstone, which motion was reversed every few rounds, has fallen from its once high repute into comparative neglect. An improvement on the barrel C. was the making of the barrel stationary, the milk being agitated by internal apparatus fixed on a horizontal spindle which is turned by a winch handle. Barrel churns, sometimes of monster size, are generally used in large dairies in Holland. For small or moderate-sized dairies, perhaps the most suitable is the *box* C., consisting of a cubical or oblong box, of birch or plane tree, having the agitators fixed on a horizontal spindle. Churns on a centrifugal action have also been successfully used, particularly in Sweden. More recently, churns of a barrel form, with an oscillating motion like a child's cradle, have been introduced, but without any decisively superior results.

To all forms of churns, power other than manual can be, and is applied. In some parts of the continent of Europe, and in America, the dog is employed in churning by means of a contrivance like a squirrel's box. Horse-power is in very general use in large dairies in Great Britain, and in some cases steam-power is used.

CHU'RRUS. See HEMP.

CHUSA'N, an island on the east coast of China, 40 miles northeast from Ningpo, in 30° 40′ N. lat., and 121° 48′ E. long, of an oblong shape, and about 50 miles in circumference. It is mountainous; but has many fertile valleys, with a plentiful supply of water, and is very carefully cultivated by the hardy and independent people by whom it is inhabited. Mr. Fortune was struck with the richness of its flora. Azaleas clothe the mountains; clematises, roses, and honey suckles grow in great luxuriance. The camphor and tallow tree, and many varieties of bamboo, are found in the valleys. Tea is cultivated to some extent on the hill-sides. For three-fourths of the year, the climate is temperate. June, July, and August are the hot months. In August, the thermometer averages 83°, but in January and February it is often as low as 20°. Ting-hai, the capital, a walled town about two miles in circumference, containing a fine specimen of Buddhist temple-architecture, surrendered to the British forces, July 5, 1840, and was retaken by them (having been evacuated the previous February) October 1, 1841. At the close of the war, the island was delivered up to the Chinese. In 1860, it was again occupied by British troops, but restored by the convention of Pekin. Pop. about 200,000.

CHUSAN ISLANDS, a group of islands scattered round the one described above. The most remarkable of these is the sacred island of Pu-tu, lying east from Chusan. It is covered with Buddhist temples, pagodas, and monasteries, which latter are inhabited by a great number of Bonzes, as the Chinese priests are called. The island is devoted exclusively to religious purposes, and no layman is allowed to reside upon it.

CHU'TNEE, or CHU'TNY, an East Indian condiment, very largely used in India and to a considerable and increasing extent in Great Britain. Indian C. is a compound of mangoes, chillies or capsicum (q. v.), and lime-juice, with some portion of other native fruits, such as tamarinds, &c., the flavor being heightened by garlic. It is sometimes manufactured for sale in England, but not in any quantity. Families occasionally make it for their own use, and employ the following ingredients: Chillies, 1—1½ lb.; apples 1 lb.; red tamarinds, 2 lbs.; sugar-candy, 1 lb.; fresh ginger root, 1½ lb.; garlic, ½—¾ lb.; sultana raisins, 1½ lb.; fine salt, 1 lb.; distilled vinegar, 5 bottles. The chillies are to be soaked for an hour in the vinegar, and the whole ground with a stone and muller to a paste.

CHYLE. The food undergoes various changes in the alimentary canal, which will be fully noticed in the article on DIGESTION. One of these changes is its conversion in the stomach into

a pulpy mass termed *chyme*. The chyme, which passes onward into the small intestine, is acted upon by the bile, pancreatic fluid, and intestinal juice, and through their influences is separated into the *chyle*, which is absorbed or sucked up by the lacteals (q. v.) and into matters unfit for nutrition, which ultimately find their way out of the system by the intestinal canal. The mode in which this nutritious C. is taken up by vessels distributed over the small intestines, and the changes which it undergoes before it is converted into true blood, are described in the articles LACTEALS, THORACIC DUCT, and NUTRITION. We shall here merely notice its leading physical and chemical properties. When obtained from the thoracic duct of an animal that has been killed while the process of digestion was going on (especially if it had taken fatty food), the C. is a white, milky-looking, or yellowish fluid, with a faintly alkaline reaction. Like the blood, it coagulates in about ten minutes after its abstraction from the body of the animal, and in about three hours a small but distinct gelatinous clot is separated from the serous fluid of the chyle.

On examining C. under the microscope, we find that it contains enormous numbers of minute molecules (probably consisting of fat), together with nucleated cells, which are termed the clyle-corpuscles, and are apparently identical with the white or colorless blood-cells. The chemical constituents of C. are much the same as those of blood; fibrin, albumen, fat extractive matters, and salts being the most important.

CHYLI'FEROUS SYSTEM. See LACTEALS and THORACIC DUCT.

CHYME. See CHYLE and DIGESTION.

CIALDINI, ENRICO, was born at Castel Vetro, Modena, August 10, 1813. Designed for the medical profession, he studed at Parma. When the abortive insurrection of 1831 broke out in the duchies, C. joined the volunteers of Reggio; and on the capitulation of Ancona, embarked for France, where he resumed his medical studies. The struggles against absolutism in the Iberian Peninsula opened anew the career of arms to the Italian exiles. He joined the legion raised by Dom Pedro in France against the Miguelists, when his great personal courage soon secured his promotion; and the unanimous vote of his comrades pronounced him the worthiest man to receive the Order of the Tower and Sword decreed by the government to his company. After the capitulation of Evora, C. joined (October 22, 1835) the legion of Oporto, formed under Borso di Carminati for service in Spain. In this force, C. gained further honors. In 1843, he followed Narvaez in his march against Madrid; was made by him colonel of the regiment of St. Ferdinand; and afterwards employed in organizing the Civil Guard on the model of the French *gendarmerie*. He was in this force when Charles Albert headed the Italian rising in 1848, when he hurried to Italy, and in the struggle which ensued he received a dangerous wound, and fell into the hands of the Austrians. On his release, he was employed by the Sardinian government to reduce to regular discipline the unruly volunteers from the duchies. He succeeded at last, and fought well at the head of his new regiment in the brief campaign of 1849. During the ten years that elapsed from the defeat of Novara to the renewal of the war in 1859, C. was actively employed. In the Crimea, he commanded the third division of the Sardinian Contingent; and on his return was appointed inspector-general of Bersaglieri and aide-de-camp to the king—a rare distinction for a man of plebeian origin. He was intrusted by Cavour with the formation of the famous Cacciatori delle Alpi, placed under the command of Garibaldi after the declaration of war, and co-operated actively with them at the head of the fourth division. The victory at Palestro was his chief exploit, the further progress of the Italians being stopped by the peace of Villafranca. In 1860 he defeated the Papal army under General Lamoricière at Castelfidardo. Diplomacy delayed the fall of Gaeta till February 13, 1861, when it yielded to C. after a vigorous bombardment, as did the citadel of Messina shortly afterwards. Turin erected a statue to C. (*Vincitore Sempre*), and Reggio elected him deputy in April. For a few months he was governor of Naples. He had to act against Garibaldi in the second Sicilian expedition. When the army of Italy was reorganized in 1863, C. was appointed to one of the chief commands. Senator in March 1864, he signalized himself by his brilliant speech in favor of the transfer of the capital (Dec. 1864). In the war of 1866, the advice of La Marmora was followed, and the defeat of Custazza was the result. C. was appointed chief of the staff on the resignation of La Marmora. In 1867, C. was intrusted by the king with the formation of a new ministry, but failed; he was also made commander-in-chief of the troops in Central Italy. In 1870, he was engaged in the annexation of the Papal States; and in 1876, he was sent as ambassador to Paris.

CIBBER, COLLEY, was born on the 6th November 1671, in London. He was sent to the free school at Grantham, in Lincolnshire, in 1682. Five years thereafter, he returned to London, and in 1688 was a volunteer in the forces raised by the Earl of Devonshire in support of the Prince of Orange. He afterwards conceived a passion for the stage, and after performing gratuitously for several months, he succeeded in obtaining an engagement at 10*s*. per week, which was raised to 15*s*.; and on the commendation of Congreve, who had witnessed his performance of Lord Touchwood, five additional shillings per week were added. Incited by this magnificent success, he, at the age of 22, married Miss Shore, to the great rage of her father, who revenged himself by spending the greater portion of his fortune in the erection of a retreat on the banks of the Thames. After marriage, C., discovering that 20*s*. per week was a somewhat insufficient income for an elegant gentleman and an elegant gentleman's wife, was induced to add thereto by the writing of comedies, some of which were remarkably successful. In 1711, he became one of the patentees in the management of Drury Lane, and remained in conection with that theater till 1730; when, on being appointed poet-laureate, he sold his interest in the business. He was, however, sometimes tempted back to the stage by an offer of 50 guineas a night. C. wrote and adapted many plays, but as an author he is best known by his *Apology*. He died suddenly on the 12th December 1757.

CI'BOL. See ONION.

CIBRA'RIO, LUIGI, an Italian historian and politician, was born at Turin, 23d February 1802. He studied at the university of that city, where he took his degree in 1824, as Doctor of Laws. Devoted to historical investigations, he secured a reputation in this important department, at a very early period. In 1825 appeared *Notizie sulla Storia dei Principi di Savoia;* in 1826, his *Notizie di Paolo Simone de Belli;* and in 1827, his *Delle Storie di Chieri Libri IV*. King Charles Albert—with whom he was always a great favorite—frequently employed him in diplomatic service, and in 1848, when Italy rose against the Austrians, appointed C. extraordinary royal commissioner at Venice. During the same year, he was created a senator of the kingdom. When Charles Albert —after the unfortunate issue of the war—went to live in voluntary exile at Oporto, C. was sent by the Sardinian senate to induce him to return. He wrote an account of his unsuccessful mission, entitled *Ricordi d'una Missione in Portogallo al Re Carlo Alberto* (1850). During his public career, however, C. did not neglect his early and favorite pursuits. In 1839, he published his *Della Economia Politica del Medio Evo;* in 1840, his *Storia della Monarchia di Savoia;* in 1841, his *Storia e Descrizione della Badia d'Altacomba;* and in 1847, his *Storia di Torino*. But the new life and energy which Sardinia began to manifest under Victor Emmanuel had its claims on his public usefulness.

In 1850 he was appointed Superintendent-general of Customs, and while occupying this office introduced several important reforms. Subsequently, he was intrusted with full powers to negotiate a treaty of commerce with France, in which he distinguished himself notably by his advocacy of the principles of free trade. In 1852 he was made Minister of Public Instruction, and, in 1855, Minister of Foreign Affairs. When Cavour took this department into his own hands, C. became first secretary of the king. In 1857, he was appointed president of the Telegraphic Congress of Turin. In 1860, C. again made a most successful appearance as an author, in his *Operette Varie* (Torino), and in his *Jacopo Valperga di Masino, Cancelliere di Savoya*. He died at Salo, in the province of Brescia, 1st October 1870.

CICA'DA, a genus of insects of the order *Hemiptera*, sub-order *Homoptera*, remarkable for the sounds which they emit, the loudness of which is very extraordinary, when considered with reference to the size of the creatures producing them. The largest European species are only about an inch long. The elytræ, or wing-covers, of the cicadæ are almost always transparant and veined. They dwell on shrubs and trees, of which they suck the juices. The male insects alone possess the organs of sound perfectly developed. These are in noway connected with the mouth or throat, but may be described as a musical apparatus on the under side of the abdomen. This apparatus is very complicated, consisting of a set of membranes and fibres connected with powerful muscles. The sound can be produced even after the insect has been long dead, by pulling the fibres, and letting them escape. Cicadas are most common in tropical and warm temperate regions, and are scarcely known in Britain, although one or two species have been found in the south of England. The ancients regarded the sounds of these insects as types of music and eloquence. In some countries they bear names which signify that sleep is banished by their din. The sounds produced by some of the South American species, which are much larger than the European, are loud enough to be heard at the distance of a mile, and have been likened to the sound of a razor-grinder at work. The Greek name of the C. is *tettix*, often

Cicada.

erroneously translated grasshopper. These insects have indeed no resemblance to the grasshoppers, and no power of leaping. C. is the Latin name. The modern Italian is *cicale*, the French *cigale*. Byron speaks of the 'shrill cicalas.'

CICATRIZA'TION (Lat. *cicatrix*, a scar), the process of healing or skinning over of an ulcer or broken surface in the skin or in a mucous membrane, by which a fibrous material, of a dense resisting character, is substituted for the lost texture. The new tissue, in such a case is called the cicatrix, and usually resembles, to a consider able extent, the structure which it replaces; it is, however, less elastic, and from its shrinking in volume, sometimes produces an appearance of puckering. The glands and other special structures of the original tissue are wanting in the cicatrix, which, however, performs perfectly well, in most instances, the office of protection to the parts below the surface. See INFLAMMATION and ULCERATION.

CI'CELY (*Myrrhis*), a genus of umbelliferous plants, nearly allied to Chervil, of which one species, SWEET C. (*M. odorato*) is common in the central and southern parts of Europe, and in similar climates in Asia, but in Britain is so generally found near human habitations, that it appears probably to have been introduced. It is sometimes called *Sweet Chervil*, and in Scotland *Myrrh*. It is a branching perennial, two feet high or upwards, with large triply pinnate leaves and pinnatifid leaflets, somewhat downy beneath; the fruit, remarkable for its large size, and, as well as the whole plant, powerfully fragrant, the smell resembling that of anise. The seeds, roots, and young leaves are used in Germany and other countries in soups, &c. The plant was formerly much in use as a medicinal aromatic.

CI'CER. See CHICK PEA.

CI'CERO, MARCUS TULLIUS, tne greatest orator of Rome, and one of the most illustrious of her statesmen and men of letters, was born at Arpinum, on the 3d of January, in the year 106 B.C. He belonged to an ancient family, of the equestrian order, and possessed of considerable influence in his native district. His father, himself a man of culture, and desirous that his son should acquire an eminent position in the state, removed him at an early age to Rome, where, under the direction of the orator Crassus, he was instructed in the language and literature of Greece, and in all the other branches of a polite education. In his sixteenth year he assumed the manly gown, and was introduced to the public life of a Roman citizen. He now acquired a knowledge of law, and underwent a complete course of discipline in oratory. At the same time, he studied philosophy under three successive preceptors, of the Epicurean, Academic, and Stoic schools, and neglected no mental exercise, however arduous, which might conduce to his future eminence; being thus early of the opinion which he afterwards maintained in his treatise *De Oratore*, that an orator should possess almost universal knowledge. With the exception of a brief campaign under Sulla, in the Social War, he passed his time in these preliminary studies until his 26th year, when he began to plead in public. In one of his earliest causes, he distinguished himself by defending the rights of Roscius, a private citizen, against one of the favorites of Sulla, who was then dictator.

Soon after, for the benefit of his health, and in order to his improvement in elocution, he traveled to the chief seats of learning in Greece and Asia; and, on his return, was regarded as second to no orator at the Roman bar. Having been elected quæstor (76 B.C.), he was appointed by lot to a government in Sicily, a post which he filled with great ability, and to the entire satisfaction of those whom he governed. Some years after his return, he laid the Sicilians under still greater obligations by his successful prosecution of their prætor, Verres, against whom he prepared no less than six orations, although the first had the effect of disheartening the accused so effectually, that he voluntarily retired into exile. Passing, at short intervals, through the offices of ædile (69 B.C.) and prætor (66 B.C.), he was at length elected, by an overwhelming majority, to the consulship. His tenure of office was rendered memorable by the conspiracy of Catiline, which he frustrated with admirable skill and promptitude. See CATILINE. The highest praises were showered upon C.; he was hailed by Cato and Catulus as the 'Father of his Country;' and public thanksgivings in his name were voted to the gods. But his popularity did not last long after the expiry of his consulship. His enemies charged him with a public crime, in having put the conspiring nobles to death without a formal trial, and he found it necessary to leave Rome, and went to reside in Thessalonica (58 B.C.). A formal edict of banishment was pronounced against him, but he was recalled from exile in about 16 months, and on his return to Rome was received with great enthusiasm. His recovered dignity, however, soon excited the envy of the honorable party in the senate, with whom he had desired to make common cause; while Pompey and Cæsar, the greatest powers in the state, and from whose enmity he had most to dread, courted his alliance and co-operation. Thus, while preserving an appearance of independence, he was betrayed into many actions which he could not but regard as ignominious, and which, by increasing the power of the triumvirs, led indirectly to the ruin of the republic. A remarkable exception to this servile conduct is to be found in his assisting Milo when suing for the consulship, and defending him, against the wish of Pompey, and in spite of the hostile feeling of the populace, after he had slain Clodius in an accidental rencounter. During this period, he composed his works, *De Oratore*, *De Republica*, and *De Legibus*.

After a year's admirable administration of the province of Cilicia (51—50 B.C.), he returned to Italy on the eve of the civil war. With the convictions which he avowed, there was but one course which it would have been honorable for him to pursue—to enlist himself, at all hazards, on the side of Pompey and the republic. But instead of this he hesitated, balanced the claims of duty and of interest, blamed Pompey for his want of preparation, and criticised the plan of his campaign. At length he joined the army of the senate, but, after the battle of Pharsalia, abruptly quitted his friends, and resoloved to throw himself upon the generosity of the conqueror. After nine months' miserable suspense at Brundusium, he was kindly received by Cæsar, whom he followed to Rome. During the years which ensued, he remained in comparative retirement, composing his principal works in philosophy and rhetoric, including those entitled *Orator*, *Hortensius*, *De Finibus*, *Tusculanæ Disputationes*, *De Natura Deorum*, *De Senectute*, *De Amicitia*, and *De Officiis*. On the death of Cæsar, he was disposed to unite his interests with those of Brutus and the other conspirators, but was restrained by dictates of prudence. In the commotions which followed, he espoused the cause of Octavianus, and gave utterance to his celebrated philippics against Antony. These orations were the occasion of his death. When Octavianus and Lepidus joined with Antony in a triumvirate, C. was among the proscribed; and his life was relentlessly sought. The soldiers of Antony overtook him while his attendants were bearing him, now old, and in an infirm state of health, from his Formian villa to Caieta, where he intended to embark. He met his death with greater fortitude than he had supported many of the untoward incidents of his life. Desiring his attendants to forbear resistance, he stretched forward in the litter, and offered his neck to the sword of his executioners. He died in the 63d year of his age, on the 7th December, 43 B.C.

The character of C. is one which it is not difficult to estimate. Really a lover of virtue, no one could follow in her footsteps with greater dignity when attended by the popular applause. But he was weak enough to yield to the depraved spirit of his times, and to act according to his convictions only when they were not evidently discordant with his private interests. Few men, possessing such talents, have been so utterly devoid of anything approaching to heroism. As a statesman, it would be unjust to deny his legislative abilities; but he was generally deficient in courage and resolution. He was one of the greatest masters of rhetoric that have ever lived. His orations were the result of consummate art, combined with unwearied industry, and survive as characteristic memorials of a time when eloquence, far more than at present, was a power which bent the verdicts of judicial tribunals, and influenced the decrees of the state. In philosophy, he does not rank with the original thinkers of antiquity; nor, in truth, did he aspire to do so.

His writings on speculative subjects are valuable as reflecting the varied thought of the different schools. See his collected works by Orelli (9 vols. 1837; new ed. 1845); by Baiter and Kayser (1869). Also the lives by Middleton, Forsyth (1864), and Jeens (1880); and Trollope's *Life*, 2 vols. (1880).

CICERO'NÉ (from Cicero orator or speaker), a guide, usually for the purpose of showing the curiosities and works of art in a town to strangers. Ciceronés are of all degrees, from distinguished archæologists, who undertake the office as a favor, to the humble *laquais de place*, who, though quite indispensable on a first arrival, is too often both incompetent and dishonest. The stranger ought to be particularly on his guard against allowing a C. to make purchases for or even with him, as the practice of adding a commission to him to the price charged now prevails probably in every country in Europe.

CICHO'RIUM. See CHICORY and ENDIVE.

CICISBE'O is the name given in Italy to the professor gallant or constant attendant upon a married lady. In the higher ranks of Italian society, it was at one time considered unfashionable for the husband to associate with his wife anywhere except in his house. In society, or at public places of amusement, the wife was accompanied by her C., who attended at her toilet to receive her commands for the day. This custom, which was once universal, and which naturally gave rise to much scandal, has now almost disappeared. C. is sononymous with *cavaliere servente*.

CICINDELA, a genus of insects of the order *Coleoptera*, section *Pentamera*, the type of a large family, *Cicindelidæ*. This family is nearly allied to *Carabidæ*, and the insects belonging to it are among the most voracious of those beetles which both in their perfect and larva state, prey on other insects. They have a strong head, with projecting toothed mandibles, and are particularly distinguished by a sort of hook or nail, which is articulated by its base to each of the lower jaws or maxillæ. They are more abundant in tropical than in cold countries; a few species, none of them large, are found in Britain. The head of the larva is large, concave above, and the back furnished with two remarkable hooked spines, which are said to be used as anchors to fix it at any part it chooses of its burrow in the earth; whilst the soil which it excavates is carried to the mouth of the burrow in a sort of natural basket formed of the concave back of the head and the recurved mandibles. The larva lies in wait in its burrow, its head just level with the ground, till its prey comes within reach, upon which it suddenly rushes.—*C. campestris*, a green species with whitish spots, is common in most parts of Britain in dry sandy places exposed to the sun.

Cicindela campestris, larva and perfect insect.

CICO'NIA. See STORK.

CICU'TA. See HEMLOCK.

CID CAMPEADOR is the name given in histories, traditions, and songs to the most celebrated of Spain's national heroes. There is so much of the mythical in the history of this personage, that hypercritical writers, such as Masdea, have doubted his existence; but recent researches, more particularly those of Dozy, and the investigation of newly discovered Arabic sources, have succeeded in separating the historical from the romantic. See Dozy's *Récherches sur l' Histoire Politique et Littéraire de l' Espagne pendant le moyen âge* (Leyden, 1849). The following is the result of these inquiries: Roderigo Ruy Diaz (Roderic the son of Diego) was descended from one of the proudest families of Castile. His name first appears in a document written in 1064, during the reign of Ferdinand of Leon. Under Sancho II., son of Ferdinand, he became standard-bearer and commander of the royal troops. In a war between the two brothers, Sancho II. and Alfonso VI. of Leon, it was a stratagem of Roderic's—which according to modern notions, was anything but honorable—that secured the victory of Sancho at Llantada (1068) over his brother, who was forced to seek refuge with the Moorish king of Toledo. He appears at this time to have already been called the *Campeador*, a word supposed to answer to our champion.

Upon the assassination of his friend and patron, King Sancho, he required the next heir, Don Alonzo, to clear himself by oath of any participation in his brother's murder, ere the nobles of Leon and Castile should do homage to him. By this act, he incurred the new monarch's enmity; an enmity which, however, the king's policy concealed in the hour of danger, and he even consented to Roderic's marriage with his cousin Ximena—daughter of Diego, Duke of Asturia. But when the king thought the services of Roderic no longer necessary to his own safety, he lent a willing ear to the latter's personal enemies, and banished him in 1081. Roderic then joined the Moorish kings of Saragossa, in whose service he fought against both Moslems and Christians. It was probably during this exile that he was first called the Cid or Sîd, an Arabic title which means lord. He frequently defeated the king of Aragon and the Count of Barcelona, the latter of whom, Berenguer Ramon II., he took prisoner.

He was again reconciled to the king, but only for a short time, when he was condemned to a second exile. In order to support his family and numerous followers, he now saw himself forced to carry his sword against the Moors, over whom he gained a victory, and established himself as sovereign or lord of Valencia (1094). He retained possession of Valencia five years, during which time he took many neighboring fortresses. He died of grief in 1099, on learning that his relative and comrade in arms, Alvar Fañez, had been vanquished by the Moors, and that the army which he had sent to his assistance had been defeated near Alcira. After the Cid's death, his widow held Valencia till 1102, when she was obliged to capitulate to the Almoravides, and fly to Castile, where she died in 1104. Her remains were placed by those of her lord in the monastery of San Pedro de Cadeña. The Cid had a son, who was slain by the Moors in a battle near Consuegra. He also left behind him two daughters, one of whom was married to the Count of Barcelona; the other to an Infant of Navarre, through whom the kings of Spain and many royal houses of Europe claim kindred with '*Mio Cid el Campeador.*' Relics of the 'Blessed Cid,' as he is still called in Spain, such as his sword, shield, banner, and drinking-cup, are still held in great reverence by the populace. The numerous *Cid romances* that were first published in the 16th c., contain the most romantic improbabilities concerning the life and deeds of the Cid. See *Silva de Varios Romances* (1550), and *Romancero General* (1604). These romances were taken from the ancient *cantares* (national songs) and *poemas*, most of which are entirely lost. The most important of modern works on this subject, besides that of Dozy above mentioned, are Huber's *Geschichte des Cid*, &c. (Bremen, 1829), and Southey's fascinating *Chronicle of the Cid* (Lond. 1808). See also Willemaers, *Le Cid* (Bruss. 1873). The first adequate English translation is that of Mr. Ormsby, published in 1879.

CI'DARIS, a genus of *Echinidæ* (q. v.), or Sea-urchins, closely allied to the genus *Echinus* itself, and included along with it in a family or tribe called *Cidarites*, in which the mouth and anus are opposite to each other—the mouth below, and the anus above. Only one species, *C. papillata*, has been found in the British seas, and that only on the coasts of Zetland. The Zetlanders call it the *Piper*, from a resemblance which they trace in its globe and spines to a bagpipe. They say that it is sometimes found with spines a foot long. The markings of the shell and spines are extremely beautiful.

CI'DER is the fermented juice of apples, and is extensively prepared in Gloucestershire and other parts of England, in Ireland, in the northern districts of France, and in North America. In Normandy, a vast number of varieties of acid or bitter apples are grown for the preparation of cider. The apples are first bruised in circular stone-trough or *chase*, by a similarly shaped stone or *runner*, which revolves by machinery in the interior of the trough. The pulp so obtained is placed in sieve-bags made of haircloth or reed-straw, and subjected to pressure, which yields a dark-colored, sweet liquid, and leaves in the bag a somewhat dry residue, consisting of the pips, skin, and other fibrous parts of the apple. The apple-juice passes first into a shallow tub or *trin*, and is almost immediately placed in casks in a cool place, when fermentation begins, part of the sugar is converted into alcohol, and in a few days, a clear liquid is obtained, which can easily be racked off from sedimentary matter. C. is very largely used in England as a beverage, and is very palatable and refreshing. It contains from 5½ to 9 per cent. of alcohol, and is therefore intoxicating when drunk in quantity. It does not possess the tonic and nourishing properties, however, of bitter-beer. C. quickly turns sour, becoming *hard* C., owing to the development of lactic acid, and great difficulty is experienced in the attempt to preserve it.

CIEZA, a town of Spain, in the province of Murcia, 26 miles north-west of the city of that name. It is situated on an eminence near the river Segura, overlooking a plain of great fertility. The streets are tolerably wide and well paved; and there are manufactures of linen, hempen fabrics, wine and oil; and silkworms are reared. Pop. (1877) 10,910.

CIGA'RS. See TOBACCO.

CI'GOLI, LUDOVICO CARDI DA, an eminent painter of the later Florentine school, which, about the end of the 16th c., developed, in opposition to the languid mannerists of the time, a peculiar *eclectic* style of art. C. was born at Empoli in 1559. His model was Correggio; but as the latter was deficient in design, and in a scientific knowledge of perspective, C. endeavored to unite these with the warm bright coloring and wonderful chiaroscuro of Correggio. He was invited by Clement VII. to Rome, where he died in 1613. Among C.'s most famous pictures may be mentioned—'The Healing of the Lame Man' (St. Peter's, Rome), 'The Martyrdom of St. Stephen' (Uffizi Gallery, Florence), 'Tobias in the Act of Thanking the Angel' (St. Petersburg), and 'St. Francis,' a favorite subject with Cigoli (Pitti Palace, Florence). C. was also held in high estimation as an architect, and designed several of the Florentine palaces.

CI'LIA (Lat. eyelashes), a term variously employed in botany and zoology to designate fringing hairs or hair-like processes. Thus, the margins or nerves of leaves, petals, &c., are often described as *ciliated* or furnished with cilia. The fine thread-like processes which surround the opening of the fruit of many mosses, are called C.; but these processes, when broader, are denominated teeth.—The description and uses of C. in the animal kingdom are given in the article EPITHELIUM.

CILI'CIA, an ancient division of Asia Minor, now included in the Turkish eyalet of Koniah. The Taurus range, which separated it from Cappadocia, bounded it on the N., the Gulf of Issus and the Cilician Sea on the S., while the Amanus and Pamphylia bounded it respectively on the E. and W. Lat. 36°—38° N., long. 32° 10′—37° 8′ E. The eastern portion of C. was fertile in grain, wine, &c; while the western and more mountainous portion furnished inexhaustible supplies of timber to the ancients. The pass called by the Turks Gölek Bógház is that by which the younger Cyrus passed from Tyana in Cappadocia to Tarsus; and it is also the same by which Alexander the Great entered Cilicia. Pop. about 100,000, mostly nomadic.

In early ages, C. was ruled by its own kings, the dynasty of Syennesis being apparently the most important. The Cilicians were a distinct people in the time of Xenophon; but the Greeks appear to have got a footing after the time of Alexander. The Cilicians were notorious pirates, but having carried on their depredations too close to the shores of Italy, the Roman arms were turned against them, and C. was made a Roman province in Pompey's time.

CIMABU'É, GIOVANNI, one of the restorers of the art of painting in Italy, which had fallen into neglect during the barbarism of the dark ages, was born at Florence in 1240. At this time, the fine arts were practised in Italy chiefly by Byzantines, and had degenerated into a worn-out mechanical conventionalism. C. at first studied under Byzantine masters, and adopted their traditional forms, but gradually excelled his teachers, made innovations on the fixed patterns set before him, and gave life and individuality to his works. Two remarkable pictures of the Madonna by C. are still preserved in Florence—one (chiefly Byzantine in style) in the Academy; the other, displaying a more purely original genius, in the church of Santa Maria Novella. It is said that this latter work in the time of C. was admired as a miracle of art, and was carried to the church in a sort of triumphal procession. More remarkable pictures, in point of expression or dramatic effect, are found in C.'s frescoes in the church of San Francisco at Assisi. C. died soon after 1300. What strikes one as very wonderful about C.'s pictures, is the accuracy of his naked figures, considering that he had no better professional guides than the Byzantine artists. His draperies were also very good, but he had apparently no knowledge of perspective, though acquainted with architecture. His greatest pupil was Giotto (q. v.).

CIMARO'SA, DOMENICO, an Italian composer of operas, was born at Naples in 1755, and was educated in music under Sacchini, and in the conservatory of Loretto. His first pieces were the *Sacrificio di Abramo* and the *Olympiade*. When barely 22, he had achieved a reputation in all the leading Italian theaters. He was then called to St. Petersburg, where he resided four years. Afterwards, he lived at various German courts; thence he proceeded to Vienna, where he became imperial chapel-master; and finally, he returned to Italy. At Naples, his comic opera, *Il Matrimonio Segreto*, composed at Vienna, 1791, was repeated 57 times in succession. C. died at Venice in 1801. His comic operas are remarkable for their novelty, spirit, whimsicality, and liveliness of idea, as well as for their great knowledge of stage-effect. The wealth and freshness of his invention gave rise to the saying, that one finale of C. contained material for a dozen operas.

CI'MBALO, a musical instrument with a set of keys like the clavecin or harpsichord.

CI'MBRI, or KI'MBRI, a people who issued from the north of Germany in conjunction with the Teutones, and first came into hostile contact with the Romans in the Eastern Alps in 113 B.C. They were victorious in several great engagements, and were only prevented from devastating Italy by sustaining a terrible defeat from Marius, on the Raudii Campi, near Verona, or, according to others, near Vercelli, in August, 101 B.C. Their infantry fought with their shields fastened together by long chains; their horsemen, of whom they had 15,000, were well armed with helmet, coat of mail, shield, and spear. Marius had so chosen his position that the sun and dust were in their faces, and yet they contested the victory most bravely with the Romans, who were 55,000 strong When the battle was lost, the women, who remained in the camp formed of the wagons, killed themselves and their children. 140,000 C. are said to have fallen in the battle; the number of prisoners is given at 60,000. It is not till long afterwards, when the Romans themselves penetrated into Germany, that the name of the C. again appears. Cæsar represents the Aduatici of Belgium as the descendants of the C. and Teutones. Tacitus speaks of a people, bearing the name of C., few in number, but of great reputation, that sent ambassadors to Augustus. This people lived in the extreme north of Germany, on the borders of the ocean; according to Pliny and Ptolemy, at the extremity of the peninsula called from them the Cimbric Chersonese, now Jütland. The ethnology of the C. is doubtful. Greek writers associated them groundlessly, with the Cimmerians (q. v.); Sallust calls them Gauls; Cæsar, Tacitus, and Plutarch looked upon them as Germans, and the opinion of their German origin has been adopted by most moderns. Yet H. Müller, in his *Marken des Vaterlands* (1837), has endeavored to show that they belonged to the Celtic race, and lived originally on the north-east of the Belgæ, of kindred origin; and that their name is the same as that by which the Celts of Wales designate themselves to this day—*Cymri*.

CI'MEX AND CIMI'CIDÆ. See BUG.

CIMI'NNA, a town of Sicily, in the province of Palermo, 18 miles south-east of the city of that name. Pop. (1871) 5721.

CIMME'RIANS, or CIMME'RII, in the poems of Homer, the name of the people dwelling 'beyond the ocean-stream,' where the sun never shines, and perpetual darkness reigns.—But the historic C. were a people whose country lay between the Borysthenes (Dnieper) and the Tanais (Don), including also the Tauric Chersonesus (Crimea). The Cimmerian Bosporus (Strait of Yenikale) derived its name from them. Being driven out by the Scythians, they migrated to Asia Minor, dwelt there for some time, plundered Sardis, failed in an attempt upon Miletum, and were finally routed and expelled by the Lydian king Alyattes, some time after 617 B.C.

CI'MOLITE. See FULLERS' EARTH.

CI'MON, an Athenian commander, was the son of Miltiades, the conqueror at Marathon. In conjunction with Aristides, he was placed over the Athenian contingent to the allied fleet, which, under the supreme command of the Spartan Pausanias, continued the war against the Persians (477 B.C.). He effected the important conquest of Eïon, a town on the river Strymon, then garrisoned by the Persians. Later (according to Clinton, 466 B.C.), when commander-in-chief, he encountered a Persian fleet of 350 ships at the river Eurymedon, destroyed or captured 200, and defeated the land-forces on the same day. He succeeded likewise in driving the Persians from Thrace, Caria, and Lycia; and expended much of the money which he had obtained by the recovery of his patrimony in Thrace upon the improvement of the city of Athens. At this period he appears to have been the most influential of the Athenians. The hereditary enemy of Persia, it was his policy to advocate a close alliance with Sparta; and when the Helots revolted, he led an army upon two occasions to the support of the Spartan troops; but on the latter occasion, having lost the confidence of his allies, he was ignominously dismissed. After his return to Athens, his policy was opposed by the democracy, headed by Pericles, who procured his banishment by ostracism. He was recalled in the fifth year of his exile, and was instrumental in obtaining a five years' armistice between the Spartans and the Athenians. He died in the year 449 B.C., at the siege of a Cyprian town.

CINALO'A, a town of Mexico, in the state of the same name, on the Rio Cinalca, about 50 miles from its entrance into the Gulf of California. It is a thriving place, with gold-washings in the vicinity. Pop. about 9000.

CINCHO'NA (better spelt *chinchona*, it appears; see CHINCHON), a most important genus of trees of the natural order *Cinchonaceæ*; yielding the bark so much valued in medicine, known as Peruvian Bark, Jesuits' Bark, China Bark, Quina, Quinquina, Cinchona Bark, &c., and from which the important alkaloids *Quinia* or *Quinine* (q. v.), and *Cinchonia* or *Cinchonine*, are obtained. The species of this genus are sometimes trees of great magnitude; but an aftergrowth springing from their roots when they have been felled, they often appear only as large shrubs; and some of them in the highest mountain-regions in which they are found, are low trees with stems only eight or ten feet in height.

They exist only in South America, between S. lat. 20° and N. lat. 10°, and chiefly on the eastern slope of the second range of the Cordilleras. All the Cinchonas are evergreen-trees; with laurel-like, entire, opposite leaves; stipules which soon fall off; and panicles of flowers, which, in general appearance, are not unlike those of lilac or privet. The flowers are white, rose-colored, or purplish, and very fragrant. The calyx is small and 5-toothed; the corolla tubular with a salver-shaped 5-cleft limb. In the true *Cinchonas*, the capsule splits from the base upwards; the species in which it splits from above downwards from the sub-genus *Cascarilla;* the distinction acquiring importance from the consideration, that the barks of the former alone contain the alkaloids so valuable in medicine; and this property is further limited to those species which have the corolla downy or silky on the outside. Beyond the botanical limits thus narrowly marked out, not a trace of these alkaloids has yet been discovered anywhere.

Great difficulty has been found in determining the species by which the different varieties of C. bark known in commerce are produced. The common commercial names are derived partly from the color of the kinds, and partly from the districts in which they are produced, or the ports where they are shipped. It appears, however, to be now ascertained that *Calisaya Bark*, also called Royal or Genuine Yellow Bark, one of the very best kinds —mostly shipped from Arica—is chiefly the produce of *C. Calisaya*, a large tree, growing in hot mountain valleys of Bolivia and the south of Peru. To give all the varieties of bark and species of tree would go beyond our limits.

The accurate discrimination of the different kinds of bark requires much experience. The taste is always bitter; but it is possible even to distinguish by the taste those varieties which contain quinia most largely from those in which cinchonia is most abundant.

The cutting and peeling of C.-trees are carried on by Indians, who go in parties, and pursue their occupation during the whole of the dry season. They build a hut, which serves both for their abode and for drying the bark. The trees are felled as near the

root as possible, that none of the bark may be lost; and the bark being stripped off, is carefully dried; the quilled form of the thinner bark is acquired in drying. The bark is made up into packages of various size, but averaging about 150 lbs. weight, closely wrapped in woollen cloth, and afterwards in hides, to be conveyed on mules' backs to the towns. These packages are called drums or *seroons*. It is in them that the bark is always brought to Europe.

A number of spurious kinds of Peruvian or C. Bark are either sent into the market separately, or are employed for adulterating the genuine kinds. They are bitter barks, and have, in greater or less degree, febrifugal properties, but are chemically and medicinally very different from true C. bark. They are produced by trees of genera very closely allied to cinchona.

Whilst C.-trees have been becoming every year more scarce in their native regions, no attempt has been made to cultivate them there, notwithstanding the constantly increasing demand for the bark; but the Dutch have made extensive plantations in Java, and the same has been done in British India and Ceylon. The plantations in Jamaica, now yield bark superior to the best produce of Ceylon. Plantations have also been made in Trinidad, Mauritius, and St. Helena. See article PERUVIAN BARK; also Mr. Markham's book *Peruvian Bark* (1880).

The Indians of Peru call the C. trees *Kina*, from whence are derived the names *China*, *Quina*, &c. But it is not certain that they knew the use of the bark, before the arrival of Spaniards. It is a medicine of great value in the cure of intermittent fevers (see AGUE), and diseases attended with much febrile debility; also in certain forms of Neuralgia (q. v.), and other diseases of the nervous system. It seems to have been first imported into Europe in 1639, by the Countess Del Cinchon or Chinchon, the wife of the viceroy of Peru, who had been cured of an obstinate intermittent fever by means of it, and upon this account it was named *C. Bark* and *Countess's Powder* (*Pulvis comitissæ*). The Jesuit missionaries afterwards carried it to Rome, and distributed it through their several stations, and thus it required the name of *Jesuits Bark* and *Powder of the Fathers* (*Pulvis Patrum*). Cardinal Juan de Lugo having been particularly active in recommending and distributing it, it was also known as *Cardinal de Lugo's Powder*. It attained great celebrity in Spain and Italy, being sold at high prices by the Jesuits, by whom it was lauded as an infallible remedy, while by most of the orthodox physicians it was coldly received, and by the Protestants altogether repudiated. Its mode of action not being well understood, and the cases to which it was applicable not well defined, it seems, in the first instance, to have been employed without due discrimination, and to have fallen very much into the hands of empirics. Falling, however, into disuse in Europe, it was again brought into notice by Sir Robert Talbor or Talbot, an Englishman, who brought it to England in 1671, and acquired great celebrity through the cure of intermittents by means of it, and from whom Louis XIV. purchased his secret 1682. A pound of bark at that time cost 100 louis-d'or. Talbor seems to have been a vain and self-seeking man, but who had, nevertheless, the acuteness to discern and systematically to avail himself of the healing virtues of the neglected Jesuits' Bark, which he mixed with other substances, so as to conceal its taste and odor.

Soon afterwards, both Morton and Sydenham, the most celebrated English physicians of the age, adopted the new remedy; and its use, from this period, gradually extended, both in England and France, notwithstanding the opposition of the Faculty of Medicine in the latter country. As it came into general use, it became a most important article of export from Peru; but for a long time, the value of the bark to be procured in New Granada remained unknown; and in order to the maintenance of a commercial monopoly, extraordinary methods were even employed to prevent it from becoming known at a comparatively recent period of Spanish rule in America. The discovery of the alkaloids on which its properties chiefly depend, constitutes a new era in the history of this medicine, and did not take place till the beginning of the present century.

The chief active principles are the two alkaloids, Quinine (q. v.) and Cinchonine. The latter is not generally present in so large a proportion as the quinine, and does not possess such powerful medicinal properties. When isolated, the alkaloid *Cinchonia*, or Cinchonine, has the formula ($C_{40}H_{24}N_2O_2$), and can be obtained in a crystallized state.

C. Bark itself has, in later times, fallen into comparative disuse, owing to the discovery of the alkaloid quinine, which is now extensively in use in medicine in the form of sulphate or disulphate of quinine, and is given in doses of from one to twenty grains, in almost all the cases to which the bark was supposed to be applicable.

CINCHONA'CEÆ, a natural order of exogenous plants, consisting of trees, shrubs, and herbaceous plants, with simple, entire, opposite, or whorled leaves, and stipules between their footstalks. The calyx is adherent to the ovary; the corolla is tubular and regular, its segments are equal in number to those of the calyx, when the calyx is divided; the stamens arise from the corolla, and are alternate with its segments. The ovary is surrounded by a disk, and usually two-celled; the style single. the fruit either splitting into two halves or not splitting at all, either dry or succulent.—This order has been very generally regarded by botanists as a sub-order of *Rubiaceæ* (q. v.), but far exceeds all the rest of that order, both in the number and importance of its species, of which from 2500 to 3000 are known, mostly tropical, and the remainder, with few exceptions, sub-tropical. The C. are nearly allied to *Caprifoliaceæ* (woodbines or honeysuckles, &c.), and interesting relations have been pointed out between them and *Umbelliferæ*. They constitute a very large part of the flora of tropical regions.

Besides the genus *Cinchona* (q. v.) and other genera producing febrifugal barks—*Exostemma*, *Condaminea*, *Pinckneya*, *Portlandia*, &c.—the order produces a number of valuable medicinal plants, of which Ipecacuanha (q. v.) is the most important. The Coffee (q. v.) shrub belongs to it; and also the tree which yields Gambir (q. v.). It produces a number of plants employed in dying, among which are the Chay Root or Choya, and some species of *Morinda*. Some trees of this order yield valuable timber. Many of the species have beautiful and fragrant flowers; and some produce pleasant fruits, among which are the Genipap (*Genipa Americana*) of South America, the Native Peach (*Sarcocephalus esculentus*) of Sierra Leone, and the Voavanga of Madagascar *Vangueria edulis*).

CINCINNA'TI, the commercial capital of Ohio, is situated on the right bank of the river which gives name to the state, and separates it from Virginia and Kentucky. It stands in lat. 39° 6′ 30″ N., and in long. 84° 26′ W., 458 miles below Pittsburg, in Pennsylvania, where the Ohio, as such, is first formed, and 500 miles above the junction of that stream and the Mississippi. Though C. was founded in 1788, yet, in 1800, it had only 750 inhabitants. In the years 1820, 1830, 1840, 1850, and 1860 respectively, the census returns showed a population of 9602, 24,830, 46,338, 115,438, and 161,004. In 1870, it was 216,289; in 1880, 255,139, including a large proportion of Germans and Irish. The natural facilities of C. for commerce are great, and the Ohio River gives valuable carrying facilities. The Miami Canal unites C. with Lake Erie. Railways branch off from C. as a center in several directions. The advantage of rail over water is shown by the value of commerce exported in 1880–81; by railroad, the value was 207,700,000 dollars; by river, 45,800,000 dollars; by canal, 524,000 dollars.

The staple article of the trade of C. is the slaughter of swine and the packing of pork. C. has an extensive trade in wheat, flour, and maize. Wine from the Catawba (q. v.) grape is made in the neighborhood to a great extent. The city itself also is largely engaged in a variety of important manufactures, hundreds of steam-engines being employed in the different establishments. The manufactories include iron-foundries, rolling mills, lard, oil, and stearine factories, and countless works connected with flour, clothing, furniture, paper, printing, tobacco, soap, candles, hats, &c. In one average year, during the period 1870–80, it was computed that iron was produced to the value of 17,000,000 dollars; food, 24,000,000 dollars; clothing, 13,230,000 dollars; and liquors, 24,000,000 dollars. There are about 75 newspapers and periodicals, including 9 daily, of which 3 are in German.

C. is substantially and handsomely built. Its ecclesiastical, literary, and commercial edifices are as numerous as befits the acknowledged Queen of the West. The city occupies chiefly two terraces, which are elevated respectively 50 feet and 108 above the level of the river. For the supply of the inhabitants, the water of the Ohio has been lifted up into an immense reservoir, at an expense of about £160,000. A large suspension bridge, 100 feet above low water, connects the city with Covington in Kentucky. There are also two railway pier-bridges. Education flourishes, and there are numerous free schools.

CINCINNA'TI (the Cincinnatuses), a society or order in the United States of North America, established by the officers of the revolutionary army in 1783, 'to perpetuate their friendship, and to raise a fund for relieving the widows and orphans of those who had fallen during the war.' It was so named because it included patriots, headed by Washington, who in many instances had left rural affairs to serve their country (see CINCINNATUS). The badge of the society is a bald eagle suspended by a dark-blue ribbon with white borders, symbolizing the union of France and America. On the breast of the eagle there is a figure of Cincinnatus receiving the military ensigns from the senators, with the plough in the background; round the whole are the words, *Omnia reliquit servare rempublicam*. On the reverse, the same hero is represented crowned by Fame with a wreath on which is inscribed *virtutis præmium*, &c. As this distinction was made hereditary, it was

attacked, as opposed to republican equality. Franklin saw in it the germ of a future aristocracy, and at a meeting held in Philadelphia in 1784, several changes were made in the constitution of the society, and in several of the states it was quietly abolished. There are still however, several state societies, which hold a general meeting by delegates triennially.

CINCINNA'TUS, Lucius Quinctius, a Roman consul, regarded by the later Romans as the model of antique virtue and simple manners. So far as we can discern his character through the veil of legend, C. appears to have been a violent patrician. About 460 B.C., he was chosen consul, and two years later was made dictator. When the messengers from Rome came to tell C. of his new dignity, they found him ploughing on his small farm. He soon rescued the consul Lucius Minucius, who had been defeated and surrounded by the Æqui. Livy's account of the mode in which the deliverance was effected is rejected by Niebur, who points out the inconsistencies and impossibilities of the story, and seems disposed to regard the whole as a mere myth. We are next informed that, after a dictatorship of sixteen days, C. returned to his small farm on the Tiber. When 80 years old, he was once more made dictator (439 B.C.), and suppressed a threatened plebeian insurrection.

CI'NDER-BED, a name given by the quarrymen to a stratum of the Upper Purbeck series, almost entirely composed of the loosely aggregated shells of a small oyster (*Ostrea distorta*).

CINERA'RIA, a genus of plants of the natural order *Compositæ*, sub-order *Corymbiferæ*, very nearly allied to *Senecio* (Groundsel, Ragwort, &c.) from which it differs only in having the involucre formed of one row of equal erect scales. The species are numerous, and widely diffused over the world in various climates. They are annual or perennial herbaceous plants; with simple, generally toothed or sinuate leaves. Many of them are remarkable for the ashy appearance of the lower part of the leaves, whence their name (Lat. *cinis*, *-eris*, ashes). The leaves are often covered with a peculiar sort of down. Two small species are natives of the southern parts of Britain. The flowers of some are very pretty. *C. maritima*, a native of the south of Europe, and other species, have for some time been much cultivated in gardens and greenhouses. Many hybrids and varieties have been produced by cultivation.

CI'NERARY URNS (Lat. *cinis*, ashes) were used by the nations of antiquity to contain the ashes of the dead when gathered from the funeral pile. Previous to being deposited in the urn, the embers were soaked with wine; the urn was then placed in a

Fig. 1.

Fig. 2.

niche in the family mausoleum. Only the wealthy could afford so expensive a rite. C. U. were either sculptured in marble, or formed of clay or glass. They were not always in the form in which we commonly see them represented in modern tombs. Fig. 1 of the accompanying illustrations is the celebrated cinerary urn known by the name of the Portland or Barberini vase, preserved in the British Museum. This beautiful production of Greek art was discovered about the middle of the 16th c., in a marble sarcophagus (believed to be that of the Roman emperor Alexander Severus, 223—235 A.D.) at Monte del Grano, near Rome. The height of the urn is 10 inches. Fig. 2 is one of the finest specimens yet discovered in the British Isles, and is preserved in the museum of the Royal Irish Academy. It was found in a small stone chamber near Bagnalstown, county of Carlow. It is composed of very fine clay, and is but 2⅛ inches high. It contains the burnt bones of an infant or very young child.

CINI'SI, a town of Sicily, in the province of Palermo, 14 miles west-north-west of Palermo, near the coast. It is a neat, cheerful town, with straight, regular streets, and has 6714 inhabitants. The Benedictine convent here was once a feudal castle.

CI'NNA, Lucius Cornelius, a Roman noble, was one of the principal supporters of the faction of Marius. After Sulla had driven Marius from the city, and before setting out on his expedition against Mithridates, he allowed C. to be elected to the consulship. But C. had no sooner entered upon that office (87 B.C.), than he impeached Sulla, endeavored to form an interest among the citizens who had been added to Rome after the Social War, and agitated for the recall of Marius. The events which led to the return of Marius are stated in the article Marius (q. v.). After a cruel massacre of the Roman citizens, in which some of the most eminent statesmen and orators were slain, Marius and C. declared themselves consuls. On the death of Marius, which occurred within a few days of his usurpation, C. made L. V. Flaccus his colleague for that year, and C. P. Carbo for the two succeeding years. In 84 B.C., he prepared to meet Sulla, who was then on his way from the East to take vengeance upon his enemies, but was slain by his disaffected troops at Brundusium. During his fourth consulate, his daughter Cornelia had been married to Julius Cæsar.

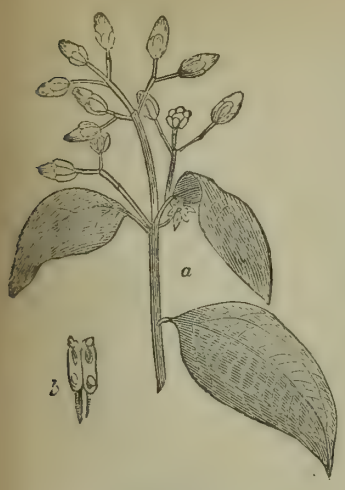
CI'NNABAR, an ore of mercury, from which almost all the mercury of commerce is obtained. Chemically, it is a bisulphuret of mercury, containing 86·2 parts of mercury and 13·8 of sulphur. It occurs both crystallized and massive, not unfrequently disseminated. Its crystals are six-sided prisms. It varies from perfectly opaque to almost transparent; has an adamantine almost metallic lustre, and a carmine color, with a bright scarlet streak. Its specific gravity is 8—8·2. *Hepatic C.*, so called from its liver-brown color, is a variety containing a little carbon. C. sometimes occurs in primitive rocks, but more frequently in those of the coal formation, and is sometimes even intimately mixed with coal itself. It is, however, a rare mineral, and is nowhere found in Britain. The C. mines of Almaden, in Spain, have been worked for about 2300 years, and are still the most productive in the world. At Almaden, the C. is found in a dark-colored slate mixed with quartzite. Next to the mines of Almaden, rank those of Idria in Carniola. C. mines exist also in Germany, Hungary, Peru, California, China, Japan, &c. C. is used as a pigment under the name of *Vermilion*.

CINNA'MIC ACID and the CINNAMYL SERIES. Cinnamyl is a compound radical, as yet unisolated, which is represented by the formula $C_{18}H_7O_2$, and which includes amongst its compounds cinnamic acid ($C_{18}H_7O_2$,HO), oil of cinnamon, which is chemically a slightly impure aldehyde of cinnamic acid, or a hydride of cinnamyl ($C_{18}H_7O_2$,H), chloride of cinnamyl ($C_{18}H_7O_2$,Cl), styrone or peruvine, known chemically as cinnamic alcohol ($C_{18}H_{10}O_2$), cinnamol and styrol, each represented by the formula $C_{16}H_8$, and styracin ($C_{18}H_{16}O_4$). We shall briefly notice the most important of these compounds—viz., cinnamic acid and oil of cinnamon. *Cinnamic Acid* ($C_{18}H_8O_4$) crystallizes in colorless prisms, which are sparingly soluble in cold water, but dissolve readily in boiling water, alcohol, and ether. It fuses at 266°, and boils with or without decomposition, according to the manner in which it is heated, at about 570°. It is converted by most decomposing agents into benzoyl compounds, such as benzoic acid, oil of bitter almonds, &c.; for example, when fused with hydrate of potash, it assimilates the elements of water, and breaks up into acetic and benzoic acids; when boiled with peroxide of lead, it is converted into oil of bitter almonds and benzoic acid, &c. It exists naturally in a free state in liquid storax, the balsams of Tolu and Peru, and gum benzoin, and is often deposited in large crystals from old samples of oil of cinnamon and from cinnamon water. It is always formed from oil of cinnamon when the latter is exposed to the action of the air, and it has been synthetically or artificially formed by exposing equivalent quantities of chloracetyl ($C_4H_3O_2Cl$) and oil of bitter almonds ($C_{14}H_6O_2$) to a prolonged heat in a closed glass tube. *Oil of Cinnamon* and *Oil of Cassia*, although prepared from different kinds of trees, are virtually identical in their composition, each consisting mainly of cinnamic aldehyde, or hydride of cinnamyl, mixed with certain resinous matters. Oil of cinnamon is an article of the materia medica, and in doses of one minim to a five-grain pill, forms an excellent aromatic addition to cathartic pill-masses.

CI'NNAMON is the spicy, aromatic, and stimulating bark of certain species of the genus *Cinnamomum*. This genus belongs to the natural order *Lauraceæ*, and was formerly included in *Laurus*. It contains a considerable number of species, natives of tropical and subtropical parts of the East. C. has been in use from the remotest antiquity. It is mentioned in the Old Testament, and by a name almost the same as that which it still bears in most languages.

The finest kind is said to be chiefly produced by *Cinnamomum Zeylanicum* (formerly, *Laurus Cinnamomum*), which chiefly grows in the island of Ceylon, although, having been introduced into the West Indies in 1782, along with various other plants of the East,

it is now cultivated there to some extent. The tree attains the height of 20—30 feet, and is sometimes 1½ foot in thickness. Its bark is of a grayish-brown color, internally of a yellowish red. The leaves are oval, 4—6 inches long, with a blunt point, and marked with three principal nerves. They have the taste of cloves. The flowers are of a silky gray on the outside, and a pale-yellowish color internally. The fruit is somewhat like an acorn in shape; it is a small drupe, brown when ripe. There are two seasons of cinnamon-harvest in Ceylon, the first commencing in April, and the last in November—the former being that in which the chief crop is obtained. The branches of 3—5 years' growth being cut down, the epidermis is scraped away; the bark is then ripped up longitudinally with a knife, and gradually loosened, till it can be taken off. The slices are then exposed to the sun, when as it dries, it curls up into *quills*, the smaller of which are inserted into the larger, and the whole tied up in bundles of about 88 lbs. each. C. is examined and arranged according to its quality by persons who are obliged for this purpose to taste and chew it, although in a short time it produces painful effects on their mouths and tongues. The finest C. is yielded by the young branches of the tree, especially by the numerous shoots which spring up from the stump after a tree has been cut down, and which are cut when about 10 feet long, and of the thickness of an ordinary walking-stick. The smell, particularly of the thinnest pieces, is delightfully fragrant, and the taste pungent and aromatic, with a mixture of sweetness and astringency. It is used like other spices by cooks and confectioners, and also in medicine as a tonic, stomachic, and carminative. The average quantity annually imported into London is about 500,000 lbs. Its virtues depend chiefly upon the essential oil which it contains (*Oil of Cinnamon*).



Cinnamon:
a, end of branch, with leaves and flowers; *b*, four-celled anther.

Oil of cassia is very often substituted for this oil, as cassia—which, however, may readily be distinguished by its mucilaginous taste—is for cinnamon. The root of the C.-tree contains camphor. The fruit yields a concrete oil, called *Cinnamon Suet*, which is highly fragrant, and in Ceylon was formerly made into candles, for the exclusive use of the king.—CASSIA (q. v.) is the produce of another species of *Cinnamomum*.—*C. Loureirii*, a native of Cochin China and Japan, is said to yield a bark even superior to that of *C. Zeylanicum*. A species of C., which ascends to the elevation of 8500 feet in the Sikkim Himalaya, deserves a trial even in the climate of Britain.

The constituents of C. are a volatile oil (*Oil of C.*), tannin, starch, mucilage, woody-fibre, resin, coloring matter, and an acid. The oil of C. is generally prepared in Ceylon by grinding the coarsest pieces of C., soaking them in sea-water for two or three days, and then distilling. Two oils pass over, one lighter, the other heavier than water. Oil of C. varies in color from yellow to cherry red, the yellow variety being considered the best, and is most highly esteemed. *Oil of C. leaf* is prepared from the leaves in Ceylon by a similar process, and is met with in commerce under the name of *clove oil*, which it much resembles in odor. *C. water* is obtained by adding water to C., and distilling a large quantity, or by diffusing the *oil of C.* through water by the aid of sugar or carbonate of magnesia. *Spirit of C.* is procured by acting upon C. with spirit of wine and water, and distilling; and *tincture of C.*, by soaking C. in spirit of wine, and straining. The medicinal properties of C., and its preparation, are aromatic and carminative, and it is serviceable in cases of nausea and vomiting, and in cases of flatulence and spasmodic states of the stomach and alimentary canal.

CI'NNAMON-STONE, a precious stone of which the finer specimens are highly esteemed; it is regarded as a variety of Garnet (q. v.). Its color varies from hyacinth red to orange yellow; and when pure, it is transparent. It is composed essentially of silica, alumina, and lime. It is found chiefly in Ceylon, where vast boulders of gneiss containing it in profusion exist in many places.

CI'NNYRIS. See SUN-BIRDS.

CI'NQUÉ CE'NTO (Ital.), five hundred. A technical, or rather *slang* artistic term, used to designate the style of art which arose in Italy after the year 1500, and which therefore belongs to the 16th c.; i. e., after the fall of all the great schools. It is sensuous in its character, the subjects chosen being usually borrowed from heathen mythology or history.

CI'NQUEFOIL, in Botany. See POTENTILLA.

CINQUEFOIL, a common bearing in heraldry. It is usually depicted with the leaves issuing from a ball as a center point.—C., in architecture, is an ornamental foliation in five compartments,

Cinquefoil:—In Heraldry.

Cinquefoil:—In Architecture.

used in the tracery of windows, panellings, and the like. The C. is often represented in a circular form, the spaces between points or cusps representing the five leaves, as in the accompanying illustration.

The C. of heraldry and of architecture is not derived from any leaf of five leaflets, but, as its perfect regularity of form indicates, from the flower of the plant called C. (*Potentilla*), or other similar flower of five petals or *leaves*. The C. thus closely resembles the rose, with which it would, indeed, be identified, but that a double and not a single rose is chosen for the purposes of heraldry and decorative art.

CINQUE PORTS (Fr. five ports). It is said that the five maritime ports of England lying opposite to the coast of France—Sandwich, Dover, Hythe, Romney, and Hastings—were enfranchised in the time of Edward the Confessor. But it was subsequent to the battle of Hastings that the Conqueror, in order that he might wield the resources of the seaports with greater vigor, constituted this whole line of coast into a jurisdiction entirely separate from the counties of Kent and Sussex, and erected it into a sort of county palatine, under a warden or guardian, the seat of whose administration was in Dover Castle. The warden, whose office corresponded to that of the ancient count of the Saxon coast (*Comos littoris Saxonica*), exercised jurisdiction, civil, military, and naval, uniting in his single person the functions of sheriff, custos rotulorum, lord-lieutenant, and admiral. Privileges equal to those originally bestowed on the C. P. were subsequently extended to the so-called *ancient towns* of Winchelsea and Rye; and most of the municipal towns had subordinate ports and towns attached to them, which were called *members*. In place of the Saxon terms of *aldermen* and *freemen*, those of *jurats* and *barons* were introduced, and the latter term has always been applied to the representatives of the C. P. in parliament. The chief function performed by the C. P. in early times consisted in furnishing such shipping as was required for the purposes of the state, the crown having possessed no permanent navy previous to the reign of Henry VII.

In the time of Edward I., they were bound to provide no less than 57 ships, fully equipped and manned at their own cost; though the weight of this heavy burden was somewhat lessened by the provision, that the period of gratuitous service should be limited to 15 days. In consequence of the warlike navy which they were thus compelled to maintain, the C. P. became so confident in their strength, and so insolent and audacious as not only to undertake piratical expeditions, but even to make war and form confederacies as independent states. Previous to the Revolution of 1688, the lord-wardens were in use to nominate the barons, or parliamentary representatives of the C. P.; but in 1689, an act was passed to 'declare the right and freedom of election of members to serve in parliament for the cinque ports.' The Reform Bill of 1832 reduced the number of members sent to parliament by the C. P. from 16 to 8, and the Municipal Reform Act has broken up the ancient organization of the ports, and assimilated their internal arrangements to those of other English municipalities. The ancient courts of Stepway, Brotherhood, and Guestling are still occasionally held, but their powers scarcely extend beyond matters of form, such as appointing the barons, who are to exercise an ancient privilege of the ports, which consists in carrying the canopy over the sovereign's head at a coronation. The lord-warden's jurisdiction, in relation to civil suits and proceedings, was abolished by 18 and 19 Vict. c. 48, amended by 20 and 21 Vict. c. 1.

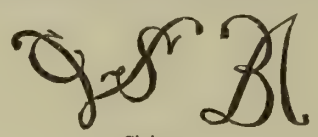
CI'NTRA, a small but picturesquely situated town in Portugal, in the province of Estremadura, about 15 miles west-north-west of Lisbon, with a population of 4000. It stands on the declivity of the Sierra de Cintra, and is surrounded by country residences. There is a palace at C., a strange mixture of Moorish and Christian architecture, anciently occupied by the Moorish kings, and subsequently a favorite residence of the Christian monarchs. A charming view of the town and of the sea is to be had from the top of a hill crowned with the ruins of a Moorish castle. On an-

other hill-top stands La Penna, once a convent, now a residence of the king of Portugal, who has restored and given it the outward appearance of a feudal castle. In the neighborhood, also, is what is called the Cork Convent, which derives its name from the cells—which are cut out in the rock—being lined with cork to prevent damp.

C. is historically remarkable for the *Convention* concluded here, August 22, 1808, between the English and French, by which the latter agreed to evacuate Portugal. Junot had been defeated by Sir Arthur Wellesley at Vimieira, and had retreated towards Torres Vedras and Lisbon, whither the English under Sir Hew Dalrymple, who had just arrived and assumed the chief command, were preparing to follow them. But the French, despairing of finally holding out, agreed to evacuate the country, on condition of not being treated as prisoners of war, but landed on the coast of France, retaining their arms and effects. This convention excited the greatest public indignation both in the Peninsula and in England. Several English newspapers appeared in mourning, and the ministry were obliged to have the generals who signed the convention tried by a court-martial, which, however, resulted in their acquittal. In fact, though the terms of the convention might be advantageous for the French, to obtain immediate possession of Portugal and Lisbon, instead of being put to the necessity of a bloody siege for months, was no less advantageous to the English and their allies. Such, at least, was the opinion of two competent judges—Napoleon and Wellington.

CIOTAT, La, a town of France, in the department of Bouches-du-Rhone, situated on the west side of a bay in the Mediterranean, about 15 miles south-east of Marseille, in the midst of a district clad with olive, orange, and pomegranate plantations. It is well built, and has a good and commodious harbor, formed by a mole, and well defended. The industry consists in cotton-spinning, ship-building, and an active trade in the produce of the district. Pop. (1876) 8104.

CI'PHER, an ornamental arrangement of the initial letters of a name, by which they become also a private mark, adopted by artists and architects as distinctive of their work. That of Albrecht



Ciphers

Dürer is well known. Of those given in the illustration, the first is that of Christopher von Sichem; the second, that of Adrian Bolswert.

CI'PHER-WRITING. See Cryptography.

CIPRIA'NI, Giambattista, painter and copper-engraver, was born in Florence 1732, or, according to others, in 1727, and when 19 years old, went to Rome, where he chose Correggio as a model, and soon gained a high reputation. Invited by certain English residents in Rome, the artist came to London about 1754, where he was one of the first members of the Royal Academy (founded 1769), and died in 1785. His drawing is correct, his coloring harmonious, his heads have grace and loveliness, and the general style of his works is attractive, although exceedingly conventional. A series of small copperplate illustrations of *Orlando Furioso* well exemplifies his graceful style. Several of Bartolozzi's best engravings are in C.'s manner.

CIRCÆ'A (from *Circe*, q. v.), a genus of rather pretty little herbaceous plants of the natural order *Onagraceæ*, with a deeply 2-cleft calyx, a corolla of two petals, and two stamens. *C. Lutetiana* is frequent in shady situations in Britain, and in most parts of the continent of Europe. It bears the English name of Enchanter's Nightshade, and in Germany it is called Hexenkraut (Witches' Herb). The origin of such names is not easily explained. The plant possesses no remarkable properties, being merely a little astringent. Other species are found in the Himalaya, &c.

CIRCASSIA, a division of the Western Caucasus, comprising the north, and also a portion of the south slope of that mountain-range extending in latitude 42°—45° N., and longitude 37°—47° E. See Caucasus.

CIRCASSIANS, in the wide sense of the term, is the name given to all the independent tribes of the Caucasus; in a narrower sense, it denotes the tribes who inhabited the western part of the range which is called, in consequence, Circassia. The C. proper, however, occupied only the north-western wing of the Caucasus, with the exclusion of Abasia, or the portion between the Black Sea in the west and the lower bank of the river Kuban in the north. They call themselves Adighé, but the Russians and Turks call them *Tcherkesses*. On their conquest by Russia in 1864, rather than remain in subjection to that power they chose to emigrate to Turkey, and from 400,000 to 500,000, or nearly the whole nation of fifteen tribes, carried this resolution into effect. The greater part of them were distributed over the Turkish possessions in Asia Minor, but others were settled in the mountainous parts of Bulgaria and on the borders of Servia. In their original country they were a marauding and warlike people, amongst whom it was held more honorable to live by plunder than by peaceful industry. In common with all brigand tribes, the C. cherished the most unrestrained love of independence. Their government was a singular compound of constitutionalism and feudalism. There were five distinct ranks in the nation—viz., chiefs or princes, nobles, common freemen, dependants, and slaves. The class of common freemen made up the great mass of the people; they possessed property, and enjoyed the same political rights as the nobles. The fourth class, the dependants, were the vassals of the princes and nobles, whose lands they cultivated, and whose armies they formed. Yet their lord had no right over their persons; for in some cases they and their whole families left him; and they could only be sold as slaves for punishment according to the previous verdict of a national assembly. The fifth class comprised the slaves, or those who had been made captive in war. That the C. have not lost some of the worst traits of their natural character since their settlement in Turkey is shown by their participation in the Bulgarian massacres of 1876 and 1877.

The C. princes and nobles are principally Mohammedans, whilst the great mass of the people have a religion which is a kind of mixture of Christianity and paganism, in which the celebration of Easter, the sign of the Cross, sacred trees, sacrifice, and processions with lights, play an important part. Besides agriculture and the rearing of cattle, they possess a few other branches of industry. The C. are proverbially handsome; they are also strong, active and temperate, and are characterized by the higher attributes of self-dependence, courage, and prudence. As a nation they made their first historical appearance during the middle ages. They are, however, chiefly known through their long struggles to maintain their independence against the aggression of Russia. See Caucasus. For their place in ethnology, see Caucasian Variety of Mankind.

CI'RCÉ, a fabulous sorceress, is described by Homer as 'fair-haired, a clever goddess, possessing human speech,' sister of 'all-wise Æætes,' daughter of 'the Sun, who gives light to mortals, and of Perse, whom Ocean begot as his daughter.' Round her palace in Ææa were numbers of human beings, whom she had changed into the shapes of wolves and lions by her drugs and incantations. She changed two-and-twenty of the companions of Ulysses into swine; but that hero, having obtained from Mercury the herb *Moly*, went boldy to the palace of the sorceress, remained uninjured by her drugs, and induced her to disenchant his comrades. He remained with her for a year; and when he departed she instructed him how to avoid the dangers which he would encounter on his homeward voyage (*Odyssey*, Books x. and xii.). Jealous of Scylla, whose love was sought by Glaucus, she poured the juice of poisonous herbs into that part of the sea where her rival was accustomed to bathe, and changed her into a hideous monster (*Metamorphoses*, Book xiv. fables 1 and 6).

CI'RCLE, a plane figure bounded by a curved line, which returns into itself, called its *circumference*, and which is everywhere equally distant from a point within it called the *center* of the circle. The circumference is sometimes itself called the C., but this is improper; C. is truly the name given to the space contained within the circumference. Any line drawn through the center, and terminated by the circumference, is a *diameter*. It is obvious that every diameter is bisected in the center. (See Arc, Chord.) In Co-ordinate Geometry, the C. ranks as a curve of the second order, and belongs to the class of the conic sections. It is got from the right cone by cutting the cone by a plane perpendicular to its axis. The C. may be described mechanically with a pair of compasses, fixing one foot in the center, and turning the other round to trace out the circumference. The C. and straight line are the two elements of plane geometry, and those constructions only are regarded as being properly geometrical which can be effected by their means. As an element in plane geometry, its properties are well-known and investigated in all the text-books. Only a few of the leading properties will here be stated.

1. Of all plane figures, the C. has the greatest area within the same perimeter.

2. The circumference of a C. bears a certain constant ratio to its diameter. This constant ratio, which mathematicians usually denote by the Greek letter π, has been determined to be 3·14159, nearly, so that, if the diameter of a C. is 1 foot, its circumference is 3·14159 feet; if the diameter is 5 feet, the circumference is $5 \times 3{\cdot}14159$; and, in general, if the diameter is expressed by $2r$ (twice the radius), then c (circumference) $= 2r \times \pi$. Archimedes, in the book *De Dimensione Circuli*, first gave a near value to the ratio between the circumference and the diameter, being that of 7 to 22. Various closer approximations in large numbers were afterwards made, as, for instance, the ratio of 1815 to

5702. Vieta, in 1579, showed that if the diameter of a C. be 1000, &c., then the circumference will be greater than 3141·5926535, and less than 3141·5926537. This approximation he made through ascertaining the perimeters of the inscribed and circumscribed polygons of 393,216 sides. By increasing the number of the sides of the polygons, their perimeters are brought more and more nearly into coincidence with the circumference of the circle. The approximation to the value of π has since been carried (by M. de Lagny) to 128 places of figures. It is now settled that π belongs to the class of quantities called *Incommensurable* (q. v.), i. e., it cannot be expressed by the rato of any two whole numbers, however great. In general, it may be considered that 3·14159 is a sufficiently accurate value of π.

Though the value of π was at first approached by actually calculating the perimeter of a polygon of a great number of sides, this operose method was long ago superseded by modes of calculation of a more refined character, which, however, cannot here be explained. Suffice it to say that various series were formed expressing its value; by taking more and more of the terms of which into account, a closer and closer approach to the value might be obtained. We subjoin one or two of the more curious.

$$\pi = 4\left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \&c.\right)$$

$$\pi = 8\left(\frac{1}{1\cdot3} + \frac{1}{3\cdot5} - \frac{1}{3\cdot5\cdot7} + \frac{1}{5\cdot7\cdot9} - \frac{1}{7\cdot9\cdot11} + \frac{1}{9\cdot11\cdot13} - \&c.\right)$$

3. The area of a C. is equal to π multiplied by the square of the radius ($= \pi r^2$); or to the square of the diameter multiplied by $\frac{\pi}{4}$ i. e, by ·7854. Euclid has proved this by showing that the area is equal to that of a triangle whose base is the circumference, and perpendicular height the radius of the circle.

4. It follows that different circles are to one another as the squares of their radii or diameters, and that their circumferences are as the radii or diameters.

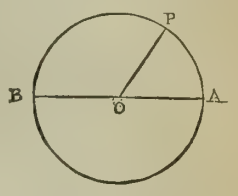
The C. is almost always employed to measure angles, from its obvious convenience for the purpose, which depends on the fact demonstrated in Euclid (Book iv. Prop. 33), that angles at the center of a C. are proportional to the arcs on which they stand. It follows from this, that if circles of the same radii be described from the vertices of angles as centers, the arcs intercepted between the lines, including the angles, are always proportional to the angles. The C. thus presents us with the means of comparing angles. It is first necessary, however to graduate the C. itself; for this purpose, its circumference is divided into four equal parts, called *quadrants*, each of which obviously subtends a right angle at the center, and then each quadrant is divided into degrees, and each degree into minutes, and so on. The systems of graduation adopted are various, and will now be explained.

The sexagesimal scale is that in common use. According to it, each quadrant or right angle being divided into 90 *degrees*, each degree is divided into 60 seconds, and each second into 60 thirds, and so on. According to this scale, 90° represents a right angle; 180°, two right angles, or a semicircle; and 360°, four right angles, or the whole circumference—the unit in the scale being the $\frac{1}{90}$th of a right angle. As the divisions of the angles at the center, effected by drawing lines from the center to the different points of graduation of the circumferance, are obviously independent of the magnitude of the radius, and therefore of the circumference, these divisions of the circumference of the C. may be spoken of as being actually divisions of angles. By laying a graduated C. over an angle, and noticing the number of degrees, &c., lying on the circumference between the lines including the angle, we at once know the magnitude of the angle. Suppose the lines to include between them 3 degrees, 45 minutes, 17 seconds, the angle in this scale would be written 3° 45′ 17″.

It is obvious, however, that the division of the quadrant into 90 degrees instead of any other number, is quite arbitrary. We may measure angles by the C., however we graduate it. Many French writers, accordingly, have adopted the

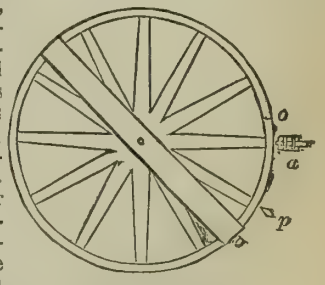
Centesimal Division of the Circle.—In this division, the right angle is divided into one hundred degrees, while each degree is divided into one hundred parts, and so on. This is a most convenient division, as it requires no new notation to denote the different parts. Such a quantity as 3° 45′ 17″ is expressed in this notation by 3·4517. the only mark required being the decimal point to separate the degrees from the parts. Of course, in this illustration, 3° means 3 centesimal divisions of the right angle, and 45′ means 45 centesimal minutes, and so on. If we want to translate the quantity 3° of the common notation into the centesimal notation, we must multiply 3 by 100, and divide by 90. To translate minutes in the common notation into the centesimal, the rule is to multiply by 100, and divide by 54. There remains yet another mode of measuring angles, known as the

Circular Measure.—The circular measure of angles is in frequent use, and depends directly on the proposition (Euc. vi. 33), that angles at the center of a C. are proportional to the arcs on which they stand. Let POA be an angle at the center O of a C., the radius of which is r; APB a semicircle whose circumference accordingly $= \pi r$; and let the length of the arc AP $= a$. Then, by Euclid $\frac{\text{angle POA}}{\text{2 right angles}} = \frac{a}{\pi r}$; and $\angle \text{POA} = \frac{\text{2 right } \angle \text{s}}{\pi} \cdot \frac{a}{r}$. Now, supposing a and r to be given, although the angle POA will be determined, yet its numerical value will not be settled unless we make some convention as to what angle we shall call unity. We are free to make any convention we please, and therefore choose such a one as will render the preceding equation the most simple. It is made most simple if we take $\frac{\text{2 right angles}}{\pi} = 1$. We shall then have (denoting the numerical value of the angle POA by θ) $\theta = \frac{a}{r}$. The result of our convention is, that the numerical value of two right angles is π, instead of 180°, as in the method of angular measurement first alluded to; and the unit of angle, instead of being the ninetieth part of a right angle, is $\frac{\text{2 right angles}}{\pi}$, or 57°, 17′ 44″ 48‴ nearly. Making $\theta = 1$ in the equation $\theta = \frac{a}{r}$, we have a (or AP) $= r$ (or AO), which shows that in the circular measure, the unit of angle is that angle which is subtended by an arc of length equal to radius. It is frequently a matter of indifference which mode of measuring angles is adopted; the circular measure, however, is generally the most advantageous, as being the briefest. It is easy to pass from this mode of measurement to the sexagesimal. If θ be the circular measure of an angle, the angle contains $\frac{\theta}{\pi}$. 180 degrees; conversely, if an angle contain $n°$, its circular measure is $\frac{n}{180}.\pi$.



CIRCLE, Magic, a space in which sorcerers were wont, according to the ancient popular belief, to protect themselves from the fury of the evil spirits they had raised. This C. was usually formed on a piece of ground about nine feet square (in the East, seven feet appears to have been considered sufficient), in the midst of some dark forest, churchyard, vault, or other lonely and dismal spot. The C. was described at midnight in certain conditions of the moon and weather. Inside the outer C. was another somewhat less, in the center of which the sorcerer had his seat. The spaces between the circles, as well as between the parallel lines which enclosed the larger one, were filled 'with all the holy names of God,' and a variety of other characters supposed to be potent against the powers of evil. Without the protection of this C., the magician, it was believed, would have been carried off by the spirits as he would have been, had he by chance got out of the charmed space.

CIRCLE, Mural, an instrument used for determining the meridian altitude or zenith distance of a star. It consists of an astronomical telescope firmly fixed to a graduated circle, which moves about a horizontal axis, fixed in a strong vertical wall running north and south. In the common focus of the eye-piece and the object-glass of the telescope is a system of cross-wires (spider lines are generally used for the purpose), one being horizontal, and five vertical, with equal spaces between. The line joining the optical center of the object-glass with the intersection of the horizontal and middle vertical wires, is called the line of *collimation* of the telescope, and when the instrument is in perfect adjustment, this line moves in the plane of the meridian.



Mural Circle.

Besides the above-mentioned fixed wire, there is a movable one, called a micrometer wire, which is moved by means of a screw, remaining always parallel to the fixed horizontal wire.

If the instrument be so adjusted that the image of a star, while passing across the middle vertical wire in the field of view, shall at the same time be bisected by the fixed horizontal wire, the star is at that moment in the line collimation of the telescope. It is therefore at that moment in the meridian, and its meridian zenith distance is the angle through which the circle would have been turned from the position it had when the line of collimation of the telescope pointed to the zenith. There is a fixed pointer, p, for the purpose of approximately reading the instrument. If the instrument were accurately adjusted, so that p was opposite the

zero point of the circle, when the line of collimation of the telescope pointed to the zenith, the arc *op*, in the above position of the instrument, would be the meridian zenith distance of the star.

Great nicety is required in 'reading' the instrument; i. e., in determining exactly the arc through which the circle has moved in bringing the telescope from the vertical to any other position, such as that represented in the figure.

The rim is usually graduated at intervals of five minutes; and the eye could determine only the division nearest to the fixed index *p*. But by means of a 'reading microscope,' or Micrometer (q. v.), fixed opposite to the rim, as at *a* (the distance between the axis of which and the point *p* is constant), the portion of the interval to the nearest division on the rim can be read to seconds. There are usually six such microscopes fixed opposite different points of the rim; and the 'reading' of the instrument is the mean of the 'readings' of all the microscopes. This tends to eliminate errors arising from imperfect graduation and adjustment. If the instrument is properly adjusted, the zero point of the circle will be at *p* when the line of collimation of the telescope points to the zenith. In practice, however, this is not always accurately, or even approximately the case. As we shall immediately show, it is of no consequence as the final result of every observation is the *difference* between two readings.

It is evident that the difference between any two readings of the instrument will represent the angle through which the line of collimation of the telescope moves in passing from one position to the other. It remains to show how a fixed point—viz., the Nadir (q. v.), is observed, and then how an observation is taken of the star itself in its meridian passage.

We must explain here that the fixed horizontal wire in the eye-piece of the telescope, in the instruments as now used, is only an *imaginary* line which determines the line of collimation of the telescope. It coincides with the position of the micrometer wire, when the screw-head of the micrometer marks zero.

To observe the nadir, a trough of mercury is placed underneath the instrument, and the telescope is turned so as to look vertically downwards into it. An image of the system of cross-wires which is in the common focus of the object-glass and eye-piece, will be reflected back again to nearly the same focus. Looking into the telescope, the observer now adjusts it by means of a tangent screw till the reflected image of the horizontal wire coincides with the real one. The final adjustment is perhaps most delicately effected by turning the screw-head of the micrometer which moves the wire itself. When they coincide, the line joining the center of the object-glass of the telescope with the intersection between the middle vertical and horizontal micrometric wire, will be vertical. Now, the angle between this and the line of collimation of the telescope, which, as we have said, joins the optical center of the object-glass with the intersection of the middle vertical and imaginary fixed horizontal wire, will, if the micrometer is in proper adjustment, be at once read off the micrometer screw-head. The instrument being clamped as above adjusted, the microscopes are read off, and the reading of the micrometer screw-head above mentioned being added to or subtracted from this reading, as the case may be, the nadir reading of the instrument is determined. The zenith reading, therefore, which differs from it by 180°, is at once known.

Again, to observe a star in the meridian, the instrument is previously adjusted so that the star, in passing the meridian, shall pass over the field of view of the telescope. As the image of the star approaches the center of the field, the observer adjusts the telescope by the tangent screw, so as very nearly to bring the image of the star to the horizontal wire. Finally, just as the star passes the middle vertical wire, he bisects the image of the star with the horizontal wire by a touch of the micrometer screw-head. The circle being now clamped (or made fast), the 'reading' is determined as before by reading the pointer and microscopes, and adding or subtracting, as the case may be, the reading of the micrometer. This reading now substracted from the zenith-reading gives the meridian zenith distance of the star; and this, again, subtracted from 90°, gives its meridian altitude above the horizon.

At the Royal Observatory of Greenwich, the principal observations are now made by an instrument which combines the mural C. with the transit instrument. See TRANSIT INSTRUMENT.

CIRCLE, QUADRATURE OF. See QUADRATURE.

CIRCLES OF THE SPHERE. See ARMILLARY SPHERE.

CI'RCUITS (Fr. *circuit*; Lat. *circuitus*, a going round). IN ENGLAND.—England and Wales, with the exception of the county of Middlesex, are divided, for judicial purposes, into seven C., which the judges of the High Court of Justice visit four times a year in pairs for the purpose of adjudging civil and criminal causes. The number of C. was reduced from eight to seven by authority of the Judicature Act, 1875. They are—the Northern, North-eastern, Midland, South-eastern, Oxford, Western, and North and South Wales. Trials by jury of issues of fact within London and Middlesex are held at what are called the London and Middlesex Sittings. Criminal charges within that and surrounding district are disposed of at sessions which are held monthly at the Central Criminal Court. 'These judges of assize came into use in the room of the ancient justices of eyre, *justiciarii in itinere*, who were regularly established, if not first appointed, by the parliament of Northampton, 1176 A.D., in the twenty-second year of Henry II., with a delegated power from the king's great court, or *aula regia*, being looked upon as members thereof.'—Stephen's *Com.*, volume iii. page 415. See ASSIZE and NISI PRIUS.—IRELAND is divided into the North-east, the North-west, the Home, the Leinster, Connaught, and Munster circuits. For the Scottish Circuits, see the article JUSTICIARY COURT.

CIRCULAR NOTES are bank-notes specially adapted for the use of travelers in foreign countries; and being, in fact, bills personal to the bearer, they are believed to be more safe as traveling money than ordinary notes or coin. C. N. are furnished by the chief London banking-houses. Those who wish to obtain them, determine beforehand what sum of money they will require on their journey, and that they pay to their banker, who, in exchange, gives C. N. to the amount, each of the value of £10 and upwards. Along with these notes is given a 'letter of indication.' This letter (a lithographed form in French) is addressed to foreign bankers, requesting them to pay the notes presented by the bearer, whom they name, and to aid him in any way in their power. By way of verification, the bearer appends his signature, and the letter is complete. On the back of the letter there is a long list of foreign bankers, extending all over Europe, any of whom will cash one or more of the C. N., on being presented and indorsed by the bearer; the indorsement being of course compared with the signature on the letter of indication, which is at the same time exhibited. In paying these notes, the money of the country is given, according to the course of exchange, and free of any charge for commission. For security, the letter and the notes should not be carried together, in case of being stolen or lost. These C. N. are doubtless a safe and convenient species of money, exchangeable in almost every town visited; and if any remain over on coming home, they will be taken back at their value by the banker who issued them. There are, however, certain drawbacks connected with these notes, which every traveler less or more experiences. In many, almost in all, instances, there is a difficulty in finding out where the banker named is to be found; for foreign bankers generally occupy obscure apartments several stories high, and not unusually in dingy out-of-the-way alleys. To discover them, a commissionaire may be necessary. Then, in some instances, it happens that the banker jealously scrutinizes the bearer, asks to see his passport, and takes a note of the hotel at which he lodges; all which may be proper as a precaution against roguery, but it is not pleasant. Further, the C. N. are ordinarily of a thick stiff kind of paper, which does not well fit into a purse or pocket-book. On these several accounts, the careful class of travelers who keep to the main thoroughfares of France, Germany, and Belgium, will find £5 or £10 Bank of England notes, and sovereigns or napoleons, a preferable kind of money to take on their journey.

CI'RCULAR NU'MBERS are numbers whose powers end on the same figure as they do themselves: such are numbers ending in 0, 1, 5, 6.

CIRCULAR PARTS, the name given to a rule in spherical trigonometry, invented by Lord Napier. It is to be found in any treatise on that subject.

CIR'CULATING DE'CIMALS. See DECIMALS.

CIRCULATING LIBRARY, a collection of books lent out on hire—circulated from hand to hand. The plan of lending books on hire is not new. Chevillier, in his *Origines de l'Imprimerie de Paris* (4to, 1694), mentions that, in 1342, a century before the invention of printing, a law was framed in Paris to compel stationers to keep books to be lent on hire, for the special benefit of poor students and others. This fact is alluded to as follows, by E. S. Merryweather, in his entertaining work, *Bibliomania in the Middle Ages* (London, 1849): 'The reader will be surprised at the idea of a circulating library in the middle ages, but there can be no doubt of the fact, they were established at Paris, Toulouse, Vienna, and other places. These public librarians, too, were obliged to write out regular catalogues of their books, and hang them up in their shops, with the prices affixed, so that the student might know beforehand what he had to pay for reading them.' This writer, quoting from Chevillier, gives a list of books so lent out, with the prices for reading them. The books are all of a theological or classical kind. Among them is the Bible, the perusal of which is set down at 10 sous. 'This rate of charge,' it is added, 'was also fixed by the university, and the students borrowing these books were privileged to transcribe them, if they chose; if any of them proved imperfect or faulty, they were denounced by the university, and a fine was imposed upon the bookseller who had

lent out the volume.' In these arrangements, we see the efforts that were made to procure the use of books before the art of printing had cheapened the cost of literature.

By whom the modern C. L. was projected, there is no record. All that can be given are a few facts on the subject. It is known that Allan Ramsay, author of *The Gentle Shepherd*, who was a bookseller in Edinburgh, established a C. L. in that city about 1725. Fond of dramatic literature, Ramsay appears to have incurred some local obloquy by lending out plays; and his wish to introduce a taste for the drama into Edinburgh may accordingly have suggested the notion of a circulating library. Be this as it may, the library which he began was continued through various hands for above a hundred years. At Ramsay's death in 1758, his library was sold to a Mr. Yair, whose widow carried it on till 1780, when it was bought by Mr. James Sibbald, an ingenious inquirer into Scottish literary antiquities. Sibbald lived some years as a literary man in London, during which period, beginning with 1793, the C. L. was carried on, subject to an agreement, by a Mr. Laurie. Sibbald afterwards resumed the direction of the library, which he considerably extended. At his death in 1803, his brother attempted to carry it on; but not being successful in his management, he disposed of it in 1806 to Alexander Mackay, a person of extraordinary energy and perseverance. By the acquisition of various other libraries, Mr. Mackay greatly enlarged the collection, which, under the name of the Edinburgh C. L., he conducted at 154 High Street. Here, by long continued and minute attention to business, Mr. Mackay realized a competency, and he retired from active pursuits in 1831, when this extensive collection of books was broken up and sold by auction.

There are several circulating libraries in London, claiming to be of old date, but probably not so early as 1725. In a late reprint of an old advertisement, we see 'Proposals for erecting a Public Circulating Library in London,' under date June 12, 1742. This library was to be established 'in some convenient place at or near the Royal Exchange;' and the subscription was to be a guinea per annum. Two of the present circulating libraries are believed to be descended from this primitive stock. So numerous had circulating libraries become in the early years of the present century, that they absorbed whole editions of novels and romances prepared for the purpose by a London publishing establishment, designated the Minerva Press. The issue of cheap books and periodicals about 1832 (see BOOK-TRADE) seriously damaged the C. L. system; for people now bought instead of borrowing materials for light reading. The vast increase to the reading public in recent times, and the continually augmenting number of new and popular works of a respectable class, have been the means of restoring prosperity to circulating libraries, more especially in London, where some of them are on a surprisingly gigantic scale. To one library alone, as many as 100,000 new books are said to be added annually, and of kinds very different from those of the old Minerva Press school. The method of reading from these libraries consists in paying a sum per annum—usually a subscription of a guinea—for which a number of new books may at all times be procured, and kept for a specified period. When the books are no longer in demand, they are sold at reduced prices.

The method of circulating books among the members of private associations, is noticed under the head BOOK-CLUB; and that of circulating books in rural districts by means of libraries which are shifted from place to place, will be found in the article ITINERATING LIBRARIES.

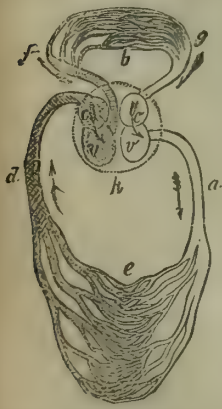


Fig. 1.—Mode of Circulation in Man and other Mammals, and in Birds.

h, heart; *v*, right ventricle; *v'*, left ventricle; *c*, right auricle; *c'*, left auricle; *a*, aorta; *d*, vena cava; *e*, greater circulation; *b*, smaller circulation: *f*, pulmonary artery; *g*, pulmonary veins.

CIRCULA'TION, in Anatomy and Physiology, is the term used to designate the course of the blood from the heart to the most minute blood-vessels (the Capillaries, q. v.), and from these back to the heart.

To simplify the consideration of the subject, we shall consider—1. The Anatomy of the Organs of Circulation—and, 2. The Physiology of the Circulation.

1. The organs of C. consist of the heart, arteries, veins, and capillaries. The course of the blood through these organs will be best elucidated by the aid of a diagram, which is equally applicable for all other mammals as well as for man, and for birds. The shaded part of fig. 1 represents structures filled with impure or venous blood, while the unshaded portion represents structures in which pure, oxygenated, arterial blood occurs. In this diagam we observe a dotted circle, representing a closed bag or sac, termed the pericardium, and enclosing the four cavities *c*, *v*, *c'*, *v'*, of which the heart is composed. Two of these cavities, *c* and *c'*, are for the purpose of receiving the blood as it flows into the heart, and are termed the *auricles;* while the two cavities *v* and *v'* are for the purpose of propelling the blood through the lungs and general system respectively, and are termed the *ventricles*. The vessels that transport blood into the auricles are termed *veins*, and the vessels through which the blood is driven onwards from the ventricles are known as *arteries* (q. v.).

The diagram further shows that what we commonly term the heart, is in reality *two distinct hearts* in apposition with each other—one, shaded in the figure, which is called the right, or venous, or pulmonary heart; and the other, unshaded, which is called the left, or arterial, or systemic heart—the last name having been given to it, because the blood is sent from it to the general system; just as the right heart is termed pulmonary from its sending blood to the lungs. We will now trace the course of the blood as indicated by the arrows in this diagram, commencing with the right auricle, *c*. The right auricle contracting upon the venous or impure blood with which we suppose it to be filled, drives its contents onwards into the right ventricle *v*, through an opening between these two cavities, called the right auriculo-ventricular opening, which is guarded by a valve, named the tricuspid—from its being composed of three pointed membranous expansions—which almost entirely prevents the regurgitation or reflux of the blood from the ventricle into the auricle. The ventricle *v* being now filled, contracts, and as the blood cannot return into the auricle, it is driven along the shaded vessel, the driving branches of which are indicated by *f*. This vessel is known as the pulmonary artery, and conveys the blood to the lungs. At its commencement, it is guarded by valves, termed, from their shape, the semilunar pulmonary valves, which entirely prevent the blood which has once been propelled into the pulmonary artery from re-entering the ventricle. The pulmonary artery gradually divides into smaller and smaller branches, which ultimately merge into capillaries. In these capillaries, which are freely distributed over the interior of all the air-cells (of which the lung is mainly composed), the venous blood is brought in contact with atmospheric air, gives off its carbonic acid gas (which is its principal impurity), and absorbs oxygen, by which processes it is converted into pure or arterial blood. The capillaries, *b*, in which the blood is arterialized, gradually unite to form minute veins, which, again, join to form larger vessels, until finally the blood is collected into a small number of vessels known as pulmonary veins, which pour their contents into the left auricle. Only one such vessel, *g*, is shown in the figure, because the main object of this diagramatic scheme is to illustrate the mode and general direction in which the blood circulates, not to indicate the special vessels through which it flows in different parts of the body. The actual number of the pulmonary veins is four—viz., two from each lung. The blood, now fitted for the various purposes of nutrition, enters the left auricle, *c'*, which by its contraction propels it into the left ventricle, *v'*, through the left auriculo-ventricular opening. This opening, like the corresponding one in the right heart, is guarded by a valve which, from its form, is termed the mitral valve, and which entirely prevents the reflux of the blood.

The left ventricle, *v'*, contracts and drives its contents into the large artery, *a*, which represents the aorta—the great trunk which, by means of its various branches (none of which are indicated in the diagram), supplies every portion of the body, from the crown of the head to the soles of the feet, with pure arterial blood. From the aorta and its various subdividing branches, the blood passes into the capillaries, *e*, which occur in every part of the system; in these capillaries it undergoes important changes, which may be considered as almost exactly the reverse of those which occur in the pulmonary capillaries: it parts with its oxygen, becomes charged with carbonic acid, and, as it leaves the capillaries, and enters the minute veins formed by their union, presents all the characters of venous blood. The veins gradually unite till they form two large trunks, termed the superior and inferior *venæ cavæ*, which pour their contents into the right auricle—the point from which we started. Only one of these great veins, *d*, is indicated in the diagram. We thus perceive that there is a complete double C.—that there is a lesser C. effected by the blood in its passage from the right to the left heart through the lungs; and that there is a greater C. effected by that fluid in its passage from the left heart through the system generally to the right heart.

From the above simple ideal scheme, we proceed to the consideration of the more complicated arrangements by which the C. is actually effected in man and the higher animals.

The heart is situated in very nearly the center of the cavity of the chest, or *thorax*, as it is termed in anatomy, between the lungs, behind the breast-bone, or *sternum*, in front of the vertebral column, and above the diaphragm, on which it obliquely rests. Its form is somewhat conical, the lower end tapering almost to a point, and directed rather forwards and to the left. This lower portion alone is movable, and, at each contraction of the heart, it is tilted forwards, and strikes against the walls of the chest between, in man, the fifth and sixth ribs, or a little below the left nipple. All the large vessels connected with the heart—the *venæ cavæ*, the pulmo-

nary artery, and the aorta—arise from its base (see fig. 2), and serve, from their attachment to the neighboring parts, to keep that portion of it fixed. Indeed, these vessels may be regarded as suspending the heart in the cavity, which is lined by a smooth serous membrane, which, near the top, is reflected downwards over the roots of the great vessels, and covers the whole of the outer surface of the heart. These two smooth serous surfaces—one lining the cavity, the other investing the heart—are kept moist by a fluid which they secrete, and by this arangement, friction may be regarded as reduced to its minimum. The cavity or sac in which the heart lies is called the pericardium. Like all serous membranes, it is a closed sac, and, as it may not be easy for the non-professional reader to understand the relative position of the heart, which is at the same time surrounded by and external to this membrane, we may observe that the head in an old-fashioned double night-cap—which is a closed bag—is in much the same position as the heart in the pericardium; it is inside the night-cap, but not in the cavity which intervenes between its two layers.

The substanee of the heart is essentially muscular. The fibres run in different directions, longitudinally and transversely, but most of them obliquely; many over the apex from one side of the

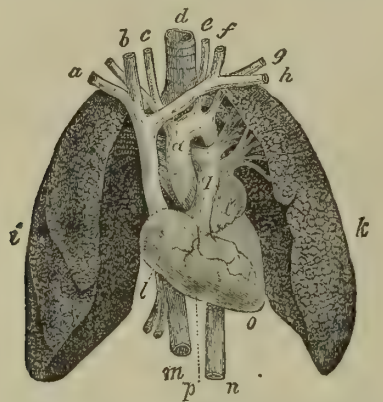


Fig. 2.—The Lungs, Heart and principal Blood-vessels in Man.

a, *h*, veins from the right and left arms; *b*, *f*, right and left jugular veins, returning the blood from the head and neck—these four veins unite to form a single trunk, the *vena cava superior*, which enters the right auricle, *l*; *c*, *e*, the right and left carotid arteries, the latter rising directly from the arch of the aorta, *a'*, the former from a short trunk called the *arteria innominata*; *g*, the left subclavian artery, rising directly from the aorta, while the right subclavian springs from the *arteria innominata*; *d*, the trachea or windpipe; *i*, *k*, the right and left lungs; *l*, *l'*, the right and left auricles; *p*, the right ventricle; *o*, the apex of left ventricle; *m*, the inferior or ascending *vena cava*; *n*, the descending aorta, emerging from behind the heart; *q*, the pulmonary artery.

heart to the other; and all are so involved as to render it very difficult to unravel them. In consequence of this arrangement, the fibres, by their contraction, seem simultaneously to diminish each cavity in all directions, and thus serve most efficiently to drive the blood onwards. The size of the heart has been estimated as about that of the closed fist of the same individual. Its weight, as compared with that of the body was determined by Dr. Clendinning to be 1 : 160 in the male, and 1 : 150 in the female. The same physician carefully examined nearly four hundred hearts of persons of both sexes, and determined the average weight at about 9 oz. avoirdupois, while Dr. John Reid found the average weight of the male heart to be a little more than 11 oz., and that of the female heart to be a little above 9 oz.

In our ideal sketch of the organs of C. (fig. 1), we have indicated the different cavities into which the heart is divided. In fig. 3 there is represented a section of the human heart, which is sufficiently like the reality to give the reader a fair idea of the position of its various parts. The two theoretical hearts, which were nearly in contact in fig. 1, are here fused into a single organ, but the division of the two sides is still as complete, in so far as the functions of the heart are concerned, as in the ideal scheme.

We see a strong vertical partition separating the entire heart into two halves, which are very similar to each other. In the accompanying figure (fig. 4), we have a representation of all these valves—the auricles having been removed so as to give a distinct view of the upper surface of the ventricles. The tricuspid and mitral valves, which are entirely closed—the two ventricles contracting simultaneously—are represented by 1 and 3 respectively; while the pulmonary and aortic semilunar valves, which, when closed, always present a concave surface towards the lungs, are indicated by 4 and 5. The walls of the ventricles are much thicker than those of the auricles, and those of the left ventricle are about four times as thick as those of the right; the amount of muscular tissue being, in all these cases, proportional to the work to be done. All details regarding the anatomy of the heart, except such as bear directly upon the C., would be out of place in this article, and we shall, therefore, omit all notice of many structures which present themselves on opening its various cavities. We will merely add, that the heart receives the arterial

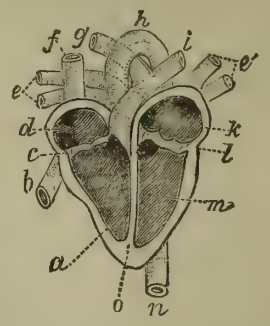


Fig. 3.—Theoretical Section of the human Heart:

f, *b*, the two *venæ cavæ*, opening into *d*, the right auricle; *c*, the tricuspid valve; *a*, the right ventricle, from which proceeds the pulmonary artery, dividing into branches *g* and *i*, going to the right and left lung respectively; *e*, *é*, the pulmonary veins (two from either lung), entering into the left auricle, *k*; *l*, the mitral valve; *m*, the left ventricle, from which proceeds the aorta, whose arch is identicated by *h*, the descending portion by *n*, none of its branches being indicated in this figure; *o*, the partition, or *septum*, between the right and left hearts.

blood necessary for its own nutrition from the coronary arteries, two trunks which are given off by the aorta immediately above the semilunar valves; and that this blood having discharged its function, is carried back to the right auricle by the coronary veins; this blood obviously having the shortest possible systemic circulation.

Since all the arterial blood leaves the heart through the aortic opening, in tracing its course to the different parts of the system we obviously have only to follow the aorta to its final branches. Referring to the article AORTA, where the principal branches of that great organ are indicated, it is sufficient, without further anatomical details, to say that the final ramifications of the arteries distribute the arterial blood to the Capillaries (q. v.), which pervade every part of the body.

The *veins* like the arteries, are found in nearly every tissue; they commence by minute plexuses (an anatomical term for a network-like arrangement), which communicate with the capillaries. Branches from these plexuses uniting together, form small venous trunks, which, by joining, increase in size as they pass onward towards the heart. If we except certain venous structures (called *sinuses*) occurring in the interior of the skull, we may divide the veins into two sets—the *superficial* or *cutaneous*, and the *deep* veins.

The deep veins accompany the arteries and are usually enclosed in the same sheath of cellular tissue with them. In the case of

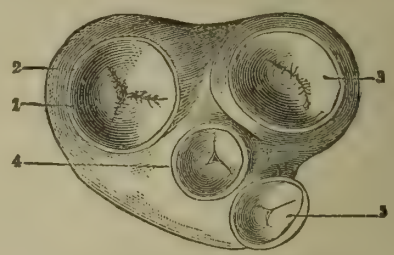


Fig. 4.—Valves of the Heart and Arteries.

Upper surface of the Heart, the Auricles having been removed. In this figure the heart is turned in such a position that the anterior surface lies lowermost; hence the apparent discrepancy of the *right* auriculo-ventricular orifice lying on the *left* side of the diagram.

1. Right auriculo-ventricular orifice, obliterated by the tricuspid valve; 2. fibrous ring surrounding this orifice; 3 left auriculo-ventricular orifice, surrounded by a ring, and closed by the mitral valve; 4. orifice leading into the aorta from the left ventricle, closed by the semilunar valves; 5. orifice leading into the pulmonary artery from the right ventricle, also provided with three semilunar valves.

the smaller arteries, they generally exist in pairs, one on each side the artery, and are called *venæ comites*, while the larger arteries have usually only one accompanying vein.

The superficial veins occur immediately beneath the integument; they not only return the blood from the skin and adjacent structures, but communicate with the deep veins.

All the veins finally unite into two large trunks, termed the *superior* and *inferior vena cava*, which open into the right auricle of the heart; the superior vena cava being formed by the union

of the veins which return the blood from the head and neck (the jugulars) with those which convey it from the arms (the subclavians), as shown in fig. 2; while the Inferior vena cava (also shown in the same figure) receives the blood from the lower extremities, the trunk, and the abdominal and pelvic viscera.

We must refer to the article VEIN for the structure of the walls of this part of the circulating system. There is only one point that imperatively requires notice here—viz., that while the arterial system presents no valves, except at the points where the two great trunks leave the heart, the veins contain a great number of valves, which are formed by a doubling of their lining membrane, and resemble pocket-like folds or pouches, which allow the blood free passage towards the heart, but prevent its reflux.

There is one part of the venous C. which, from its great importance, requires special notice—viz., that of the venous blood of the spleen, pancreas, stomach, and intestinal canal. The blood supplied to these organs by the cœliac axis and the two mesenteric arteries is not returned directly to the vena cava, and thence to the heart, as occurs in other parts of the system. The veins of these organs unite together into one large vessel, called the *vena portæ*, which, entering the liver, branches out again like an artery, and finally subdivides into a capillary network that permeates the whole of its mass. It is from the venous blood, as it traverses these capillaries, that the bile is secreted. This portal blood, together with the blood of the hepatic artery, after it has become venous, is finally carried off by the hepatic veins (usually three in number), which open into the inferior vena cava.* Thus the blood which flows through the portal vein passes through two sets of capillaries, between the period of its leaving the aorta and entering the vena cava.

Our knowledge of the true course of the C.—viz., that the blood propelled from the left side of the heart, after traversing the arteries, returned by the veins to the right side of the heart; and the blood of the right side, passing through the pulmonary artery, traversed the lungs, and returned by the pulmonary veins to the left auricle—is of comparatively recent date. Harvey's celebrated work, *Exercitatio de Motu Cordis et Sanguinis*, was not published till 1628, although there is good reason to believe that it was written nine or ten years previously. Before the appearance of this celebrated work, which marks an epoch in physiological science, the views that were held on this subject were so vague that it is unnecessary for us to enter into any notice of them. (The reader who takes an interest in this point is referred to Dr. Willis's *Life of Harvey*, prefixed to his translation of Harvey's Works, for the Sydenham Society.) In one point, Harvey's proof of the course taken by the blood was defective; the microscope had not then revealed the existence of the capillaries, and he was consequently altogether at fault as to the mode by which the blood passed from the arteries to the veins. By a strange coincidence, Malpighi, who discovered the corpuscles by which the motion of the blood in the capillaries can be traced, was born in the course of the very year (1628) in which Harvey's work was published.

The double C. which we have described, is the course performed by the blood from the time of birth during the whole period of life. The C. of the blood, however, begins before birth—indeed, at a very early period of intra-uterine or fœtal existence; and the circumstance that before birth the lungs do not act as organs of respiration, induces a very important modification in the course of the blood in fœtal life, which will be described under FŒTUS.

We now leave for the present the C. in man, and proceed to notice some of the leading peculiarities of the C. in other animals. In the warm-blooded animals—mammals and birds—the course of the blood is *essentially* the same as in man, for in all these animals the heart, like the adult human heart, possesses four distinct cavities. In form, however, it presents certain peculiarities in some of the mammalia. It is generally more rounded and less elongated than in man. In the cetacea, it is very broad and flat; and in at least one genus, the dugong, the right and left ventricles are separated by a deep fissure. In some herbivorous mammals, as in the ox, sheep, goat, &c., a cruciform ossification, called the bone of the heart, is found in the septum between the ventricles. In the ornithorhynchus, or duck-billed platypus, the heart, in some respects resembles that of birds. We likewise find certain varieties in the distribution of the blood-vessels. Thus, while in man the subclavian and carotid arteries arise on the right side from a short common trunk given off by the aorta, and on the left side arise directly from the aorta, we find several varieties of this arrangement in the mammalia.

In the horse and the ruminants, the aorta divides at once at its origin into an anterior trunk, which gives off the carotid and subclavian arteries of both sides, and a posterior trunk for the thoracic and abdominal aorta. In the dolphin, and in some—if not all—of the bats, two short trunks (*arteriæ innominatæ*) arise, and give off each a carotid and subclavian on either side. In the elephant, both carotids are given off from a single common trunk, situated midway between the two subclavians. All these, and other varieties which might be noticed, are occasionally found in man; and it may be laid down as a general rule, that when any abnormal arterial distribution is detected in the human subject, it represents the normal type in some lower mammal.

A very remarkable peculiarity in the distribution of the vascular system (both arteries and veins) is exhibited by the cetacea and other diving animals, in which the respiration, and consequently the arterialization of the blood, is temporarily stopped. Various

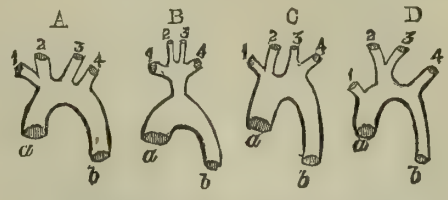


Fig. 5.—Diagram of certain varieties in the Origin of the Main Trunks from the Arch of the Aorta:

A, Man; B, the Ruminants; C, Dolphin and Bats; D, the Elephant. 1, the right subclavian; 2, right carotid; 3, left carotid; 4, left subclavian; *a*, ascending aorta; *b*, descending aorta.

arteries of the trunk here assume a ramified and convoluted form, so as to constitute reservoirs capable of holding a large quantity of pure blood; while the venous trunks exhibit similar dilatations, capable of receiving and retaining for a considerable time the impure blood which has circulated through the system, and of preventing the right heart from being overcharged with venous blood during the temporary suspension of respiration. By means of these arterial reservoirs, the cetacea can support life under water for a quarter of an hour, or even longer.

Another peculiarity deserving of notice is, that occasionally a large artery will divide into a great number of smaller vessels, which again reunite to form a single trunk. An arrangement of this kind is known as a *rete mirabile*, and a good example of it occurs within the scull in long-necked grazing animals, the object being to check too strong a current of blood to the brain.

In birds, the heart is usually of a very large size, as compared with the bulk of the body. The trunk of the aorta is extremely short, and divides into three main branches, the central one forming the descending aorta, while the two lateral ones give off the carotid and subclavian arteries on either side. The branches of the latter give an abundant supply of blood to the powerful thoracic muscles by which the wings are moved.

In the class of reptiles, there is not a complete double C., a mixture of arterial and venous blood being sent both to the lungs and to the general system. In fig. 6, the general nature of the C. in this class is typically represented. The heart consists of two auricles and one ventricle. The impure blood which has circulated through the system is conveyed by the vena cava into the right auricle, from whence it passes into the common ventricle. At the same time, blood which has been aërated in the lungs is poured into it from the left auricle; hence the ventricle contains an admixture of venous and arterial blood. As both a pulmonary artery and an aorta are given off by the ventricle, the latter by its contractions simultaneously drives one portion of its contents to the lungs, and another to the general system. In this way, a semi-oxygenated blood is transmitted to the various parts of the body, the only pure blood being that which is contained in the left auricle, and in the veins opening into it.

Although the above may be regarded as the *general* type of the circulating apparatus in reptiles, yet there are many modifications of it (into which we have not space to enter), which connect it on the one hand (in the case of the *Perennibranchiate amphibia*, such as the axolotl, proteus, &c.) with that of fishes, and on the other hand (when there is a more or less perfect separation of the ventricular cavity, as in the crocodiles) with that of birds and mammals.

In the class of fishes, the circulating apparatus is far simpler than in reptiles. The heart possesses only two cavities, an auricle and a ventricle, and is traversed solely by venous blood; hence it is analogous to the right side of the mammalian heart. Venous blood is brought by veins, which correspond with our *venæ cavæ*, from all parts of the system, and enters the auricle (see fig. 7); from the auricle, the blood passes into the ventricle, which is of great muscular strength; and the ventricle propels its contents through a vessel which corresponds with our pulmonary artery, and which dividing on either side into four or five branches, goes to the gills, in the capillaries of which it becomes oxygenated, by means of the air that is diffused through the water. From the filaments and fringe-like structures of the gills, it is at length collected into a large trunk, commonly called the dorsal vessel, but analogous to the aorta of mammals and birds, in so much as it

* In fishes, not only the blood of the intestines, but that of the posterior part of the body, enters this portal system, which is distributed in this class of animals both to the kidneys and to the liver.

supplies the whole body with arterialized blood. After passing through the systemic capillaries, the blood returns in a venous condition to the heart, and the above process is repeated.

Although the heart is simpler then in reptiles, the C. is in one sense of a higher character, in so far as pure arterial (not mixed) blood

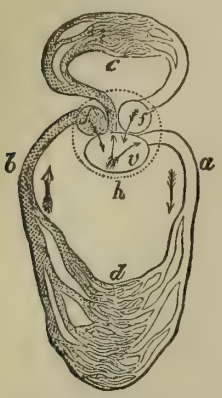


Fig. 6.—Circulation in Reptiles:

h, heart, enclosed in pericardium; *f*, *f*, right and left auricles; *v*, single ventricle; *a*, aorta; *b*, vena cava; *c*, smallar circuluation; *d*, greater circulation.

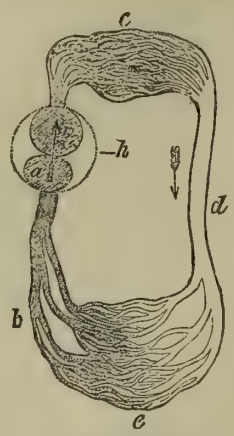


Fig. 7.—Circulation in Fishes:

h, heart, enclosed in pericardium; *a*, the auricle; *v*, the ventricle; *c*, the capillary circulation in the gills; *d*, the dorsal artery; *e*, the systemic capillaries; *b*, the veins.

is here conveyed to all parts of the system; hence, probably, the far greater muscular energy of fishes may be explained.

We can only allude very briefly to the C. in the invertebrate animals.

In the mollusca, we find hearts of varying complexity,* usually with one or two auricles, and one ventricle; but in all cases, the auricle or auricles receive aëriated blood from the respiratory organs, and pass it to the strongly muscular ventricle, which propels it over the body. The heart is therefore a *systemic* heart. There seem to be no capillaries in these animals, excepting in the respiratory organs; the blood leaving the open ends of the arteries, passes into the interstices (*lacunæ*) of the parenchyma of the body, from whence it is taken up by the open mouths of the venus radicles; hence this kind of C. is called lacunary.

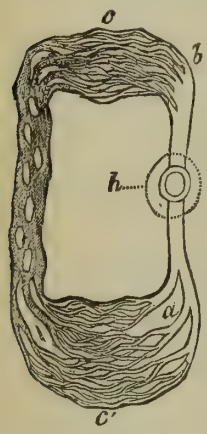


Fig. 8.—Circulation in the Crustaceans:

h, the heart and pericardium; *a*, the arteries; *c'*, the systemic capillaries; *c*, the branchial or respiratory capillaries; *b*, the branchio-cardiac vessels.

In the crustacea, the form of the heart and the number of its orifices presents several modifications; the following is, however, the *typical* mode of C. of these animals. The heart, which is here a single cavity, is sometimes round, and sometimes long and tubular, and is the point of departure of the arterial system, which consists of trunks emerging in various directions. The blood returning from the arteries does not enter into distinct veins, but into irregular excavations in the tissues which are termed venous sinuses; from these venous sinuses it passes to the gills, from whence it is returned to the heart in an aërated state by the branchio-cardiac canals; so that here, as in the mollusca, the heart is systemic.

It is unnecessary for us to notice the comparatively imperfect C. in insects and animals lower in the scale than those we have already considered.

We now approach the last part of the subject—the physiology of the circulation.

We shall consider—1. The flow of blood through the heart; 2. The phenomena of the arterial C.; 3. The phenomena of the capillary C.; and 4. The phenomena of the venous circulation.

1. Direct observation and experiment clearly show, that the muscular contraction of the heart is the principal source of the power by which the blood is propelled in its course. This action of the heart may be observed by opening the chest of a living animal, or, better still, of an animal deprived of sensation and motion by poison, and in which artificial respiration is kept up. It is then seen to consist of two motions—first, a contraction or systole of the auricles, and second, a corresponding contraction of the ventricles. The contraction of the auricle immediately precedes that of the ventricle, and the systole of each cavity is directly followed by its diastole or relaxation; there is then a brief period of repose, the heart exhibiting little or no motion. At the moment of the systole of the ventricles, the apex of the heart is tilted forwards, causing a pulsation against the ribs that can be felt externally.

The force exerted by the left ventricle has been so very variously estimated, that we must regard this point as still unsettled. The number of contractions of the heart of an adult in a minute is about 70 or 75; it is, however, liable to great variations, which will be noticed in the article PULSE. The sounds accompanying the heart's action, which may be readily heard by applying the ear either directly or through the medium of the stethoscope to the cardiac region, are discussed in the article HEART, SOUNDS OF THE.

2. The arteries exercise a vast influence on the movement of the blood through them, in virtue of two properties which they possess—viz., elasticity and contractility. These two endowments are not equally and uniformly possessed by the whole arterial system—elasticity (the property by which the interrupted or discontinuous force of the heart is made equable and continuous) existing chiefly in the larger trunks; while contractility—which is more required for regulating the flow of blood to particular parts—is most marked in the smaller vessels. The rate of movement of the blood through the arteries in man can only be roughly calculated from experiments on animals. Volkmann finds that in the carotids of mammals, the average velocity of the blood-stream is about 12 inches per second; he likewise ascertained that the velocity is greater in arteries lying near than in those at a distance from the heart, that it is not increased by an augmentation in the number of pulsations, but that it is greatly augmented by an increase in the volume of the blood, and lessened by its diminution.

3. It has long been a debated point, whether the capillary C. is influenced by any other agency than the contractility of the heart and arteries. Harvey believed that the action of the heart alone was sufficient to send the blood through the whole circuit, and in recent times his view has been supported by J. Müller and other eminent physiologists. On the other hand Professor Draper of New York holds the opposite extreme view, asserting that 'it is now on all hands conceded that the heart discharges a very subsidiary duty.' We believe that Bichat was the first to maintain the opinion, that the capillaries are organs of propulsion, and are alone concerned in returning the blood to the heart through the veins. Although Bichat attributed too great power to the capillaries, there cannot be a doubt that the movement of the blood through these vessels is not solely due to the heart; in short, that there is what may be termed a capillary power. The following are a few of the facts proving this to be the case: 1. On watching the C. in the web of a frog's foot, it is at first seen to go on with perfect regularity. After a time, however, various changes are observed, which cannot be attributed to the heart, such as alterations in the size of some capillaries, and in the velocities of the currents passing through them, and occasionally even a reversal in the direction of some of the lesser currents. 2. In cold-blooded animals, the movement of the blood in the capillaries continues long after the excision of the heart. 3. Actual processes of secretion not unfrequently continue after death; sweat, for instance, may be exuded from the skin, and other secretions may be formed by their respective glands, which could not take place if the capillary C. had stopped. 4. Cases occasionally occur in which a fœtus without a heart is produced, and yet in these cases most of the organs are well developed.

What the nature of this capillary power is, is not clearly known. Professor Draper and others have endeavored to explain it on the principles of capillary attraction. There is no satisfactory evidence that the capillaries possess true contractility, for, although their diameter is subject to great variations, this may be due simply to the elasticity of their walls. If we could only establish their contractility, the difficulty would be removed.

The rate of movement of the blood through the capillaries is about 1·2 inch per minute in the systematic capillaries of the frog. In the warm-blooded animals it is probably more rapid. From Volkmann's observations, the rate in the dog is about 1·8 inch per minute.

4. It is usually estimated that the venous system contains from two to three times as much blood as the arterial. The latter is probably the more correct ratio, and, as the rapidity of blood in the two systems seems to bear an inverse ratio to their respective capacities, the venous blood will move with only one-third of the velocity of arterial blood. We have already noticed the occurrence of valves in the venous circulation.

Their object is evidently to prevent the reflux of blood; hence they are of important use in the maintenance of this part of the circulation. They are most abundant where there is much muscular movement. The movement of blood through the veins is

* In some of the ascidians and in salpa, the following remarkable phenomenon occurs: The heart, which is extremely simple, and of course without valves, at definite intervals (of about twenty minutes) reverses the direction of its current. Before the heart changes the direction of its contractions, it remains still for a short time, and the blood-currents in the body are thus slackened in their course before they receive an impulse in the opposite direction. The vessels entering and leaving the heart thus act alternately as an aorta and as a vena cava.

undoubtedly mainly due to the *vis a tergo* resulting from the contraction of the heart and arteries. This is much assisted in many parts of the system by the constantly recurring pressure of the adjacent muscles upon their trunks. The movement of inspiration, by causing a comparative vacuum in the chest, has been supposed by some physiologists to assist the flow of venous blood to the heart, and a similar influence has been ascribed to an assumed suction power of the heart. The contractility of the veins in man is to slight too produce any marked effect on the propulsion of the current. From the investigations of Professor Wharton Jones 'on the rythmical contractility of the veins of the bat's wing,' we may infer that, in many of the lower animals, it is probably more efficient power.. In connection with this article, consult ARTERY, CAPILLARIES, PULSE, and VEIN.

CIRCULA'TION OF SAP in plants—its ascent from the root to the leaves and bark, and its partial descent after the elaboration which it undergoes in these organs. The sap drawn from the ground by the roots (see OSMOSE) ascends in exogenous plants, which have hitherto been principally the subjects of examination, through the more recent parts of the woody tissue, and especially through the alburnum. The descent of the sap takes place chiefly through the liber or inner bark. It appears certain also that, on its return to the root, only a small portion is excreted, and that the greater part ascends again, readapted to the use of the plant by the excretion which has taken place. Much of the sap which is taken up by the roots is, however, thrown off in perspiration by the bark and leaves. The sap is laterally diffused through the cellular tissue of plants, and very interesting observations have been made by Schultz and others on the peculiar movements of the elaborated or descending sap (*latex*). Many physiologists dislike the term *circulation* applied to sap, as suggesting a closer analogy than really exists to the circulation of the blood in animals. See PLANT, LEAVES, and SAP.

CIRCUMCI'SION (Lat. a cutting around), the cutting off the foreskin (*præputium*), a rite widely diffused among ancient and modern nations. The prevalent idea among Christians was (and perhaps still is), that the rite originated with Abraham, who (as we read in Gen. xvii. 9—14) was commanded by God to circumcise himself and his whole household, and to transmit the custom to his descendants. But, as Jahn (*Biblische Archäologie*, Vienna, 1797—1800) acutely observes, this is inconsistent with the very terms in which the command is expressed, these terms pre-supposing a knowledge of the rite on the part of Abraham. That it existed previously to the time of the patriarch, however, seems to be indisputable. The researches of modern scholars prove that the Egyptians, for instance, were in the habit of circumcising long before Abraham was born. Rawlinson, in a note to his version of Herodotus, remarks that 'circumcision was already common in Egypt at least as early as the fourth dynasty of kings, and probably earlier, long before the birth of Abraham, or 1996 B.C.' The testimony borne by the monuments of Upper and Lower Egypt (consult Sir Gardiner Wilkinson's *Manners and Customs of the Ancient Egyptians*) is to the same effect, and apparently conclusive. Another argument which has been adduced against its Abrahamic origin, is the fact of its being so extensively practised. At the present day, it may be traced almost in an unbroken line from China to the Cape of Good Hope. It is also a usage in many of the South Sea Islands, and the followers of Columbus were much astonished to find it existing in the West Indies, and in Mexico. Recently, too, it has been ascertained to have been long practised by several tribes in South America. Such being the case, many scholars hold it impossible to suppose that the origin of so universal a rite can be traced to a single Semitic nation, more especially when that nation was peculiarly averse to intercourse with other nations, and in other respects exercised no overt influence on their customs. Whether, as Jahn supposes, Abraham obtained his knowledge of C. from the Egyptians, we cannot determine. It would appear, however, that the Canaanites among whom he came to reside were not circumcised, for we read of the Prince of Shechem and his people undergoing the operation, that the former might obtain the hand of Dinah, daughter of Jacob; and the institution of it in the family of Abraham was probably sufficient to mark off that family from the surrounding tribes. In the case of Abraham and his descendants, the rite acquired a religious significance. It was ordained to be the token or seal of the everlasting covenant between God and his people. Such is the view of St. Paul, who looked upon the C. of the foreskin as symbolical of the C. of the heart; and that along with all that was merely Judaistic and material, it was abrogated by the more spiritual teaching of Christ.

The time for C. among the Jews is the 8th day after the birth of the child; among the Arabians, the 13th year, in remembrance, it is said, of their ancestor Ishmael; among the Kaffirs, at a still later period, marking, in fact, the transition from youth to manhood; and, indeed, each nation seems to have selected the time most agreeable to its own notions of what is prudent or becoming. The Abyssinians are the only people professing Christianity among whom C. is practised. The C. of females, or what is equivalent to such, is not known among the various African nations. For fuller information in regard to C., consult Sonnini's *Travels in Egypt*, Sir John Marsham's *Chronicus Canon Ægyptiacus*, and Winer's *Biblisches Realwörterbuch*.

CIRCU'MFERENCE, or PERI'PHERY, the curve which encloses a plane figure: thus, we speak of the circumference of a circle, or of an ellipse; but in figures bounded by straight lines, as the triangle, square, and polygon, the term *perimeter* is employed to designate the whole bounding lines taken together.

CIRCUMNAVIGA'TION, the term usually applied to the act of sailing round the world, its literal meaning being simply a sailing round. The C. of the globe was at one time considered a great feat, but it is now regarded as one of the most commonplace affairs in a sailor's experience. The first to circumnavigate the globe was Magalhaens (q. v.), or Magellan, a Portuguese, in 1519; eighteen years afterwards, it was accomplished by a Spaniard; and in 1577 by the illustrious Englishman, Drake. The most celebrated of circumnavigators, however, was Captain James Cook, who between 1768 and 1779, made three voyages round the world.

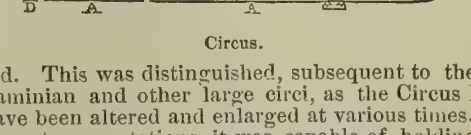
CIRCUMSTA'NTIAL E'VIDENCE. See EVIDENCE.

CIRCUMVALLA'TION, in Fortification, is a series of works surrounding a place when under siege; not to serve offensively against the place, but to defend the siege-army from an attack from without. It usually consists of a chain of redoubts, either isolated or connected by a line of parapet. Such lines were much used in the sieges of the ancient and middle ages; but in modern times they are not so necessary, because the use of artillery lessens the duration of a siege, and also because the besiegers have generally a corps of observation in the open field, ready to repel any force of the enemy about to succor the besieged. A remarkable example of C. was that at Sebastopol, where, while a circuit of batteries fired upon the town, an outer circuit of redoubts and lines kept off the Russians who were in the open field; but the necessity for this arose out of the smallness of the besieging force compared with that of the besieged. The narrow escape of the allies from utter overthrow at Inkerman, showed the necessity for this external defence. For the relation which C. bears to COUNTERVALLATION, see that article.

CIRCUMVE'NTION. See FRAUD.

CI'RCUS. See HARRIER.

CIRCUS, THE, of ancient Rome, was a large oblong building, adapted for chariot-races and horse-races, and used also for the exhibition of athletic exercises, mock-contests, and conflicts of wild beasts. The Circensian Games were alleged by tradition to have originated in the time of Romulus, when they were dedicated to Consus or Neptune, and called *Consualia*. After the first war undertaken by Tarquinius Priscus, in which he captured the Latin city of Apiolæ, his victory was celebrated by games. A space was marked out for a C., and the senators and knights were allowed to erect scaffoldings round it for themselves. The games continued to be held annually, and a permanent edifice was soon afterwards



Circus.

constructed. This was distinguished, subsequent to the erection of the Flaminian and other large circi, as the Circus Maximus. It must have been altered and enlarged at various times. According to different computations, it was capable of holding 150,000, 260,000, or 385,000 persons. Its extent also has been variously estimated. In the time of Julius Cæsar, it was three stadia or 1875 feet long, and one stadium or 625 feet wide, while the depth of the buildings surrounding the open space was half a stadium, or about 312 feet. All the circi in Rome, of which there were a considerable number, are now completely destroyed; but a small C. on the Appian Way, about two miles from Rome, known as the Circus of Caracalla, is still in a state of preservation. Its construction is believed to have differed very little from that of similar buildings. The annexed wood-cut will give some idea of the arrangement and relative dimensions of its parts.

Along the sides and at the curved end (round the lines AA), were ascending ranges of stone seats for the spectators. At the other end, BB, were the *carceres*, or stalls, which were covered and furnished with gates, and in which the horses and chariots remained until, on a given signal, the gates were simultaneously flung open, In the center is the *spina* C, a long and broad wall round which the charioteers drove, terminating at both ends at the *metæ*, or goals—three cones of carved wood which marked the turnings of

the course. At each extremity of the *carceres* is a stone tower, DD. From its gates and castellated appearance, the whole of this side received the name of *oppidum*, a town. Over the *carceres* were seats for the president of the games, the consuls, or other distinguished persons. There were four entrances, of which the most important were the *Porta Pompæ*, F, and the *Porta Triumphalis*, G. The games were inaugurated by a procession from the Capitol, in which those bearing the images of the gods went first, and were followed by the performers in the games, the consuls, and others. This procession entered through the *Porta Pompæ*, while the *Porta Triumphalis* was that by which the victors left the circus.

The *spina*, an object conspicuous from its situation, was in general highly decorated by such objects as statues, small temples, altars, &c. In the *spina* of the Circus Maximus, two very large obelisks were erected by Augustus and Constantius. This C. was also distinguished by six towers, and by a canal or *euripus*, formed by Julius Cæsar, to protect the spectators more effectually during the conflicts of wild beasts.

The C. was especially adapted for races, an amusement of which the Romans were passionately fond. The length of a race was seven circuits round the *spina*, and 25 races were run in each day. The number of chariots was usually four. The charioteers adopted different colors, representing the four seasons. Bets and party-spirit ran high, and the victor received a substantial pecuniary reward at the end of the race. The athletic exercises, such as boxing and wrestling, which sometimes terminated fatally, were probably exhibited in the large open space between the *carceres* and the *spina*. The *Ludus Trojæ* was a mock-conflict between young men on horseback. A regular battle was sometimes represented (*Pugna Equestris et Pedestris*). By the formation of canals and the introduction of vessels, a *Naumachia*, or sea-fight, was occasionally exhibited; but, under the empire, this species of exhibition,as well as the *Venatio*, was gradually transferred to the Amphitheater (q. v.). In providing for the *Venatio*, or hunting of wild beasts, vast sums of money were expended. Animals were procured from every available part of the Roman empire, including Africa and Asia. The exhibition not only afforded an opportunity for the display of private munificence or ostentation, but attained the importance of a political engine, which none who aspired to popularity ventured to overlook. When Pompey opened his new theater, he is said to have given public exhibitions in the C. for five days, during which 500 lions and 20 elephants were destroyed.

In modern times, the C. stands but as the shadow of a name. It is about the same size as the modern theater, and is employed principally for the exhibition of feats of horsemanship and for acrobatic displays.

CI'RENCESTER, or CI'CESTER, a parliamentary borough in Gloucestershire, on the Churn, an upper branch of the Thames, and on the Thames and Severn Canal, 17 miles south-east of Gloucester. It has four chief streets, and the appearance of opulence, though it has but little trade. An agricultural college was founded here in 1846 (see AGRICULTURAL EDUCATION). Pop. (1881) 8431. C. returns a member to parliament. C. was the Roman *Corinium-Ceaster*, at the junction of five Roman roads, and has traces of ancient walls two miles in circuit. Roman relics have been found here, as coins, urns, baths. Canute held a council here in 1020 to expel Ethelwolf. Rupert stormed C. in 1642 and 1643, and it was afterwards given up to Essex.

CIRRHO'PODA, or CIRRI'PEDA (Gr. or Lat. cirrhus-footed), the animals which formed the genus *Lepas* of Linnæus, ranked by him among the multivalve *Testacea*, and by subsequent naturalists very generally regarded as an order of mollusks, until, in consequence of recent discoveries, a place has been assigned them among the *Articulata*, either as a distinct class of that great division of the Animal Kingdom, or as a sub-class of *Crustacea*. Barnacles (q. v.) and *Balani* or Acorn-shells (see BALANUS) are the most familiar examples of C.; but many species are now known, all exhibiting much general similarity to these, all marine, and all in their mature state permanently attached to objects of various kinds, as rocks, sea-weeds, shells, &c. Some are found imbedded in corals, others in the thick skin of whales, some in the flesh of sharks. They are distributed over the whole world; the species however, are not numerous anywhere; those species which adhere to fixed bodies are in general much more limited in their geographic range than those which attach themselves to floating objects or to vertebrate animals. They are generally divided into two orders, *Pedunculated* and *Sessile*, those of the former order being supported on a flexible stalk, which is wanting in the latter. Barnacles are pedunculated C., and *Balani* are sessile.

The resemblance of C. to mollusks consists chiefly in their external appearance. In the more important parts of their organization, however, the C. resemble crustaceans rather than mollusks. The gills, when these exist, occupy the same relative position as in crustaceans; but the aëration of the blood is supposed to be also effected in the *cirrhi*, as the limbs or organs have been generally called, of which there are six pair on each side, and which may be described as long tapering arms, each composed of many joints and *ciliated* or fringed with stiff hairs. The *cirrhi* nearest the mouth are shortest, and all of them together form a sort of net for the capture of minute animals, being incessantly thrown out by the cirrhopod from a lateral opening of its sac, and drawn in again in such a manner as to convey any prey which they may have caught to the mouth. Almost all the C. are hermaphrodite; but in a few genera the sexes are distinct, and these exhibit an anomaly of a very remarkable kind, the males being not only very small in comparison with the females, and more short-lived, but, in their mature state, *parasitic* on the females, or attached to them as they are to other objects; whilst in some the still more remarkable anomaly appears of what have been called *complemental* males, attached in this way to hermaphrodites. The eggs of C. are hatched before being finally set free from the body of the parent.

The young possess the power of locomotion, swimming freely in the water, and are furnished with eyes, which disappear after they have permanently fixed themselves, by instinctive choice, in situations adapted to their kind. They have also shells, quite different from those of their mature state. The shelly coverings of the C. are all formed according to a certain type, but with many variations, and they differ extremely in the number of pieces or valves of which they consist, some, as the common barnacles, having only five valves, and others having additional small pieces arranged in whorls, and exceeding 100 in number. In most of the C., the shelly covering is very complete; in some, it is almost rudimentary.

The most important discoveries concerning the structure and metamorphoses of the C., determining their place in the animal kingdom, were made by Mr. J. V. Thompson. For the most extended examination of species, and for an admirable monograph, published by the Ray Society, the scientific world is indebted to Mr. Darwin.

CI'RRHUS, CI'RRUS (Lat. a curl, or lock of hair), or TE'NDRIL, in Botany, a leaf altered into a slender spiral, which, by twisting around such objects as it comes in contact with, attaches the plant to them, and enables it to climb, when otherwise, through the weakness of its stem, it must have been prostrate. There are many varieties of C., as it is merely an elongation of the midrib of a pinnate leaf—and altered terminal leaflet, or becomes compound by the alteration of several leaflets, or occupies altogether the place of a simple or compound leaf, and is accordingly either simple or branching. Examples of different kinds may be seen in the pea, vetch, vine, passion-flower, &c.—The term C. is also employed in zoology, to designate any curled filament, and has been applied, but not quite aptly, to the curiously modified feet of the *Cirrhopoda*.

CI'RRUS. See CLOUDS.

CIS, a Latin preposition meaning, 'on this side,' which is often prefixed to names of rivers and mountains to form adjectives; Cisalpine, Cispadane, 'on this side of the Alps,' 'of the Po.' As most of these words are of Roman origin, Rome is considered the point of departure.

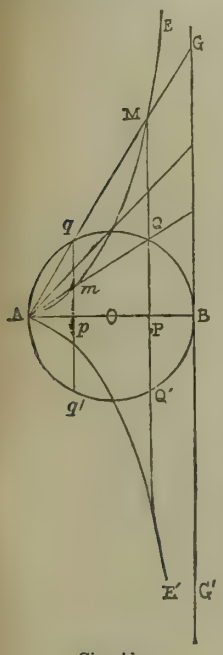
CISA'LPINE REPU'BLIC. After the battle of Lodi, in May 1796, General Bonaparte proceeded to organize two states—one on the south of the Po, the Cispadane Republic, and one on the north, the Transpadane. These two, however, were in 1797 united into one under the title of the C. R., which embraced Lombardy, Mantua, Bergamo, Brescia, Cremona, Verona, and Rovigo, the duchy of Modena, the principality of Massa and Carrara, and the three legations of Bologna, Ferrara, and the Romagna. The republic had a territory of more than 16,000 square miles, and a population of 3½ millions. Milan was the seat of the government or Directory, and the place of meeting of the Legislative Assembly, which was composed of a senate of 80 members, and a great council of 160. The army consisted of 20,000 French troops, paid by the republic.

A more intimate connection was formed in 1798 between the new republic and France, by an alliance offensive and defensive, and a treaty of commerce. The republic was dissolved for a time in 1799 by the victories of the Russians and Austrians, but was restored by Bonaparte, after the victory of Marengo, with some modifications of constitution and increase of territory. In 1802 it took the name of the Italian Republic, and chose Bonaparte for its president. A deputation from the republic in 1805 conferred on the Emperor Napoleon the title of King of Italy; after which it formed the kingdom of Italy till 1814.

CISSA'MPELOS (Gr. ivy-vine), a genus of plants of the natural order *Nenispermaceæ*, of which some of the species possess valuable medicinal properties; particularly *C. Pareira*, a native of the West Indies and warm parts of America, the root of which is known by the names of *Pareira Brava* and *Butua Root*. The plant is called Velvet Leaf in the West Indies, from the peculiar and beautiful appearance of the leaves. It is a climbing shrub, with roundish-triangular leaves, racemes of small yellow

flowers, and small hairy scarlet berries. The root appears in commerce in pieces of two or three feet long, varying from the thickness of the finger to that of the arm, tough, but so porous that air can be blown from end to end of it. It has a sweetish, afterwards nauseous taste; is used as a tonic and diuretic, appears to exercise a specific influence over the mucous membrane of the urinary passages, and is administered with advantage in chronic inflammation of the bladder. It was formerly supposed to possess great lithontriptic powers, which it was even hoped would put an end to all necessity for lithotomy. It is supposed that the roots of other plants of the same order are often fraudulently mingled with it; but those of several species of C., both American and East Indian, appear to possess pretty nearly the same properties. An alkaloid, called *Cissampelin*, exists in this root, and gives it its properties.

CI'SSOID OF DI'OCLES, a curve first employed by Diocles the mathematician, whose name it bears, for the purpose of solving two celebrated problems in geometry—viz., the trisection of a plane angle, and the construction of two geometrical means between two given straight lines. Let AB (see fig.) be the diameter of any given circle, and PQ, *pq*, any two ordinates at equal distances from the center O. Then, if we draw a straight line through A and either of the points *q*, Q, and produce it till it cuts the other ordinate, produced if necessary, the point of intersection, M, or *m*, will, in its different positions, trace out a curve called a *cissoid*. The circle AB is called the generating circle, and the diameter AB is called the axis of the curve. It is clear from the figure that the C. must consist of two infinite symmetrical branches, AE and AE', having a cusp point at A. The straight line GB tangent at B to the generating circle, is a common asymptote to these branches. Taking A as origin, and AB = a and a line at right angles to it, through A, as axes of co-ordinates, the equation to the C. is $y^2 = \frac{x^3}{(a-x)}$. The curve may be constructed mechanically. The area of the space included between the two branches and their asymptote, is equal to three times the area of the generating circle. If, instead of a circle, we employed any other curve as the generating curve, the curve generated in the same way as the C. of D., is called *cissoidal*. The word cissoid comes from the Greek *cissos*, ivy, and *eidos*, form.



Cissoid.

CI'SSUS. See VITACEÆ.

CISTE'RCIANS, a religious order, taking its name from the parent monastery of Citeaux (Cistercium), near Dijon, which was founded in 1098 by the Benedictine abbot, Robert of Molême. Through the influence chiefly of St. Bernard of Clairvaux, who became a monk of Citeaux in 1113, the order, within little more than a century after its foundation, was in possession of more than 1800 abbeys in France, Germany, England, Ireland, Denmark, Norway, and Sweden. The C. were distinguished from the order of Clugny by their severer rule and stricter poverty, avoiding everything like splendor in their churches, even gold and silver crosses; by being submissive to the jurisdiction of the bishops, at least till after the death of St. Bernard; by not meddling with the cure of souls; by wearing a white robe with a black scapulary; and by their peculiar form of government, which was introduced by Innocent III., in 1215, into all the monastic orders.

In France, the members of this order called themselves Bernardines, in honor of St. Bernard. Among the fraternities emanating from the C., the most remarkable were the Barefooted monks or Feuillans, and the nuns of Port Royal in France, the Recollets or reformed Cistercian nuns in Spain, and the Trappists. The number of Cistercian abbeys in England, in the reign of Henry VIII., was 75, besides 26 Cistercian nunneries. In Scotland, there were 11 abbeys and 7 nunneries. Among the English abbeys were Woburn, Tintern, Furness, Fountains, Kirkstall, and Rievaux; among the Scottish, Melrose, Dundrennan, Kinloss, Glenluce, Culross, Deer, Balmerino, and Sweetheart or New Abbey. The chief French abbeys, *les quatre premières filles de Citeaux*, as they were called, were La Ferté, Pontigny, Clairvaux, and Morimond. Riches and indolence brought this powerful order, as well as others, into decay. Even before the Reformation, many of their convents had ceased to exist. The French Revolution reduced the C. to a few convents in Spain, Poland, Austria, and Saxony.

CI'STERN, a tank for holding water. In places where the supply of water is intermittent, or where rain-water is used, every house requires a C. or water-butt. Cisterns are much used for the supply of steam-engine boilers at railway-stations. They are variously constructed—many of cast or wrought iron, of deal lined with lead or zinc, or of impervious pavement or slate slabs, in which last two cases the sides and bottom are grooved, and cemented together with white-lead putty, or some other cohesive substance to prevent leakage; and the sides, if the dimensions be at all large, are frequently bound together by means of wrought-iron rods; but very large cisterns are generally made cylindrical, so that the pressure acting at all points equally from the center, the strain comes longitudinally on the outside, and tie-rods can be dispensed with, which is an advantage, as the holes for the tie-rods are apt to be a cause of leakage. See WATER SUPPLY.

Helianthemum Vulgare.

CI'STUS (Gr.), or RO'CK-ROSE, a genus of exogenous plants, which gives its name to the natural order *Cistaceæ;* an order allied to *Cruciferæ* and *Capparideæ*, and containing about 200 known species of shrubs and herbaceous plants, chiefly natives of the south of Europe and north of Africa. The flowers have generally five petals, very delicate; the stamens are numerous, the style simple, the fruit a capsule. Many species of this order are more or less resinous; and from the twigs of some species of *Cistus*, natives of the south of Europe and the Levant, particularly *C. Creticus*, *C. Cyprius*, and *C. ladaniferus*, the resinous substance called *Ladanum* is obtained, which is used as a stimulant, chiefly in plasters, but has become obsolete in British medical practice. Many species of *Cistus* are much cultivated for the beauty of their flowers, which are red, white, lilac, yellow, or frequently of two colors, and are common in gardens and green-houses. Most of the larger kinds require in Britain some protection in winter. The only plant of the order which extends to Scotland is *Helianthemum vulgare*, the yellow flowers of which are a frequent ornament of dry hill-slopes.

CI'TADEL (from the Italian *cittadillo*, 'a little city') is a fort of four or five bastions, in or near a town. A C. serves two purposes: it enables the garrison of a town to keep the inhabitants in subjection; and, in case of a siege, it forms a place of retreat for the defenders, and enables them to hold out after the rest of the town has been captured. A C. must fully command the fortifications of the city, and must have a large space round it clear of buildings.

CITA'TION, the act of calling a party into court to answer an action, to give evidence, or to perform some other judicial act. Being derived from the civil law, the term C. is known in England chiefly or exclusively in the ecclesiastical courts. But it is in frequent use in the legal systems both of France and Scotland. In Scotland, a C. is done in the Court of Session by an officer of court, or by a Messenger-at-arms (q. v.), under authority either of a summons passing the Signet (q. v.), or under a warrant by the court. In inferior courts, no summons, complaint, or decree is now validly served by affixing it to the door of the house, except where the defender has left, and his address is unknown; and no witness is necessary to the service except in poinding, sequestrating, or charging. For the Citation Amendment Acts of 1882, see DEBTS (RECOVERY OF).

Where the party, though amendable to the court, is not resident in Scotland, he must be cited edictally, by a copy of the C. being left at the office of the keeper of edictal citations (see EDICTAL CITATION), by whom lists of such citations are printed and published. Formerly, this C. was effected by a proclamation in Edinburgh and at Leith.

In criminal cases the party cannot appear voluntarily in court: he must be cited, and can plead any omission in form, which cannot be obviated even by consent. This form of C. is regulated by 9 Geo. IV. c. 29, commonly called Sir William Rae's Act. A full and correct copy of the libel, or charge against him, must be served on the panel, or accused, with a list of witnesses, and of the assize, or jury. A notice, intimating the day of compearance, must be marked on the copy of the libel, and subscribed by the officer and a witness. This C. must proceed on a warrant issuing from the court before which the accused is to be tried. It may be executed either by a Macer (q. v.), a Messenger-at-arms (q. v.),

or a Sheriff-officer (q. v.) of the county within which the C. is made (11 and 12 Vict. c. 79, s. 6). If the panel can be found personally, the C. must be delivered to him, but if not, it must be left at his dwelling-place with his wife or servants; or if access cannot be obtained, the officer must affix a copy to the principal door of the house (1555, c. 33).

CITATION FOR INTERRUPTING PRESCRIPTION.—Either the positive or negative prescription may be interrupted by citation in an action. See PRESCRIPTION.

CITI'ZEN (Fr. *citoyen*, Lat. *civis*). Aristotle defines a C. to be one to whom belongs the right of taking part both in the deliberative, or legislative, and in the judicial proceeding of the community of which he is a member (*Politics*, iii. 1). A C., therefore, can exist only in a free state. Between a C. and a subject there is this distinction, that whilst the latter merely is governed the former also governs; and thus, though every C. is a subject, many subjects are not citizens. In this, which was also the sense attached to the term by the Romans, when used in its highest meaning—that, viz., of the *civis optimo jure*—it has passed to the modern world, gradually coming to be understood everywhere. In the heroic ages of Greece, the idea of citizenship was but imperfectly understood. The members of the council and assembly were mere advisers of the kings, who, as god-descended, were regarded as monarchs in the strict sense. But something of the C. character even then attached to the immediate followers of the chief, when regarded in opposition to slaves and strangers; and it was from them that the dominant class sprang, which everywhere overthrew the monarchies, and established the small self-governing states—the democracies, or rather aristocracies, of Greece. At first, the rights of citizenship in Athens and other Greek communities were readily attained by those who were not born to them; but at a later period, when the organization of Greek civic life had reached a high degree of perfection, admission to the roll of citizens was procured with great difficulty. In Sparta, indeed, according to Herodotus, so sparing were they of their national privileges, that there were only two instances of their conferring them in their full measure on strangers. The Periœci, or strangers by origin, who shared the Spartan territory, though not on equal terms with the Spartans, were probably, as regarded political rights, pretty much in the same position with the Roman plebeians. In Rome, there were perfect and less perfect citizens, whose respective positions are thus described by Savigny in his *History of the Roman Law in the Middle Ages:* 'In the free republic, there were two classes of Roman citizens—one that had, and another that had not, a share in the sovereign power. That which peculiarly distinguished the higher class, was the right to vote in a tribe, and the capacity of enjoying magistracy.' All the private rights of citizenship (the *jus connubii* and *jus commercii*) belonging to the citizens of the lower class, but the public rights of voting in a tribe, and of enjoying the honors of the magistracy (*suffragium et honors*), were denied them. Under these two classes, again, there were two others—the Latini and the Peregrini,

Roman citizenship was acquired most commonly by birth, but for this it was requisite that both father and mother should be citizens. If a C. married a Latina, or a Peregrina, even believing her to be a C., the children begotten of the marriage followed the status of the mother. But latterly, it was permitted, by a decree of the senate, to the parents to prove their mistake, and thus to raise both the mother and her children to the rank of citizens. In earlier times, the citizenship could be conferred on a stranger only by means of a *lex*—i. e., by a vote of the people assembled either in one or other of the Comitia (q. v.). It was conferred at a single sweep on the whole of the Latini and Socii. In the case of some of the provinces, both in Italy and Gaul, the *Latinitas* was given as a step to the *Civitas*, the former being converted into the latter in the case of any one who had exercised a magistracy in his own state or city.

When the imperial power was established, the public rights which formed the chief characteristic of the full Roman citizenship, became little more than empty names; and the only value which thenceforth attached to it consisted in the private rights which it conferred. Such as it was, the constitution of Caracalla extended it to the whole Roman world, the distinctions between Cives and Peregrini and Latini being preserved only in the case of certain individuals, such as freedmen and their children. Even this distinction was abolished by the legislation of Justinian, the only divisions of persons henceforth being into subjects and slaves. A fuller account of this interesting subject will be found in Smith's *Dictionary of Greek and Roman Antiquities.*

In its modern use, the term C. is applied in Great Britain to a dweller in a town, and this either in the general sense of an inhabitant, or in the narrower and stricter sense of one who enjoys its privileges and franchises. In France, it denotes any one who is born in the country, or naturalized in it; and in America, it is used in the same sense, but so long as slavery was an institution there, slaves were not included in the title. In this latter acceptation, it is equivalent to the term *subject* in England.

CI'TRIC ACID ($C_{12}H_5O_{14}$, or $C_{12}H_5O_{11},3HO$) is a powerful tribasic acid, which crystallizes in large transparent colorless prisms. These crystals are readily soluble in water and alcohol, but are insoluble in ether. The crystals contain two atoms of water of crystallization (not expressed in the above formulæ), which are expelled at a temperature of 212°. Citric acid has a strongly acid taste and reaction and displaces carbonic acid from the carbonates. Its watery solution quickly becomes mouldy on exposure to the air, and the acid is then found to be converted into acetic acid. When heated to about 350°, vapor of acetone and carbonic oxide are given off, and a residue of aconitic acid ($C_{12}H_6O_{12}$), an acid occurring in the leaves and roots of monkshood and other species of Aconite, is left; and when fused with potash, it assimilates the elements of water, and is decomposed into oxalic and acetic acids, as shown in the equation:

$$\overbrace{C_{12}H_5O_{14}}^{\text{Citric Acid.}}+2HO=\overbrace{C_4H_2O_4}^{\text{Oxalic Acid.}}+\overbrace{2C_4H_4O_4}^{\text{Acetic Acid.}}.$$

These reactions illustrate the changes which organic acids naturally undergo in the vegetable kingdom. It is to the presence of citric acid that a great many fruits owe their agreeable acidity. It occurs in a free state either alone or associated with malic and tartaric acids in oranges, lemons, cherries, currants, raspberries, gooseberries, strawberries, whortleberries, &c., and in several tubers and bulbs, as in the potato and onion. It also exists in combination with potash or lime in potatoes, onions, and artichokes.

This acid, which is almost always prepared from lemon or lime juice, is thus obtained. The juice, after undergoing incipient fermentation, is filtered, and neutralized with chalk; and the insoluble citrate of lime thus formed is decomposed with very dilute sulphuric acid. On the removal of the sulphate of lime that is thus formed by filtration, the solution of citric acid must be concentrated till a film begins to form, when the crystals readily separate on cooling. Citric acid has also been prepared from unripe gooseberries, whose juice is allowed to ferment; and after the removal of the alcohol by distillation, the acid is separated in the way already described. 100 lbs. of gooseberries yield 10 lbs. of spirit of spec. grav. 0·928, and 1 lb. of crystallized acid.

Citric acid is used largely in manufactures; calico-printers employ it for discharging the mordant from the cloth in patterns; and it is used in dyeing silk with safflower, and for heightening the tint of cochineal. The raw material from which the acid for these purposes is obtained 'is a black fluid like thin treacle, which comes from Sicily, and is obtained by inspissating the expressed juice of the lemon after the rind has been removed for the sake of the essential oil.'—Watt's *Dictionary of Chemistry*, vol. i. p. 995.

The most important of the numerous salts of citric acid are the citrates of lime, potash, ammonia, and iron. *Citrate of Lime* ($C_{12}H_5O_{11},3CaO+4Aq$) is formed in the preparation of citric acid, and is a fine white crystalline powder, more soluble in cold than in hot water. *Citrate of Potash* ($C_{12}H_5O_{11},3KO+2Aq$) is formed by neutralizing the acid with carbonate of potash, and crystallizes in clear deliquescent needles, insoluble in alcohol. *Citrate of Ammonia* ($C_{12}H_5O_{11},3NH_4O$) can only be obtained in solution. *Citrate of Iron* is prepared by dissolving freshly precipitated peroxide of iron in a warm solution of citric acid; a reddish-brown solution is formed, which, on evaporation, yields brilliant scales of a light-brown color. Excepting the first, all these salts ase employed in medicine—the citrates of potash and ammonia as diaphoretics and febrifuges (see AERATED WATERS), and the citrate of iron as a tonic. Lemon juice, in which citric acid is the most active ingredient, is a most valuable medicine in scurvy, active hæmorrhage, rheumatism, &c.; and when it cannot be obtained, citric acid is the best substitute. The general uses of citric acid in combination with an alkali have been already noticed.

CI'TRON (*Citrus medica;* see CITRUS), a tree cultivated in the south of Europe, and other warm, temperate, or sub-tropical countries for its fruit; a native of the forests of the north of India. By many botanists, it is regarded as a mere variety (or perhaps the original type) of the species which produces also the lemon, sweet lemon, lime and sweet lime; by others, these, or some of them, are regarded as distinct species. The C. has oblong toothed leaves; the flowers are externally of a violet color; the fruit is large, warted, and furrowed; the rind very thick and tender; the pulp sub-acid. The pulp is refrigerant; but the part chiefly valued is the rind which has a delicious odor and flavor; and is made into a very agreeable preserve. The juice is sometimes employed to make a syrup, or with sugar and water, for a beverage, and for flavoring liquors. The rind and juice may be said generally to be applicable to the same purposes as those of the lemon, but the juice is less acid. The CEDRATE is a variety of the C., from which chiefly the fragrant Oil of C., or OIL CEDRATE, used by perfumers, is procured. In Germany, the name Cedrate is extended to all kinds of C., and the name C. is usually given to the lemon. The varieties of C. are numerous. The fruit of the

largest kind is sometimes 9 inches long, and 20 lbs. in weight. The C. is frequently cultivated in Britain, and by the aid of artificial heat and the protection of glass is produced in great perfection.

Citron.

It is probable that the C. is meant in some passages of the Old Testament where the word apple is used in the English version.

CITRO'SMA, a genus of trees of the natural order *Monimiaceæ* of which the leaves abound in an oil resembling, if not identical with, oil of citron. They are natives of the tropical parts of South America.

CI'TRUS, a genus of plants of the natural order *Aurantiaceæ*, consisting of trees and shrubs, natives of India and other warm parts of Asia, but many of which are now commonly cultivated in all warm climates on account of their fruit. To this genus belong the ORANGE, CITRON, LEMON, LIME, BERGAMOT, SHADDOCK, POMPELMOOSE, FORBIDDEN FRUIT, &c. See these heads. It is distinguished by numerous stamens, irregularly united in bundles by their filaments, a pulpy fruit with a spongy rind, and smooth seeds. The leaves and the rind of the fruit abound in volatile oil. The flowers also contain volatile oil, and exhale a peculiar fragrance.

CITTADE'LLA, a town of Northern Italy, in the province of Padua, 14 miles north-east of Vicenza. It is situated on the Brentella, an affluent of the Brenta, is walled, and has woollen and paper manufactures. Pop. 7820.

CITTA' DI CASTE'LLO, a town of Central Italy, 25 miles north-west of Perugia. C. has a very pleasant situation on the left bank of the Tiber. Though a place of only some 5580 inhabitants, it is exceedingly rich in ecclesiastical structures of Gothic architecture, palatial residences, and works of art. Raphael painted many of his early works in C. di C.; and they were to be found in churches and private galleries here until the French invasion, when they were dispersed. Two small pictures of this great master still remain in Citta di Castello. Silk-twist is the chief manufacture of the town.

CITTA VE'CCHIA. See MALTA.

CI'TY (Fr. *cité*, Lat. *civitas*). In the sense in which it was first used in the Romanic languages of modern Europe, the word C., like its Latin orignal, was probably equivalent to State (q. v.) (*respublica*) rather than to town or borough (*urbs*, *municipium*); and whilst the latter signified a collection of hearths and households, governed by municipal laws internally, but subject externally to the laws of the country of which they form a part, the former was applied only to such towns as, with their surrounding district, were independent of any external authority whatever. Nearly the only cities in this sense now are the free towns of Germany, and such of the cantons of Switzerland as consists chiefly of a town and its surroundings, for example, Geneva. But as the ancient Gauls, though composing one nation were divided into tribes, living in different cantons, each with its town, to which the term *civitas* was applied, and as they also acknowledged a species of central authority, several cities sending delegates to a central one of greater extent and importance to discuss their common affairs, there is reason to believe that the term C. was applied *par excellence* to these central places of meeting, and that it thus, from a very early period, signified a *capital* or *metropolis*, though not independent.

In England, the term is said to be confined to towns or boroughs which are or have been the seats of bishops' sees, but this restriction rests on no sufficient ground. 'The cities of this kingdom are certain towns of principal note and importance, all of which either are or have been sees of bishops; yet there seems to be no necessary connection between a city and a see.'—Stephen's *Com.*, i. p. 124. In America, the term is applied to all towns which are incorporated and governed by a mayor and aldermen. See BOROUGH.

In the case of towns which have grown greatly beyond their original dimensions, it is not unusual to give the name of C. to the space which they originally occupied—thus, we speak of the C. of London, the C. of Paris, of Vienna, &c.

CITY OF REFUGE. The Jewish law (Numb. xxxv., Deut. iv., Josh. xx.) set apart six cities, three on each side of Jordan, as cities of refuge for the manslayer, in which he might find an asylum, and be safe from the avenger of blood. See BLOOD, AVENGER OF. These cities were Hebron, Shechem, and Kadesh-Naphtali on the west of Jordan; Bezer, Ramoth-Gilead, and Galan, on the east. The Jews were careful to keep the roads to the cities of refuge clear, and signs were set up to show the way. The manslayer was received and protected in the C. of R. until the death of the high-priest, after which the avenger of blood had no longer any claim against him. Thus this peculiar institution was connected with the typical institutions of the Jewish religion, and partook somewhat of their character, whilst it modified and restrained the avenging of blood. The C. of R. afforded no permanent protection to the murderer, who, if his crime could be proved against him, was to be taken from it that he might be put to death.

CIUDA'D (from the Lat. *civitas*) is the Spanish word for 'a city;' and is used as a prefix corresponding to the English affix *town*, as in

CIUDAD BOLIVAR. See ANGOSTURA.

CIUDAD REA'L, a town of Spain, capital of the province of the same name, situated on a plain between the rivers Guadiana and Jabalon, about 100 miles south of Madrid. It is surrounded with walls in parts ruinous, and has some handsome houses; but, on the whole, is a poor dull place. It has two or three fine churches—the nave of the parish church being one of the finest Gothic specimens of the kind in Spain—and several monasteries. There are manufactures to a small extent of coarse woollens, linen, and table cloths, and a trade in the agricultural produce of the district. Pop. (1877) 13,589.

CIUDAD RODRI'GO (Roderic's Town), a fortified town of Spain in the province of Salamanca, about 50 miles south-west of the city of that name.

It is situated on an elevation above the river Agueda, which washes the walls, and is here crossed by a fine bridge. It has a cathedral, the earliest portion of which dates from the 12th century. The town generally has a mean appearance, and is not over-cleanly. During the Peninsular War, C. R., though of little strength itself, was considered a place of the utmost importance, as a key of Spain on the west, and was consequently an object of ambition both to the French and the allies. In June 1810, the French under Massena invested the town, and after a gallant defence by the Spaniards, it was forced to surrender on the 10th July. The fact that Wellington was in the immediate vicinity, with an army of 30,000 men, and afforded no relief whatever, was a subject for outcry against the hero; but subsequent events at Torres Vedras showed that his policy was the right one. In January 1812, after a siege of 11 days, the place was assaulted, and after a bloody struggle, the British succeeded in capturing the town. The storming is one of the most brilliant achievements recorded in British military annals, and important as it was brilliant; 150 guns fell into the hands of the captors, besides vast stores of every kind, and the moral effect was even more than proportionately great. Pop. (1877) 6856.

CIUDADE'LA, a seaport town of the island of Minorca, situated on a plain on the west coast, in lat. 39° 58′ N., long 3° 52′ E. It is walled, and has a cathedral, also several convents. The inhabitants, numbering between 7000 and 8000, are engaged in agriculture and the manufacture of woollen fabrics. A considerable trade is carried on at the port.

CI'VET (*Viverra*), a genus of carnivorous quadrupeds, of the family *Viverridæ* (q. v.), having the body elongated, in some of the species as much as in the weasel tribe; the head is also long, and the muzzle sharp. The ears are short, broad, and rounded. The feet have five toes, and the claws are only semi-retractile. There is a more or less conspicuous erectile mane along the back, as in hyænas. Between the anus and the sexual organs, in both male and female, there is a large double pouch, in which is secreted a peculiar odoriferous fatty substance, called *Civet*, much used as a perfume. The use of this pouch and its secretion to the animal is not very well known. There are several species of C., of which

the best known is the common or African C. (*V. civetta*), a native of the north of Africa. The common C is from two to three feet long. The height is from ten inches to a foot; the hair long, brownish gray, with numerous black bands and spots. The C. preys on birds, small quadrupeds, and reptiles, and generally takes its prey by surprise.

It is very commonly kept in confinement for the sake of its perfume, which is removed from the bag about twice a week by means of a small spatula, and is obtained most abundantly from

Civet.

the male, and especially after he has been irritated. A dram is a large quantity to obtain at a time. The civets kept for this purpose are fed on raw flesh; the young partly on farinaceous food. The town of Enfras, in Abyssinia, is a principal seat of the C. trade, and great numbers are there kept.

CIVIDA'LÉ, a walled town of Venetia, Northern Italy, about 10 miles east-north-east of Udine, situated on the Natisone, which is here crossed by a bridge. C. is the ancient *Forum Julii*, and its collegiate church, a fine Gothic edifice, dates from the 8th century. In its archives are contained some valuable manuscripts. It has silk and cotton factories, and a population of some 4500.

CI'VIL DEATH. Death, in a legal point of view, is either natural or civil: the former being the cessation both of physical life and of the legal rights which attach to it; the latter, the cessation of the legal rights whilst the physical life remains. 'Civil death occurs where a man, by act of parliament or judgment of law is attainted of treason or felony; for immediately upon such attainder he loses (subject indeed to some exceptions) his civil rights and capacities, and becomes, as it were, *dead* in law. It also took place formerly where any man abjured the realm by the process of the common law; or entered into religion, that is, went into a monastery, and became there a monk professed; in which cases he was absolutely dead in law, and his next heir should have the estate. Even in the times of popery, the law of England took no cognizance of *profession* in any foreign country, because the fact could not be tried in our courts; and therefore, since the Reformation, this disability is held to be abolished; as also the disability of banishment, consequent upon abjuration, by stat. 21 Jac. I. c. 28.' Stephen's *Com.*, vol. i., pp. 142, 143.

CIVIL ESTA'BLISHMENTS, of the Army, comprise certain departments which, though provided for out of the Army Estimates, are non-military in their organization; such as those connected with the manufacture of munitions of war.

CIVIL LAW. See LAW.

CIVIL LIST. Down to the period of the Restoration in 1660, notwithstanding an attempt at negotiation between James I. and the parliament for the commutation of the hereditary revenues of the crown, the whole expenses of the government of England, civil and military, were included in one list, or rather they were defrayed out of what was called the royal revenue. This revenue arose partly from crown lands, and partly from other sources, and for a long period after the Conquest, it was really at the disposal of the crown. Even after the supplies were provided by parliament, the specific mode of their expenditure continued to be free from parliamentary control. But at the Restoration a distinction was made (by statute 12 Charles II.) between the extraordinary expenses occasioned by war, and the ordinary cost of the civil establishments of the country. For the latter, the needful funds were provided, partly from such crown-lands as were still unalienated, and partly from taxes which parliament voted for the purpose at the commencement of each reign. These were called the hereditary or C. L. revenues. During the reign of William III., the C. L. amounted to £680,000 annually. The branches of expenditure included under this head were the following: 1. The royal household; 2. The privy purse; 3. The royal palaces; 4. The salaries of the chancellor, judges, great officers of state, and ambassadors; 5. The incomes given to the other members of the royal family; 6. The secret-service money, pensions, and other irregular claims. The support of the army and navy was now provided for by an annual vote of the House of Commons, and the interest of the national debt was never charged against the civil list. During Queen Anne's reign matters remained nearly on their former footing; but on the accession of George I., the C. L. was raised to £700,000 a year, and on that of George II., to £800,000. George III., notwithstanding that he had surrendered very large portions of the remaining hereditary revenue of England, accepted the last-mentioned sum. But it proved insufficient for the purpose. A large amount of debt was incurred, and in 1769 and 1777, parliament voted sums for his relief, amounting together to more than £1,000,000. In 1777, the C. L. revenue was raised to £900,000, but further deficiencies to the extent of £270,000 had still to be supplied by extraordinary votes. In 1780, Mr. Burke succeeded in abolishing several useless offices, and reducing the expenditure. Notwithstanding these and other efforts in the same direction, it was found indispensable continually to augment the C. L. revenue. In 1804, it was raised to £960,000, and in 1812, to £1,080,000, besides annuities to members of the royal family, which were now paid out of the Consolidated Fund (q. v.) to the amount of £260,000. When George IV. succeeded to the throne, £255,000 of expenditure was transferred to other funds, and the C. L. was then fixed at £850,000 per annum. The crown enjoyed, in addition, the hereditary revenue of Scotland, amounting to about £110,000, and a separate C. L. was kept up for Ireland of £207,000.

Against these large sums, however, were still placed many charges which belonged to the nation rather than the crown; and it was not till the 15th November, 1830, that Sir Henry Parnell, afterwards Lord Congleton, carried a motion for the appointment of a select committee for the purpose of separating the proper expenses of the crown from all other charges. The result of this measure was the act (1 Will. IV. c. 25) for the regulation of the civil list. The sum of £510,000 was now granted to his majesty, and exclusively devoted to the privy purse, the salaries and expenses of the household, secret-service money, and pensions. The separate list for Ireland was discontinued, and the Scotch hereditary revenues and other items were directed to be paid into the Exchequer. The change was rather a new distribution, which enabled the country to look more closely into its expenditure, than a real reduction of the civil list.

On the accession of Queen Victoria, the C. L., which had long been of the nature of a compact between the monarch and the parliament, and as such beyond the control of parliament during the life of the sovereign, was settled by 1 and 2 Vict. c. 2. The Queen surrendered the hereditary revenues of the crown for life, in consideration of a yearly sum of £385,000 to be devoted solely to the support of her Majesty's household, and the honor and dignity of the crown. The application of this sum to the particular branches of the Queen's privy purse, the salaries and expenses of the household, the royal bounty, alms and special services, is intrusted to the Lords of the Treasury; and it is provided that if the C. L. charges in any one year shall exceed the total sum of £400,000, an account of the particulars of excess shall be laid before parliament in thirty days. Besides the above sum, £1200 a year is intrusted to her Majesty for the payment of pensions, 'to persons who have just claims on the royal beneficence, or who, by their personal services to the crown, by the performance of duties to the public, or by their useful discoveries in science, and attainments in literature and the arts, have merited the gracious consideration of their sovereign and the gratitude of their country.'

CIVIL SE'RVICE is a general name for all the duties rendered to and paid for by the state, other than those relating to naval and military matters. At the head of the British C. S., which numbers above 50,000 officials of all grades, are placed the officers of the Royal Household, under several departments. Then come the officers of the House of Lords and the House of Commons. Then a vast number of offices or departments, of which the following are the more important: Treasury, Home Office, Foreign Office, Colonial Office, India Office, War Office, Admiralty, Board of Trade, Post-office, Customs, Inland Revenue (including Stamps, Taxes, and Excise), Exchequer and Audit Office, Office of Woods and Forests, Office of Works and Buildings, Duchy of Lancaster, Public Record Office, Local Government Board, Education Department, Civil Service Commission, Registrar-general's Office, Stationery Office, Ecclesiastical Commission, Charity Commission, Patent Office, Emigration Office, Trinity House, Heralds' College, Law and Equity Courts, Ecclesiastical and Admiralty Courts, Prisons Department, British Museum, Science and Art Department, Diplomatic and Consular Corps. Several departments peculiar to Scotland and Ireland form distinct lists, not included in the above.

The heads of most of the departments are political officers, changing with the Ministry. Others, such as the head of the Exchequer and Audit Department, or the Commissioners of Customs and of Inland Revenue, are permanent officials. Excluding the judicial offices, and a few departments where special knowledge is required, the C. S. is open to the public generally, the principle of open competition being in force as regards most of the departments.

In former times appointments to the government offices were obtained mostly by favor; but now, merit and abilities are condi-

tions superadded. By an Order in Council, dated May 21, 1855, the system was first placed on a new basis, and a commission was appointed to examine all candidates for the service. A candidate being *nominated*, the Commissioners in due time notified that he must come up to be examined, and produce certificates of birth, health, and character. The heads of the several departments agree with the Commissioners as to the extent and nature of the subjects on which the candidates should be examined. The Commissioners neither nominate nor appoint; they only examine, and notify the result of the examination.

By an Order in Council, dated 4th June 1870, the regulations were altered, the rule of open and unrestricted competition being then introduced, qualified by some exceptions. In certain small and special offices, nomination with subsequent success at an examination remained the rule of entry. But for all the principal departments—the Foreign Office being the only prominent exception—there is open competition, to which all British subjects of the required age and of good health and character, are admissible. For offices of the superior grade, the age is from 18 to 24, and in the lower division, the age is from 17 to 20. Boy clerks must be over 15 and under 17. Any successful candidate remaining on the list without obtaining an appointment, is struck off at the age of 25. Boy clerks who at 19 fail to obtain appointments as man clerks are also struck off. The first open competition held was on 22d February 1871, when 30 situations in the Excise were competed for by a large number of candidates. A further change was made by the introduction of 'writers'—a species of 'uncovenanted' clerks, who were paid by the hour, were dismissible at pleasure, and had no claim to pension. Writers were first introduced in August 1870, and 'boy clerks' were sanctioned in July 1870.

These various changes (tending in the opinion of the service to lower the status of the officers) and the increased cost of living resulted in great agitation throughout the C. S., and in the appointment of a commission under Dr. Lyon Playfair, to reconsider the whole system of C. S. organization and pay. Following on reports from this commission, considerable changes were made. The decision that the lower grade should have no claim to rise above £200 a year, or to obtain promotion into the higher grade, and the introduction of 'duty-pay' as a means of rewarding special responsibilities, may be named amongst the chief alterations. The Playfair commission reported against the employment of temporary writers; and that class of employees ceased to be appointed after the issue of the Order in Council of 12th February 1876, though a small class of temporary 'copyists' is still maintained. The granting of pensions to the C. S. is now regulated by acts passed in 1859 and 1871, the latter allowing the commutation of pensions for a slump sum when these have been granted on abolition or reorganization of office. The rate of pension is one-sixtieth of pay for each year's service.

The more important departments of the C. S. are briefly described under their proper headings. For the Indian Civil Service, see INDIA, BRITISH.

CIVIL SERVICE E'STIMATES include all expenses of the state not provided for in the Army and Navy Estimates. As an example of these C. S. E., we will quote the amounts voted under their various heads for the financial year beginning April 1, 1881, and ending March 31, 1882:

Public works and buildings	£1,506,673
Salaries and expenses of public departments	2,407,536
Law and justice	5,948,746
Education, science, and art	4,458,456
Colonial and consular services	548,027
Superannuation and retired allowances and gratuities	1,172,156
Miscellaneous and special	45,510
	£16,087,104

CIVI'LIAN. This term has three meanings which are distinct, though intimately related. 1. In a popular sense, it signifies a person whose pursuits are civil; i. e., neither military nor clerical. 2. As a law-term, it means, either a person who is versed in the principles and rules in accordance with which civil rights may be freely, blamelessly, and successfully vindicated in society generally, or in the particular state to which he belongs—or 3. One who has made a special study of these rules and principles as exhibited in the laws and government of Rome (the Roman civil law).

The civil law of Rome exercised such influence upon the formation of the municipal systems of almost all the states of modern Europe, that those who devoted themselves to its study were regarded as 'civil' or municipal lawyers *par excellence*. From the more learned training which this study demanded, C. came often to be used as synonymous with professor or doctor, as opposed to practitioner of law; the former being generally more deeply versed in the Roman law than the latter; and this in its turn led to its being loosely applied to the international lawyers of the 17th c. (Grotius, Puffendorf, &c.), who generally belonged to the class of civilians in the sense of Romanists, and who, though their subject was altogether different, quoted largely and derived many analogies from the Roman jurisprudence. At present, from our having in Great Britain no class of persons who prosecute law as a *science* as opposed to an *art*, the term C. has reverted to its narrower medieval sense of student or teacher of the Roman civil law, and thus we speak of Savigny as a C., but not of Story. The special sense in which C. is understood in England will be explained under ECCLESIASTICAL COURTS. See also ADMIRALTY COURTS.

CIVILIZA'TION. This is a general term to designate the condition of the more advanced nations, as contrasted with those that are looked upon as barbarians or savages. We term the leading nations of Europe civilized; the Chinese and Tartars less so; the Red Indians, Australians, Esquimaux, least of all. 'Whatever be the characteristics of what we call savage life, the contrary of these, or the qualities which society puts on as it throws off these, constitute civilization. Thus, a savage tribe consists of a handful of individuals, wandering or thinly scattered over a vast tract of country; a dense population, therefore, dwelling in fixed habitations, and largely collected together in towns and villages, we term civilized. In savage communities, each person shifts for himself: except in war—and even then very imperfectly—we seldom see any joint operations carried on by the union of many; nor do savages, in general, find much pleasure in each other's society. Whenever, therefore, we find human beings acting together for common purposes in large bodies, and enjoying the pleasures of social intercourse, we term them civilized.' And so of other characteristics. *Dissertations* by J. S. Mill, art. 'Civilization.'

When we come to seek for an exact definition of the term C., we meet with a variety of views, implying that there is a certain complication in the subject. The original derivation of the word points to that polish of manners that distinguishes the inhabitants of cities (Lat. *cives*) from the rustic population; but the use of the word has greatly outgrown this limitation. Guizot has given a definition, which has become generally known, to the effect that we are to include in C. the improvement of man both socially and in his individual capacity. But the chief difficulty lies in settling what is *improvement*. That people are far from agreed on this point is evident from the use of the phrase, 'vices of civilization.' How are we to distinguish its vices from its virtues?

The question is very much simplified by making a distinction between *aiming at* the improvement of mankind and really *effecting* that object. All our inventions and discoveries, and all our new arrangements introduced into every department of life, are intended to raise us further and further above the savage condition; nobody denies this; but there may be the widest difference of opinion as to whether any one new device is a real improvement. If we were to restrict the term C. to the changes introduced into human life *with a view* to improvement, the definition of it would present no difficulty; whereas the relation of this to *progress*, or actual improvement, must ever remain open to difference of opinion.

Leaving out of view for the present the disputable matter, C. may be explained as follows: In the first place, there are certain things bearing decidedly on human preservation and human happiness that are to be excluded from the definition. C. is *not* natural advantages—such as those of soil and climate; or the goodness of the mental or bodily constitution of the race; or accidents of fortune favoring our exertions; or individual dexterity or skill that cannot be imparted. It is not necessarily happiness, which is sometimes present in a low C. and absent in a high. *The permanent changes in the condition and arrangements of man's life effected by his own intelligence and exertions* make up human civilization. It is the *artificial* half of the good we enjoy. Nature has given us so much; our own powers of contrivance give the rest. Genius (in the sense of intellectual originality) is the cause, and C. the effect.

Such being the general definition, the enumeration of the separate departments is the enumeration of the institutions of civilized life. These may be briefly summed up under the following heads:

1. The *Industrial Arts*, or the devices fallen upon for turning to advantage the material resources and agencies of the globe. Perhaps no one will be found to dispute that these constitute real improvements.

2. The *Government*, or system of political organization. It is here that we are most forcibly convinced of the propriety of distinguishing C. from *absolute progress*, or the devices intended for improvement from actual improvement. Scarcely anything in the whole political system of Great Britain, for instance, has commanded unanimous approbation first and last; nearly all the changes have been carried against reluctant minorities, and every now and then voices are raised against institutions accounted by the mass of the nation the very bulwark of our national greatness; as, for example, the parliamentary control of the sovereign authority.

One aim of social reformers has been to make the necessary functions of government compatible with a larger and larger range of individual liberty. The majority of men call this state of things not merely an intended but a real improvement; not merely C., but progress. Still, there is never wanting a class of minds that see only the disadvantageous side of this and all other social innovations.

Connected with liberty, we may also notice the growth of humane sentiment in all classes, the governing power included. When we revert to the horrible punishments to which men were subjected in this country, not many generations since, not only for real crimes, but out of mere superstitious antipathies, as in the burning of witches, we are apt to feel ashamed of our own ancestors, and to congratulate ourselves on having our lot cast in a milder age.

3. The *Arts of Social Intercourse*, embracing the material machinery of conveyance and communication; and also what may be called the moral machinery, such as forms of procedure for regulating assemblies, and the minor courtesies of life.

4. The scheme of *Morality* established in a community appertains to their civilization. But in this also, difference of opinion prevails, when we compare different countries and times. Morality, in fact, has always been more or less a part of *Religion*, which must also be viewed as an institution pertaining to civilized men, whether of their own invention or the result of supernatural communication. In any case, there is mixed up with every religion much that is purely human, and which may be judged of by its tendencies to promote human welfare, like any other arrangement of society. This being the subject of all others that men have most differed upon, no criterion of progress can be laid down, because none would be universally received. The unconverted pagans alive at the final establishment of Christianity, naturally believed that the human mind was thrown backward by that event.

5. *Science* is the least disputed of all the ingredients of civilization.

6. *Literature* and the *Fine Arts* make part of the C. of mankind. They are a new class of pleasures, superadded to the gratifications of mere sense, and of a kind that can be partaken equally by a large number of people. Instead of rivalry and contention, which are inseparable from the struggle for food, money, or power, the Arts tend to sociability and good-fellowship. Every contribution to Architecture, Painting, Music, &c., is a result of human genius, and intended for human pleasure; but there is not the same unanimity in this case as in the former; for many kinds of art are objected to as corrupting the mind; and too great a devotion to Art, on the whole, is said to endanger the just balance of men's regards to the serious interests of life.

The above enumeration will amply show how to define the term C., and of what parts the total is made up. It has also been made apparent that the point as to whether any invention be an item of genuine *progress*, is, and ought always to be, an open question. The inventions of original minds intended for placing us further and further from the savage condition, and having that effect, may often be accused of producing new evils, which other arrangements are called for to neutralize. See works on the History of C. by Guizot, Draper, Buckle; and on the anthropological side, Lubbock's *Origin of Civilization* and Mr. Tylor's works.

CI'VITA CASTELLA'NA, a town of Central Italy, about 30 miles north-east of Rome, on a plateau of volcanic tufa above the Rio Maggiore. Pop. 4000. It is chiefly remarkable on account of the vast number of its Etruscan remains. It occupies the site of the ancient *Falerium Vetus*, one of the 12 cities of the Etruscan League; and *Falerii Novi*, of which also there are many remains, stood about 4 miles to the north of Civita Castellana.

CIVITA DI PE'NNE, a town of South Italy, in the province of Teramo, situated on a commanding hill about 20 miles south-east of Teramo. It is an ancient place, having, under the name of *Pinna*, been the chief city of the Vestini; and some remains are still found here. The modern town, though containing some fine edifices, including the cathedral, is in general badly built. C. di P. is noted for its manufactory of silk-flowers. Pop. 9800.

CIVITA SAN-A'NGELO, a town of South Italy, in the province of Teramo, situated near the Adriatic, about 25 miles south-east of Teramo. It has a population of 6000, and an active trade.

CIVITA VE'CCHIA, an Italian city in the province of Rome, is situated on the Mediterranean, in lat. 42° 4′ N., long. 11° 45′ E. Its ancient name was *Centum Cellæ*. The harbor of C. V. is one of the best in Italy, and was constructed by the Emperor Trajan; the town, indeed, owed its origin entirely to the port of this emperor, and hence it was also known as Portus Trajani. The harbor is formed by two artificial moles projecting into the sea, while a third constructed between the two serves to protect the harbor from the heavy sea; upon this third and outward mole there is a good lighthouse, some 80 feet above the level of the sea. Within the port, there is a small dock and an arsenal. The town of C. V. is small, and has no buildings of any note except a large church in the principal street. The streets are ill paved and narrow, and the inhabitants poor. Pop. about 10,500. It is a free port, and is regularly visited by steam-packets from Marseille, Leghorn, Naples, Genoa, Messina, and Malta; while the majority of travelers visiting Rome land here. It is famous among the modern Italians for its oysters, which are extremely small, but delicious to the taste.

CIVITANO'VA, a town of Central Italy, province of Macerata, 12 miles west of the town of Macerata. Population, including the port, 8583. It stands not far from the Adriatic, and has a fine harbor, much frequented. Its lands produce vines, olives, and pasturage. It is an industrial and commercial city.

CIVITE'LLA DEL TRO'NTO, a town of South Italy, in the province of Teramo, ten miles north of Teramo. It is situated on a rock, is fortified and defended by a strong castle. C. del T. is historically interesting as the place where, in 1053, Robert Guiscard and his Normans gained a complete victory over the forces of Pope Leo IX., and the Emperor Henry III. of Germany; and also for the siege it sustained in 1557 against the French and papal army under the Duke of Guise, who was finally forced to retreat.

CLACKMA'NNAN, the county town of Clackmannanshire, in the south part of the county, on the Devon, near its confluence with the Forth, 9 miles east of Stirling. It lies on ground rising 190 feet above the rich carse-land of the plain of the Forth, which is also rich in coal, iron, and limestone. C. was formerly a royal burgh, and is mentioned as such in the acts of parliament of James V. in 1540 and 1543. From a bull of Pope Celestine III., dated 1195, it appears that at this early date the church and its chapels, together with forty acres of land, belonged to the Abbey of Cambuskenneth. In 1330, King David Bruce resided at Clackmannan. In 1358—1359, King David II. confirmed to Sir Robert de Bruce the castle and barony of C., with the lands of Kennet and others; and from that period to the present, the Bruces have been proprietors in this parish. Pop. (1881) 1503.

CLACKMA'NNANSHIRE, the smallest county of Scotland, bounded N. and W. by Perthshire and the Ochil Hills; E. by Perthshire and Fifeshire; S. by the Forth, separating it from Stirlingshire. Its greatest length is 10 miles; area, 48 sq. miles. Pop. (1871) 23,747; (1881) 25,680. It chiefly consists of the valley of the North Devon, gently declining from the green Ochil Hills to the Forth. The Ochils consist of trap, especially amygdaloid, claystone, porphyry, and greenstone, and rise in Bencleugh (more properly Benclach) 2352 feet, and Dunmyat, or Demyat, 1345. A ridge of high ground, with inferior soil, often resting on clay, runs west through the middle of C., between the very fertile alluvial lands resting on the coal-measures in the south, and the North Devon valley in the north, where the soil is loamy, and rests on gravel, and also on the coal-measures, which extend to the base of the Ochils. The chief minerals are ironstone, sandstone, greenstone, coal, limestone, silver, copper, antimony. The chief rivers are the North Devon, rising in the south of Perthshire, and the Black Devon, rising in the south-west of Fifeshire; both run west across C. into the Forth.

The river Forth is navigable for vessels of 500 tons up to Alloa, at which port ships of 700 tons register have been built. The chief crops are wheat, barley, and oats. The number of acres in C., under all kinds of crops, bare fallow, and grass, in 1881, was 15,758; under corn crops, 5899; under green crops, 1463; clover, sanfoin, and grasses in rotation, 3569; permanent pasture and meadow land, 4546. The 'Hillfoots' have long been celebrated for their woollen manufactures, chiefly in tartan shawls and plaids, and have become favorably known in the production of tweeds. The district is likewise famed for its ale, there being several breweries in the county. There are also extensive distilleries. There are manufactures of green glass bottles, earthenware, bricks and tiles, also timber trade and ship-building. The chief exports are iron and coal. The columnar greenstone of Abbey Craig, near Stirling, has come into use for grinding flour, which it does nearly as well as the French burr-stones. C. contains four parishes. The chief towns are Clackmannan, the county town; Alloa, the most important place; and Dollar, noted for its endowed educational establishment. C., with Kinross-shire, returns one member to parliament; but the county occupies the anomalous position of having parishes within its circumference politically—Alva in Stirlingshire, and Tulliallan and Culross in Perthshire—which it does not embrace judicially. In C. have been found Roman stone coffins, sepulchral vases, and odd Roman coins. The Marquis of Montrose, in 1645, burned Castle Campbell, now a noble ruin situated on a wild but easily accessible eminence, on the brow of a hill immediately behind Dollar. In C., George Meikle constructed, in 1787, the first effective thrashing-machine in Scotland.

CLA'DIUM (Gr. *clados*, a branch or twig), a genus of plants of the natural order *Cyperaceæ*, of which one species, *C. Mariscus*, is a native of Britain, particularly common in the bogs and fens of

Cambridgeshire, where hundreds of acres are almost entirely covered with it. It is 3—5 feet high, with a rounded leafy stem, the keel and margins of the leaves rough and almost prickly. It is consequently hurtful to cattle. It is used for thatching, and in Cambridgeshire also for lighting fires. The English name Twig-rush has been given to it, but is only of recent invention.

CLAIM, in English Law, is a challenge of interest in anything that is in the possession of another, or at least out of a man's own possession. Claims are either verbal or by action, and relate either to lands or to goods and chattels; their object being generally to preserve a title which otherwise would be in danger of being lost.

CLAIM OF LIBERTY is a suit or petition to the Queen in the Court of Exchequer, to have liberties and franchises confirmed there by the attorney-general (Tomlins' *Law Dic.*).

CLAIR, St., a river of North America, being that part of the St. Lawrence, in its largest sense, which carries into Lake St. Clair the waters of Lake Huron. It is 30 miles long, and half a mile broad, and easily navigable, its depth being 50 feet. Lake St. Clair measures 30 miles in length by 12 in average width, and communicates at its south-west end with Lake Erie by means of the Detroit.

CLAIRAC, a town of France, in the department of Lot-et-Garonne, situated on the Lot, about 16 miles north-west of Agen. It has flour and paper mills, and a considerable trade. C. is chiefly interesting, however, as the first place in the south of France that embraced the doctrines of the Reformation, which it did in 1527, on the example of its abbot, Gerard Rouselle. It was the scene of frequent contests between Roman Catholics and Huguenots. Pop. (1876) 2388.

CLAIRAUT, Alexis Claude, an eminent French mathematician, was born at Paris, May 7, 1713. He early exhibited a most remarkable aptitude for mathematics, and was considered worthy of admission to the Academy of Sciences, while as yet he was only 18 years of age. C. wrote a great number of scientific papers, but his fame now rests principally upon his *Figure of the Earth*, in which he promulgated the theorem, that the variation of gravity on the surface of the earth, regarded as an elliptic spheroid, was altogether independent of the law of density, the opposite opinion having been previously held; on his explanation of the motion of the lunar apogee, a point left unexplained by Newton; and on his computation of the time of the return of Halley's comet. He died at Paris, May 17, 1765.

CLAIRE, St., or *Santa Clara*, was born in 1193, of a rich and noble family of Assisi, in the duchy of Spoletto. Attracted by the eloquence and piety of St. Francis of Assisi, she abandoned the pleasure of social life, in which she had previously indulged, and betook herself to solitude, prayer, and mystic meditation. Her imagination, excited by religious emotions, deceived her into the belief that she was in more direct communication with God than her fellow-mortals; and taking her own desires for divine intimations, she founded an order of nuns in 1212, and after obtaining a great reputation for sanctity, died at Assisi, August 11, 1253. Two years afterwards, she was canonized by Alexander IV.

CLAIRE, St., Nuns of the Order of, a religious order founded by St. Claire, with the counsel and help of St. Francis of Assisi, in 1212. At first, the nuns observed the rule of St. Benedict, but in 1224 the austerity of this rule was mitigated by St. Francis, and again modified by Urban IV. in 1264. Those who follow the rule as modified by Urban, are called *Urbanists*; the other and austerer portion of the sisterhood, *Damianists*. The order rapidly increased; and convents are numerous to the present day in Italy, France, Belgium, Bavaria, Asia, and America. The nuns devote themselves chiefly to the education of the young.

CLAIRVAUX, a village in the department of Aube, about ten miles above Bar-sur-Aube, on the left bank of the river, is remarkable as the site of the once famous Cistercian Abbey (Clara Vallis), founded in 1114 by St. Bernard, who presided over it till his death in 1153, when he was buried in the church. Besides the original buildings, a new and splendid convent was afterwards erected, and a church which was reckoned a masterpiece of architecture, but was destroyed at the Restoration. There was shown in the convent a monster cask, called 'St. Bernard,' which contained 800 tuns. The abbey, which had at one time a revenue of 120,000 livres, was suppressed at the Revolution, and the extensive buildings are now used as a workhouse and house of correction.

CLAIRVOY'ANCE. See Somnambulism.

CLAM. See Chama.

CLAM, in Heraldry, is a term for an escalop or cockleshell, and is supposed to indicate that the bearer has been a crusader, or has made long voyages by sea.

CLAM, BEAR'S PAW (*Hippopus maculatus*), a bivalve mollusk of the South Seas of the family *Tridacnidæ*. The shell is described as 'perhaps the most beautiful of bivalves, whether in regard to form, texture, or color.' It is therefore a favorite shell for ornamental purposes. It is transversely ovate, ventricose ribbed, roughened with scaly inequalities, white, and spotted with red or purple.

CLAN (Gael. *clann*, Manx *cloan*, meaning 'children,' i. e., descendants of a common ancestor). This word became incorporated with the English language at least as early as the 17th c., to mean a body of men confederated together by common ancestry or any other tie, and in this sense it is used both by Milton and Dryden. It came to be applied almost exclusively to the several communities of the Scottish Highlanders, as divided from each other topographically and by distinctive surnames. The word has sometimes been applied to those great Irish septs which at one time were a sort of separate states; but these, with their characteristic forms of internal government, were completely broken down by the power of the English predominance, before the word came into familiar use in the English language. In Scotland, it was used in the 16th c. to designate the freebooters of the border as well as to the Celtic tribes of the Highlands; and there were two characteristics common to both—their predatory habits, and their distribution into communities, each with a common surname.

In the act of the Scottish parliament of 1587, for instance, which requires landlords to find security for the conduct of their tenants, it is provided that those 'who have their lands lying in far highlands or borders, they making residence themselves in the inlands, and their tenants and inhabitants of their lands being of clans, or dependars on chieftains or the captains of the clans, whom the landlords are noways able to command, but only get their mails (or rents) of them, and no other service or obedience, shall noways be subject to this act but in manner following.' Then follow provisions for enforcing the law directly on the chieftains or captains of those clans residing in territories where the owner of the soil—generally the merely nominal owner, in terms of some useless charter—had no control. It was always the policy of the old law of Scotland to require all the Highland clans to have some respectable representative—a man of rank and substance, if possible—who should be security at court for their good conduct. Clans that could find no security were called 'broken clans,' and their members were outlaws, who might be hunted down like wild beasts. The Macgregors were a celebrated broken C., whom the law pursued for centuries with savage ingenuity. Among other inflictions, their name was proscribed, and such members of the C. as endeavored to live by peaceful industry in the Lowlands, adopted derivations from it, hence we have the names of Gregor, Gregory, and Gregorson or Grierson. The clans are never treated in the old Scots acts with any respect, or otherwise than as nests of thieves and cut-throats. The following passage in the act of 1581 (c. 112), which virtually authorizes any Lowlander, injured by any member of a C., to take vengeance against all or any of his clansmen, contains a picturesque, though, for a legislative enactment, certainly a very highly colored account of the social condition of the Highland clans in the 16th century. 'The saids clans of thieves for the most part are companies of wicked men, coupled in wickedness by occasion of their surnames or near dwellings together, or through keeping society in theft or receipt of theft, not subjected to the ordinar course of justice, nor to ony ane landlord that will make them answerable to the laws, but commonly dwelling on sundry men's lands against the good-will of their landlords, wherethrough true men oppressed by them can have no remeid at the hands of their masters, but for their defense are oftentimes constrained to seek redress of their skaiths of the hail clan, or such of them as they happen to apprehend. Likewise the hail clan commonly bears feud for the hurt received by any member thereof, whether by execution of laws, or order of justice, or otherwise.' The Highland clans are often carelessly spoken of as a feudal institution, but in reality their distinctive character cannot be better understood than by keeping in view some peculiarities which set them in complete contrast with the feudal institutions of Britain.

All feudality has a relation to land, from the serf bound to the soil through the free vassal who possesses it, up to the superior or feudal lord, who commands services out of it. The descent to all rights connected with it is hereditary. Among the Highlanders, on the other hand, the relation was patriarchal, and had no connection with the land, save as the common dwelling-place of the tribe. It often happened, as the acts above quoted explain, that the head of a C. and the owner, according to feudal law, of the estates occupied by it, were two different persons. Clans did not acknowledge the purely feudal hereditary principle, and would elevate to the chiefship a brother or an uncle, in preference to the son of a deceased chief. It is a curious illustration of this, that in the rebellion of 1715, the notorious Lord Lovat, who had just

returned from France, being acknowledged by the C. Fraser as their chief, drew them away from the rebel army, to which the proprietor of the Fraser estates had endeavored to attach them, and arrayed them on the government side.

CLAN MACDU'FF, Law of, was a privilege of immunity for homicide anciently enjoyed by those who could claim kindred with Macduff, Earl of Fife, within the ninth degree. Macduff's cross stood on the march or boundary between Fife and Strathearn, above Newburgh; and any homicide possessed of the right of clanship who could reach it, and who gave nine kye (cows) and a colpindash (or young cow), was free of the slaughter committed by him. (Bell's *Dictionary*.)

CLANDE'STINE MA'RRIAGE. A marriage contracted without the due observance of ecclesiastical ceremonies, even where concealment was not the chief or only object of the parties, is generally called a clandestine marriage. But in Scotland, a distinction is made between marriages which are clandestine, and those which are simply irregular. All marriages which are not celebrated by a clergymen after proclamation of bans are irregular, and such of these irregular marriages as are entered into before a person professing to act as a religious celebrator, without being a minister of religion, are clandestine, and expose the parties, the celebrator, and witnesses to certain penalties. These penalties may be recovered before justices of the peace, on complaint by the fiscal; and the proceeding is not without some advantage to the parties, as the conviction is received as evidence of the marriage. In the eye of the law, clandestine and irregular marriages in Scotland are as valid as those in the face of the church, provided they be of such a kind as to establish the consent of the parties to become man and wife in point of fact.

But, notwithstanding the existence of this rule of the civil law, marriages in Scotland, in any other form than *in facie ecclesiæ*, are practically of very rare occurrence. Persons convicted before a magistrate of an irregular marriage are required to register such marriage, and the magistrate is bound to give notice of the conviction to the registrar; and if the irregular marriage is established in a competent court, the clerk of court is to give notice (17 and 18 Vict. c. 80). To put a stop to Englishmen crossing the Border, merely in order to celebrate irregular marriages, it was enacted by 19 and 20 Vict. c. 96, 'that after the 31st December 1856, no irregular marriage shall be valid in Scotland, unless one of the parties has lived in Scotland for the 21 days next preceding the marriage, or has his or her usual residence there at the time.' It is further enacted, that the parties to such a marriage may apply within three months, *jointly*, to the sheriff or sheriff substitute of the county, for a warrant to register it. Upon proof that one of them had lived for 21 days, or usually resided in Scotland, and that they have contracted marriage, the sheriff is to grant a warrant to the registrar of the parish to record the marriage. A certified copy of the entry, signed by the registrar, which he must give for 5*s*., is declared to be evidence of a valid marriage.

CLANDESTINE MORTGAGE, in England, is a second mortgage of lands, already mortgaged for a valuable consideration, the first mortgage being concealed, or not discovered in writing to the second mortgagee. It is provided by 4 and 5 Will. and Mary, c. 16, that in such circumstances the mortgager, or person so mortgaging his lands, shall have no relief, or equity of redemption, against the second mortgagee.

CLA'P-NET, a kind of ground-net much used by the bird-catchers of the south of England, who supply the London market. It consists of two equal parts or sides, each about twelve yards long, by two yards and a half wide, and each having a slight frame. These are placed parallel to one another, fully four yards apart, and by an ingenious contrivance, the pulling of a string is made to close them upon one another, so as to cover the oblong space between them. Call-birds, either in small cages, or fixed by braces, are placed about the net to decoy wild birds to the spot.

CLA'PPERTON, Hugh, one of those British travelers that led the way in exploring the interior of Africa, was born at Annan, in the county of Dumfries, Scotland, in 1788. At the age of 17, he went to sea; and being impressed into a man-of-war, he distinguished himself by his services, and was appointed to the rank of lieutenant. In 1817, he returned to England on half-pay. Having become acquainted in Edinburgh with Dr. Oudney, who was about to proceed to Bornu as British consul, the thoughts of C. were directed to Africa; and government appointed him and Lieutenant Denham to accompany Oudney in an exploring expedition into the interior of that continent.

After a short stay at Tripoli, they started in February 1822 for Bornu, where Denham separated from his companions, in order to carry his researches southward. C. proceeded westward accompanied by Oudney, who died by the way. He still pushed on alone as far as Sakkatu, but not being allowed to proceed further westward, retraced his steps, and, in company with Denham returned to England in 1825. The journey had done much for the knowledge of Africa, but the great geographical problem of the course of the Niger, was still much in the same position. To solve it, if possible, C.—the rank of commander having been conferred upon him—started again in August 1825, in company with Captain Pearce, R.N., Mr. Dickson, and Dr. Morrison. He had also Richard Lander as his confidential servant. They commenced their exploration into the interior from the Bight of Benin. His companions died early on the journey, but C. and his faithful attendant Lander reached Sakkatu. Detained here by the Sultan Bello, the vexation joined to the hardships of the journey so affected his health, that he died at Changary, near Sakkatu, April 13, 1827. C. was the first European that penetrated from the Bight of Benin into the interior of Africa, and followed the course of the Niger for a great way. Though without scientific education, he was an intelligent and unprejudiced observer, and made important additions to geographical knowledge—*Narrative of Travels and Discoveries in Northern and Central Africa in the years* 1822, 1823, *and* 1824, *by Denham, Clapperton, and Oudney* (Lond. 1826); *Journal of a Second Expedition into the Interior of Africa*, &c. (Lond. 1829); *Records of Clapperton's Last Expedition to Africa*, by Richard Lander (Lond. 1830).

CLAQUE (from Fr. *claquer*, 'to clap the hands,' or 'applaud') is the name given to a contrivance for securing the success of a public performance or production, by bestowing upon it preconcerted applause, and thus giving the public, who are not in the secret, a false notion of the impression it has made. This artifice came first into operation in theaters and concert rooms, and arose from friendly or party motives; but it is to be feared that it has spread into other departments of public life, not excepting even parliaments.

It was in Paris that it was first regularly organized and turned into a trade. One Sauton, in 1820, established an Office for the Insurance of Dramatic Success (Assurance des Succès Dramatiques), and was thus the organizer of the Parisian 'claque.' The directors or managers of a theater send an order to the Office for whatever number of 'claquers' they think necessary. If the success of a piece seems doubtful, as many sometimes as from 300 to 500 of these people are furnished with gratis tickets, and are often instructed at the rehearsals at what particular places they are specially to applaud.

How minutely the art is organized, may be seen from the exact division of functions among the several claqueurs. The 'commissar' is bound to learn the play by heart, and call the attention of the audience about him to the various beauties of the piece; the 'rieur' must laugh at every jest; the 'pleureur' (weeper) has to manifest his sensibility at the moving passages. This last part is generally assigned to women, in whom the frequent use of the handkerchief seems most natural. The 'chatouilleur' (tickler), on the other hand, endeavors by distributing bonbons, snuff, theater-bills, &c., and by lively conversation to keep his neigbors in good-humor; and lastly, the 'bisseur' calls *encore!* with the utmost enthusiasm, at the conclusion of the specified pieces of music.

The following incident, which found its way into the newspapers on the occasion of the death of the famous French actress, Mademoiselle Rachel, shows the ludicrous seriousness with which the members of the C. view their singular profession: Mademoiselle Rachel had just created a new character in a modern piece, and during the first evening, was loudly applauded. The next, however, she thought her reception by no means so warm, and she complained of it, adding that the C. did not do its duty. It turned out that the head of the C. had been ill, and that his place that evening had been supplied by a confrère from another theater. This individual, on hearing of the complaint that had been made, wrote to mademoiselle as follows: 'Mademoiselle—I cannot remain under the obloquy of a reproach from such lips as yours! The following is an authentic statement of what really took place. At the first representation, I led the attack in person not less than thirty-three times. We had three acclamations for hilarities, two thrilling movements, four renewals of applause, and two indefinite explosions. In fact to such an extent did we carry our applause, that the occupants of the stalls were scandalized, and cried out "*A la porte!*" My men were positively extenuated with fatigue, and even intimated to me that they could not again go through such an evening. Seeing such to be the case, I applied for the manuscript, and after having profoundly studied the piece, I was obliged to make up my mind for the second representation to certain curtailments in the service of my men. I, however, applied them only to MM. ——, and if the *ad interim* office I hold affords me the opportunity, I will make them ample amends. In such a situation as that which I have just depicted, I have only to request you to believe firmly in my profound admiration and respectful zeal; and I venture to entreat you to have some consideration for the difficulties which environ me.'

The allegation that in London theatrical artists and managers are obliged to endeavor to insure success by means of a similar in-

stitution, is strenuously denied. Although no public offices of the kind have yet been established in Germany, the artifice is extensively practised, to the perversion of the public judgment and the detriment of art.

CLARE, a maritime county in the province of Munster, Ireland, bounded N. by Galway and Galway Bay; E. and S. by the Shannon, and its expansion Lough Derg, separating it from Tipperary, Limerick, and Kerry; W. by the Atlantic. It lies between lat. 52° 32′ and 53° 7′ N., and long. 8° 25′ and 9° 58′ W. It is seventh in size of the Irish counties; length, 67 miles; greatest breadth, 38; average, 21; area, 1294 square miles—more than a half being arable, and a hundredth in wood. The surface is mostly hilly, with some mountains, bog, marsh, and rugged pasture. There is an undulating plain in the center, from north to south. On the east, lie the Inchiquin, Slieve Baughta, and Slieve Barnagh mountains, the highest being 1758 feet, with rich pastures between. The mountains on the west rise in Mount Callan to 1282 feet. In the south, along the rivers, are rich loamy pastures called corcasses. The coast-line is 140 miles along the sea, and 80 along the Shannon estuary. The sea-line is high and rocky, in parts precipitous, with many isles and fantastic detached rocks. For five miles at Moher, the coast rises 400 feet nearly perpendicular, and at another point 587 feet. The chief rivers are the Shannon (q. v.), and the Fergus, running south 27 miles through the middle plain, and by an estuary five miles broad. The county has about 100 small lakes. Carboniferous limestone is a prevailing formation in the county. The south-west third of the county forms part of the Munster coal-field, with beds of ironstone, and thin seams of coal and culm. C. has mines of lead, copper pyrites, and manganese; slate and flag quarries; a black marble quarry near Ennis; and many chalybeate springs. The soils are warm and friable on limestone, deep rich loam on the Shannon, and cold and wet, with bogs and much timber on the coal tracts. Part of the limestone district is flooded in winter, but affords rich pasture in the summer, when the water dries up. In some places, spring-water is very scarce, and water can only be procured from the neighboring corcasses. The climate is moist and mild, but with frequent violent gales from the Atlantic. In 1880, 141,302 acres were under crops, the chief crops being oats, potatoes, wheat, barley, and turnips. The chief trade is in grain and provisions. Fine sheep and cattle are reared on the pastures. Fish are caught on the rivers in the native wicker-boats. The chief manufactures are coarse linens, hosiery, flannels, and friezes. C. is divided into 11 baronies, 80 parishes, and 7 poor-law unions, with parts of 3 others. The chief towns are Ennis (the county town) Kilrush, Ennistymon, and Killaloe. Pop. in 1841, 286,394; in 1851, 212,428; in 1871, 147,864, of whom 144,440 were Roman Catholics, 3027 Protestant Episcopalians, 220 Presbyterians; pop. in 1881, 141,457. In 1881, C. had 32,130 pupils on the rolls of the National Schools. It returns three members to parliament, two for the county, and one for Ennis. C. has many cromlechs, raths, remains of abbeys, and old castles or towers, and several round towers, one at Kilrush being 120 feet high. C., till the time of Elizabeth, was called Thomond. An adventurer called Clare gave it its present name.

CLARE COLLEGE, Cambridge, founded 1326 under the name of University Hall, by Richard Badew, was burned in 1338, and rebuilt and endowed by Elizabeth, Countess of Clare. Chaucer calls this college 'Solere' Hall. It has a master, 8 senior, and 10 junior fellows. The 18 fellowships are open to gentlemen of the degree B.A. or a higher, without restriction as to marriage. The master is elected by the senior and junior fellows. The buildings, which are in the Renaissance style, are amongst the most pleasing in the university. Richard III., pretending himself to be descended from the foundress, claimed the patronage of this Hall. The chapel was built in 1535, previous to which an aisle of St. Edward's Church, where the masters and fellows were anciently interred, was used for the purpose.

CLARE ISLAND, an island of Ireland, belonging to the county of Mayo, situated in the Atlantic, at the entrance of Clew Bay. It has a length of 4½ miles, with a breadth of 2 miles. On its north-east extremity, there is a light-house at an elevation of 487 feet above the sea. Lat. 53° 49′ 30″ N., long. 9° 55′ 30″ W.

CLA'REMONT, a mansion or country-seat at Esher, Surrey, built by a noble family of that name. When the Princess Charlotte, heiress-apparent to the crown of England, was married to Prince Leopold of Saxe-Coburg, C. was assigned as their residence; and at the death of the princess in 1817, the use of it was continued to the widower for life, along with the allowance settled on him of £50,000. The prince lived here till his election as king of Belgium, after which time he only occasionally visited it. After the revolution of February 1848, he placed it at the disposal of his father-in-law, ex-king Louis Philippe, who inhabited it till his death in August 1850. At the death of King Leopold in 1865, an Act was passed granting it to the Queen for life, after which it was to revert to the country. The Queen, in March 1882, bought the reversion of C., and it is now the residence of the Duke of Edinburgh.

CLA'RENCIEUX, the first of the two provincial Kings-of-Arms, in England, the second being Norroy. The jurisdiction of C. extends to all England south of the Trent, that of Norroy (q. v.) comprehending the portion north of that river. C. is named after the Duke of Clarence, third son of King Edward III. It is his duty to visit his province, to survey the arms of all persons bearing coat-armor within it, to register descents and marriages, and to marshal the funerals of all persons who are not under the direction of *Garter*. He also grants arms within his province, with the approval of the Earl Marshal.

CLA'RENDON, Constitutions of, were laws made by a parliament, or rather by a general council of the nobility and prelates, held at Clarendon, a village in Wiltshire, in 1164, whereby King Henry II. checked the power of the church, and greatly narrowed the total exemption which the clergy had claimed from the jurisdiction of the secular magistrate. These famous ordinances, 16 in number, defined the limits of the patronage, as well as of the jurisdiction, of the pope in England, and provided that the crown should be entitled to interfere in the election to all vacant offices and dignities in the church. The constitutions were unanimously adopted, and Becket, the primate, reluctantly signed them, at the solicitation of his brethren. But they were at once rejected by Pope Alexander III., when sent to him for ratification, and Becket thereupon immediately retracted his consent, and imposed upon himself the severest penances for his weakness in giving it. This, and the other measures adopted by the haughty and imperious archbishop, to vindicate the independence of his order, led to the unhappy disputes between him and the monarch, which terminated in the famous tragedy at Canterbury commonly known as the *martyrdom* of St. Thomas-à-Becket, the canonization of the saint, and the pilgrimages to his tomb, which subsequently became an institution of the Roman Catholic Church. Notwithstanding the personal humiliation to which Henry submitted after Becket's death, most of the provisions of the constitutions of C. continued to be permanent gains to the civil power. A masterly and dispassionate appreciation of the constitutions of C. will be found in Dr. Pauli's *Geschichte v. England;* and in Professor Stubbs's *Select Charters illustrative of English Constitutional History* the text of the constitutions is given.

CLARENDON, Edward Hyde, Earl of, an English historian and statesman, son of a private gentleman, was born at Dinton, Wiltshire, 18th February, 1608, and educated at Oxford. He studied law under his uncle, Nicholas Hyde, Chief-justice of the King's Bench; was a member of the Long Parliament, and for some time spoke and voted on the side of the popular party; but on the breaking out of the civil wars in England, he attached himself to the royal cause, and in 1642 was appointed Chancellor of the Exchequer, knighted and sworn of the privy council. Accompanying Prince Charles (Charles II.) to Jersey, he remained there for two years, and began his *History of the Rebellion* (London, 1702—1704; continuation, with Life, 1759), and also wrote the various papers which appeared in the king's name, as answers to the manifestoes of the parliament, and which far surpassed in vigor and elegance the productions against which they were directed.

In May 1648, he went to Paris, and in November 1649, was sent on an unsuccessful mission for assistance from the Spanish court. He afterwards proceeded to the Hague, where, in 1657, Charles II. appointed him High Chancellor of England. At the Restoration, he was confirmed in that office, and elected chancellor of the university of Oxford. In November 1660, he was created Baron Hyde, and in April following, Viscount Cornbury, and Earl of Clarendon. In 1663, the Earl of Bristol accused him of high treason in the House of Lords; and though this charge failed, public indignation was excited against him by the ill success of the war with Holland, and the sale of Dunkirk to the French. The victim also of some court intrigues, he was deprived of his offices; and he secretly withdrew to Calais, whence he sent his Apology to the Lords; but this writing was ordered, by both Houses of parliament, to be burned by the common hangman. After living six years in exile, he died at Rouen, December 1674, and was buried in Westminster Abbey. His daughter, Anne Hyde, became the wife in 1759, of the Duke of York, afterwards James II. and was the mother of Anne and Mary, both queens of Great Britain.

C. was on the whole both well intentioned and wise. There can be no doubt that he loved his country sincerly, and was humanely and liberally disposed. He was too moderate for the troublous times in which he lived. Lacking enthusiasm, he failed to appreciate the position of the Puritans; and after a brief period spent in their service, he passed over to the camp of the Royalists, but was never a bigoted partisan. His firmness, however, was not equal to his sagacity, and hence arose the perplexities which ultimately occasioned his fall. C.'s private character was excellent

in an age when virtue was utterly unfashionable among noblemen.

CLARENDON, GEORGE WILLIAM FREDERICK VILLIERS, EARL OF, a distinguished English statesman, was born 12th January 1800. He was a descendant of Thomas Villiers, who, in 1752, married the heiress of the last Lord Clarendon of the Hyde family, and was, in 1756, made Baron Hyde, and in 1776, Earl of Clarendon. Having studied at Cambridge, he early entered the diplomatic service, and in 1833 was appointed to the then important post of ambassador at Madrid, where he acquired great influence, which he employed in establishing the government of Spain on a constitutional basis. On the death of his uncle, the third earl, without issue, in 1838, he succeeded to the title, and returned to England to take his seat in the Upper House. In 1840, he was appointed keeper of the Great Seal. When the Whig ministry was broken up in 1841, he became an active member of the opposition; but warmly supported Sir Robert Peel in his measures for the abolition of the corn-laws.

Under Lord John Russell's premiership, he became President of the Board of Trade in 1846, and the following year was appointed Lord-lieutenant of Ireland. He entered upon his duties in troublous times. The insurrectionary follies of Smith O'Brien and his coadjutors might have set the whole country in a blaze, but for the prompt and decisive measures which C. adopted, and which soon restored general tranquillity. At the same time, his tact and impartiality contributed to allay and reconcile the exasperations of the party. The severity of his proceedings against the Orangemen on occasion of disturbances in 1849, was made the subject of a formal accusation in the House of Lords; but C. made a convincing defence, and ministers declared their complete approval of his proceedings. When the Russell cabinet resigned in 1852, C. was replaced by the Earl of Eglinton; but on the formation of the Aberdeen ministry, he was intrusted with the seals of the Foreign Office. He held the same seals under Lord Palmerston from 1855 to 1858; resumed them in 1865; retired with his colleagues in 1866; and taking the same office once more in 1868; he retained it till he died in June 1870.

CLARENDON PRESS. See BOOK-TRADE. Vol. I., p. 765.

CLA'RET (Fr. *Clairet*), a term originally applied to wines of a light-red color, but which is now used in England as a general name for the red wines of Bordeaux (q. v.). The name as used in England is unknown in France.

CLARIFICA'TION is the process of clearing a fluid from a turbid condition, as in the case of Beer (q. v.), or in the action of gelatine in fining British wines. Natural waters containing much organic matter in mechanical suspension and in chemical solution, are clarified by the addition of a little alum, which is precipitated with the organic matter, and the water then becomes healthy and refreshing. Liquids are often clarified by straining through several layers of cloth; and the addition of cold water to hot coffee, &c., causes a deposit to be thrown down, which clears the solution. The use of the CLEARING NUT (q. v.), for clarifying water, is general in India.

CLA'RINET, or CLA'RIONET, a wind-instrument of the reed kind, invented by Joseph Christoph Denner, in Nürnberg, in 1690. Its tone is produced by a thin piece of Spanish reed nicely flattened, and tied, or otherwise fixed on the mouth-piece. On the body of the instrument there are holes and keys for the fingers of the performer, by which the notes are produced. In extent, fulness, and variety of tone, the clarinet is the most perfect of wind instruments. Its construction, however, does not admit of every key in music being played on the same instrument, for which reason clarinets of different pitch are used in orchestral music, viz., the C clarinet, which plays all the notes as they are written; the B flat clarinet, a whole tone below the C.; and the A clarinet, a minor third below the C. In military music, an E flat clarinet, a minor third above the C one, is much used.

CLA'RION, or CLA'RIN, a species of trumpet, more shrill in tone than the ordinary one, also the name of an organ-stop of four feet pitch.

CLARK, SIR JAMES, Bart., a distinguished physician, was born at Cullen, Banffshire, December 1788. He was educated at the grammar-school of Fordyce; and at King's College, Aberdeen, where he took the degree of M.A. He studied medicine at Edinburgh and London, and entered as a navy surgeon in 1809—a position he held until 1815. Taking his degree of M.D. in Edinburgh in 1817, he, after traveling on the continent, settled at Rome, where he practised as a physician for eight years. In 1826, he took up his residence in London, where he soon secured for himself a prominent place among the most eminent medical men of the time. On the accession of Queen Victoria to the throne, C., who for two years previously had acted as physician to the Duchess of Kent, was appointed physician in ordinary to her Majesty; and in that capacity he attended the Queen on most of her journeys to Scotland and the continent. He was created a baronet in 1838. Among the most important of C.'s contributions to medical science, is his work *On the Sanative Influence of Climate*, a subject upon which he was considered a high authority; and *A Treatise on Pulmonary Consumption*, in which he showed that this destructive malady is one of the general health, depending upon mal-assimilation of the food, and to be prevented, and in certain cases arrested, by a wise regulation of food, air, and exercise. He was among the first in his profession, along with Dr. Andrew Combe and Sir John Forbes, who demonstrated the importance of the study of the laws of health, in order to the salutary direction and control of morbid action in disease; and he did great public and professional good by inculcating attention to the powers of recovery inherent in all living organisms. C. edited the last edition of Dr. Combe's *Management of Infancy*. He died June 29, 1870.

CLARKE, ADAM, LL.D., an eminent minister and scholar of the Wesleyan Methodists, was born about 1762 in the north of Ireland. He studied at Kingswood, near Bristol, and at the age of twenty, became a preacher or evangelist, in which capacity he obtained a great name, and seems to have exercised a most beneficial influence. Although the office of a Wesleyan pastor is very unfavorable for the development of scholarly habits, C. contrived to find time for extensive study. His first work was a *Bibliographical Dictionary*, published in 1802. His attainments in oriental literature and biblical knowledge procured for him the degree of LL.D. from St. Andrews university. The Board of Commissioners on the Public Records selected him to edit Rymer's *Fœdera*. He also edited and abridged several other works, but the great work of his life was his edition of the Holy Scriptures in English, illustrated with a commentary and critical notes, into which were compressed all the results of his varied reading. The first volume appeared in 1810, the eighth and last in 1826. C. died August 26, 1832.

CLARKE, EDWARD DANIEL, known as a traveler and author was born at Willingdon, in Sussex, in 1769. He studied at Cambridge, and from 1790 to 1799 was employed as tutor and traveling-companion in several noblemen's families, and made the tour of Great Britain, France, Italy, Switzerland, and Germany. In 1799, he set out on an extensive tour with Mr. Cripps, a young man of fortune; they traversed Denmark, Norway, Sweden, Lapland, Finland, Russia, the country of the Don-Cossacks, Tartary, Asia Minor, Syria, Egypt, Greece, and did not return to England till 1802. In consequence of his donations to the university of Cambridge, C. received the degree of LL.D. In 1807, he began a course of lectures on mineralogy, and the university established a professorship of that science in his favor. He presented to the library of Cambridge a number of valuable marbles collected during his travels; among others, the colossal statue of the Eleusinian Ceres, on which he wrote a treatise in 1803. England is also indebted to him for the possession of the famous sarcophagus with the inscription in three languages. On this he wrote a treatise: *The Tomb of Alexander, a Dissertation on the Sarcophagus brought from Alexandria, and now in the British Museum* (Lond. 1805). His "Travels," of which the first volume was published in 1810, and the fifth in 1819, were received with extraordinary favor. An additional volume, containing his *Travels through Denmark, Sweden, Lapland, Norway, Finland, and Russia*, was published after his death (Lond. 1823). A complete edition of his travels appeared in 11 vols. (Lond. 1819—1824). The university of Cambridge purchased his Greek and oriental manuscripts, among which is the famous Codex of Plato, which C. discovered in the island of Patmos. C. died March 9, 1822.

CLARKE, DR. SAMUEL, an eminent philosopher and theologian, was born at Norwich, October 11, 1675, and educated at Cambridge. The system of Descartes at that time held almost universal sway; but this failing to satisfy his mind, he adopted the views of his contemporary and friend Newton. Along with philosophy, he pursued the study of theology and philology. He was some time chaplain to the Bishop of Norwich, a promoter of science; he afterwards became chaplain to Queen Anne, and in 1709 rector of St. James's. By his work on the Trinity (1712), in which he denied that that doctrine was held by the early church, he brought himself into considerable trouble. The convocation of bishops, who wished to avoid controversy, contented themselves with an explanation, anything but satisfactory, and a promise from C. to be silent for the future on that subject. His views were of the kind known as *Semi-Arian*. For the rest, C. was a vigorous antagonist of the freethinkers of his time; in opposition to Dodwell, he sought to demonstrate the immortality of the soul from the idea of an immaterial being. He died May 17, 1729.

His most famous work is, *Demonstration of the Being and Attributes of God* (Lond. 1705); connected with it in subject is his *Verity and Certitude of Natural and Revealed Religion* (Lond. 1705). At the instigation of the Princess of Wales, who was inclined to the doctrines of Leibnitz, C. entered into a keen correspondence with that philosopher on space and time, and their relations to God, on moral freedom, &c. This correspondence was published under

the title of *Collection of Papers which passed between Leibnitz and Clarke in the years* 1715 *and* 1716 (Lond. 1717). In his ethical disquisitions, he seeks to find a foundation for moral obligation in a peculiar principle, which he calls the *fitness of things*, or the relations of things established from eternity by God. He published a valuable edition of Cæsar (Lond. 1712); that of Homer (Lond. 1729—1746) was completed by his son. A collected edition of his philosophical works appeared in 4 vols., Lond. 1738—1742.

CLARKSON, THOMAS, an eminent philanthropist, the son of a clergyman, master of the Free Grammar-School at Wisbeach, Cambr., was born in that town, March 28, 1760. He studied at Cambridge University, and was led to become the promoter of the anti-slavery agitation in Great Britain by a Latin prize-essay which he wrote in 1785, on the question, 'Is it right to make slaves of others against their will?' An English translation, on being published, had an extensive circulation, and C. resolved to devote his life to a crusade against African slavery. Associations were formed, and, besides visiting the principal towns of England, and even going to Paris, in the cause, C. published numerous essays, pamphlets, and reports on the subject. Mr. Wilberforce, M.P., whose co-operation C. had secured, took the lead in the anti-slavery agitation, and in 1787 brought the subject before parliament. On March 25, 1807, the law for the suppression of the slave-trade passed the legislature, and C. subsequently wrote a *History of the Rise, Progress, and Accomplishment of the Abolition of the African Slave-trade*, 2 vols. 8vo., 1808. On the formation of the Anti-slavery Society, in 1823, for the abolition of slavery in the West Indies, C. became one of its leading members, and saw the object of its efforts attained in 1833. He took an active part in other benevolent schemes, particularly in establishing institutions for seamen in seaport towns, similar to the Sailors' Homes. He was in deacon's orders in the Church of England, but manifested great liking for the Society of Friends, although he never joined them. He died September 26, 1846.

CLARY (*Salvia sclarea*), a plant of the same genus with Sage (q. v.), a native of Italy and other southern countries of Europe, and which has been cultivated in British gardens from a very early period for its aromatic and other properties. It is a biennial about 2 feet high, with clammy stem, large, heart-shaped, rough, and doubly crenate leaves, and whorls of pale-blue flowers in loose terminal spikes, with large colored bracteæ. The seed is generally sown in spring, and the plants flower in the second year. C. is antispasmodic and stimulating. It has an odor resembling that of Balsam of Tolu, and is used for seasoning soups, and in confectionary for flavoring. Its flowers are used for making a fermented wine, esteemed for its flavor.—A British species of *Salvia* (*S. Verbenaca*) is sometimes called Wild Clary.

CLA'SSICS. The term *classici* was originally applied to those citizens of Rome that belonged to the first and most influential of the six classes into which Servius Tullius divided the population. As early as the 2d c. after Christ, it is applied figuratively by Gellius to writers of the highest rank, and this mode of designation has since been very generally adopted both in literature and art Most nations have had at some one time a more than usual outburst of literature, and they usually styled this the Classical period of their literature, and its most distinguished writers their Classics. But as the great productions of the writers and artists of antiquity have continued to be looked upon by moderns as models of perfection, the word C. has come to designate, in a narrower sense, the best writers of Greece and Rome, and 'classical' to mean much the same as 'ancient.'

CLAUDE, ST. a town of France, in the department of Jura, romantically situated at the confluence of the Bienne and Tacon, 25 miles south of Lonse-le-Saulnier. The town originated in an abbey erected here in the 5th century. The abbey enjoyed extensive privileges, including a very oppressive one—viz., that a year's residence on the abbey-lands made a peasant a serf. Serfdom continued down to the Revolution. St. C. has a fine cathedral, and manufactures of cotton and paper; and musical-boxes, snuff-boxes, toys, and fancy articles of horn, bone, &c., are largely made. Pop. (1876) 6632.

CLAUDE LORRAINE (properly named CLAUDE GELÉE), a celebrated landscape-painter, was a native of Lorraine, and born in 1600. A relative, who traveled as a lace-dealer, took C., when still a boy, to Italy, but deserted him in Rome. However, he soon found employment in grinding colors, and doing other menial services for Agostino Tassi, a landscape-painter, from whom he gained some knowledge of art. He next studied under Godfrey Waals at Naples, and after some time spent in wandering through various portions of Europe, he finally settled at Rome in 1627. The demand for his pictures rapidly increased, and he received numerous commissions. C. died of gout in 1682.

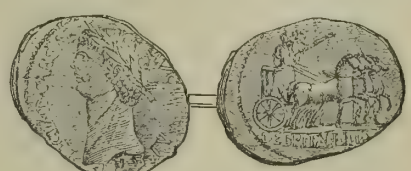
C.'s landscapes are found in the chief galleries of Italy, France, Spain, and Germany, and in particular England, which, according to Dr. Waagen, contains 54 paintings by Claude. Four of his best works—the landscapes known as 'Morning,' 'Noon,' 'Evening,' and 'Twilight'—are in the royal gallery at St. Petersburg. The painting on which C. himself set the highest value is the 'Villa Madama.' He kept it as a study, and refused to sell it, even when Pope Clement IX. offered for it as much gold coin as would cover the canvass. As C.'s paintings have always commanded high prices, many copies and imitations have been imposed on buyers. This was the case even during the artist's lifetime; for he set high prices on his works. In order to stop the fraudulent trade carried on in his name, he collected the sketches of his pictures in 6 books, to which he gave the title *Libri Veritatis*. They are now in the library of the Duke of Devonshire.

C. was an earnest, indefatigable student of nature, and possessed great invention. No one could paint with greater beauty, brilliancy, and truth the effects of sunlight at various hours of the day, of wind on foliage, the dewy moistness of morning shadows, or the magical blending of faint and ever-fainter hues in the far horizon of an Italian sky; but it has been affirmed—especially of late—that his conception is often artificial, conventional, and positively untrue, and it must certainly be admitted that his introduction of pseudo-Greek architecture into modern scenery is in the very worst taste. His figures are in general such inferior accessories, that he was wont to say he made no charge for them when he sold his pictures. In his private character, C. was amiable and very generous.

CLAUDET'S FOCI'METER, an instrument for ascertaining the coincidence or non-coincidence of the chemical and visual foci in portrait or landscape combinations of lenses. It consists of eight fans or equal segments of a circle, arranged spirally round a horizontal axis; they are white, and numbered from one to eight with black figures, and when in use, are so placed as to be all seen together from the lens. The method usually adopted in testing a lens is, to focus with great accuracy the fan numbered 4, and take a photograph of the instrument, in which, if No. 4 be the sharpest and best defined, it is a proof of the coincidence of the chemical with the visual focus; if, however, No. 3 should be sharper, the lens has been under-corrected; if No. 5, the lens has been over-corrected; in the former case, the lens must be turned more towards the ground glass, and in the latter further from the ground glass.

CLAUDIA'NUS, CLAUDIUS, a Latin poet of Alexandria, lived in the end of the 4th and beginning of the 5th century. He wrote first in Greek, which appears to have been his native tongue (though he was originally of Roman extraction); but, as Gibbon says, he 'assumed in his mature age the familiar use and absolute command of the Latin language; soared above the heads of his feeble contemporaries; and placed himself, after an interval of 300 years, among the poets of ancient Rome.' His poems brought him into such reputation, that, at the request of the senate, the Emperors Arcadius and Honorius erected a statue in honor of him in the forum of Trajan. The productions of C. that have come down to us, consist of two epic poems, *The Rape of Proserpine*, and the incomplete *Battle of the Giants;* besides Panegyrics on Honorius, Idyls, Epigrams, and occasional poems. C. displays a brilliant fancy, rich coloring, with variety and distinctness in his pictures; but he is often deficient in taste and gracefulness. A good edition of his works was published by Gesner (Leip. 1759), more recently by Doullay (Paris, 1836). An English translation was executed by A. Hawkins (London, 2 vols. 1817).

CLAU'DIUS I., TIBERIUS, a Roman emperor, the youngest son of Nero Claudius Drusus, step-son of the Emperor Augustus, was born at Lyon 10 B.C. He was naturally sickly and infirm, and his education was neglected, or left to be cared for by women



Coin of Claudius, representing his British triumph.
From the British Museum.

and freedmen. His supposed imbecility saved him from the cruelty of Caligula; but C., in his privacy, had made considerable progress in the study of history, and wrote in Latin and Greek several extensive works now lost. After the assassination of Caligula, C. was found by the soldiers in a corner of the palace, where, in dread, he had concealed himself. The prætorians carried him forth, proclaimed him emperor, and compelled his recognition by the senate and many citizens who had hoped to restore the republic. By his payment of the troops, who had raised him to the throne, C. gave the first example of the baneful practice which subjected Rome to a military despotism under the succeed-

ing emperors. The first acts of his reign seemed to give promise of mild and just government, but in the year 42, when a conspiracy against his life was detected, his timidity led him to yield himself entirely to the guidance of his infamous wife, Messalina, who, in concert with the freedmen Pallas and Narcissus, practised cruelties and extortions without restraint. C. meanwhile lived in retirement, partly occupied in studies, and expended enormous sums in building, especially in the famous Aqua Claudia (Claudian Aqueduct). This great work occupied 30,000 laborers during eleven years.

Abroad, the armies of C. were victorious Mauritania was made a Roman province, the conquest of Britain was commenced, and some progress was made in Germany. After the execution of Messalina, another woman equally vicious and more cruel, Agrippina (q. v.), married the emperor, and destroyed him by poison 54 A.D., in order to secure the succession of her son Nero. After his death, C. was deified.

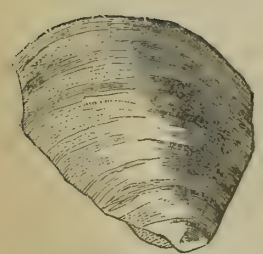
CLAUSE. See DEED.

CLAUSEL, BERTRAND, a French marshal, was born at Mirepoix, in the department of Ariège, December 1772, and entered the army at an early age. He commanded a brigade in the Italian campaign of 1799; was made a general of division of the Army of the North in 1802; and distinguished himself in the campaign of 1809 against Austria. The chief field of his fame, however, was Spain, where, after the battle of Salamanca, July 22, 1812, he succeeded Marmont in the command. He conducted the very difficult retreat from Portugal with the greatest circumspection, having to sustain a succession of battles. Although he had fought for Napoleon to the last, Louis XVIII., on his first restoration, named him inspector-general of infantry. When Napoleon again landed in France in 1815, C. immediately declared for him, was made a peer, and received the command of the Army of the Pyrenees. On the return of the Bourbons he was declared a traitor, but escaped to America; was condemned to death in his absence, but was subsequently permitted to return to France; and in 1830, after the July revolution, he received the command of the troops in Algeria, and made a successful expedition over the Atlas range into the province of Titeri, for which he was made marshal of France. Some misunderstanding, however, soon led to his recall; but he was again appointed governor-general of Algeria in 1835. After the disasters that befell the French arms before Constantine in 1836, and which were attributed in great part to him, he returned to France and defended himself—though not quite successfully—both from the press and the tribune, against the attacks made upon him. C. died at Secourrieu (Haute Garonne), 21st April 1842.

CLAU'SENBURG. See KLAUSENBURG.

CLAU'STHAL. See KLAUSTHAL.

CLAVAGE'LLA, or CLU'B-SHELL, a genus of Lamelli-



Clavagella Aperta:
External view of the Free Valve.

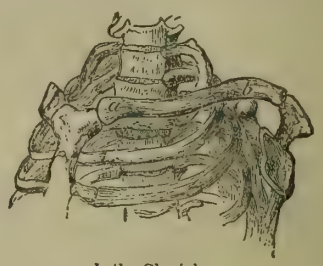
Clavagella Lata:
Showing the Cavity and Fixed Valve.

a, the fixed valve; *b*, the calcareous tube; *c*, a cavity communicating by a tubule with that of the clavagella.

branchiate Mollusks of the same family with Aspergillum (q. v.), of which fossil species were first known to naturalists, but existing species have also been discovered. These mollusks inhabit holes, which they excavate for themselves in rocks or in masses of coral, and the ordinary form of the bivalve shell is curiously modified; one valve being fixed to the inner surface of the chamber in which the animal lives, and the other free and capable of motion on its hinge within that chamber, whilst the shelly substance of the fixed valve is continued without interruption into a tube extending from the chamber outwards. The young mollusk is supposed to make its way into the rock by excavating this tube, but whether its excavations are accomplished by mere mechanical means, or by the aid of some chemical solvent, is still uncertain.—Fossil *Clavagellæ*, have not been found in any strata older than the supracretaceous group.

CLAVA'RIA, a genus of *Fungi* of the division *Hymenomycetes*, subdivision *Clavati*. The spores are produced equally on all parts of the surface. The species are numerous, some of them simple and club-shaped, some branched. Some are natives of Britain. *C. Botrytis*, a species common in oak and beech woods in Germany, growing on the ground, among moss, grass, heath, &c., is gathered when young, and used as food, having a very agreeable sweetish taste. It ceases to be edible when it becomes old. Another German species, *C. flava*, which grows on sandy ground in fir-woods, is used in the same way. Other species appear to possess similar properties, and Liebig found them to contain the saccharine substance called Mannite. *C. Botrytis* is the *Keulenpilz*, and *C. flava* the *Ziegenbart* (goat's-beard) of the Germans.

CLA'VICLE, or CO'LLAR-BONE, a bone which, in conjunction with the Scapula (q. v.) or Blade-bone, forms the shoulder. It derives its name from the Latin word *clavis*, in consequence of its resemblance to the key used by the Romans. As reference to the figure shows, it is placed horizontally at the upper and lateral part of the thorax, immediately above the first rib, and it articu-



ab, the Clavicle.

lates internally with the upper border of the Sternum (q. v.) or Breast-bone, and externally with the acromion process (or highest point) of the scapula.

Its chief office is to keep the shoulders well separated and steady, and to afford a fulcrum by which the muscles (the deltoid and great pectoral) are enabled to give lateral movement to the arm. Accordingly, it is absent in those animals in which the movement of the fore-limbs is only backwards and forwards (in one plane) for the purpose of progression, as in the Pachydermata, Ruminantia, and Solidungula; while it is present in all Quadrumana and in those of the Rodentia in which the anterior extremities are used for prehension as well as motion, as the rat, squirrel, and rabbit; and in the Cheiroptera and Insectivora, as the bat, mole, and hedgehog. In the mole it occurs in the form of a cube, being very short and broad, and of extreme strength. In many of the Carnivora (the cat, for example), the C. is present in the rudimentary form of a small bone suspended (like the hyoid bone in the neck) amongst muscles, and not connected either with the sternum or with the scapula. In Birds, where great resistance is required to counteract the tendency of the enormous pectoral muscles to approximate the shoulders, the clavicles are large and united at an angle in the median line (just above the anterior end of the sternum) into a single bone, anatomically known as the 'furculum,' but popularly recognized as 'the merry-thought.' (A lateral view of the furculum is given in the figure of the skeleton of the Golden Eagle in the article BIRDS.) In this class of animals, additional, and even more efficient, support to the anterior extremity is afforded by the extension of the coracoid process of the scapula into a broad thick bone called the 'coracoid bone' (q. v.), which extends to the sternum. It is unnecessary to trace the various modifications which this bone presents in Reptiles and certain Fishes.

In the human subject, the C. being exposed to the full force of blows or falls upon the shoulder, and not being easily dislocated (in consequence of its being well secured at both ends), is very frequently broken.

Ossification takes place in the C. earlier than in any other bone, commencing as early as the 30th day after conception, according to Beclard; and at birth it is ossified in nearly its whole extent. Mr. Humphrey (in his admirable *Treatise on the Human Skeleton*) suggests that the early ossification of this bone is a provision on the part of nature to prevent it from being fractured at birth in case of difficult labor.

Much important anatomical and physiological matter in connection with this bone will be found in Humphrey's work above cited, and in a memoir which he has recently published in the

Transactions of the Cambridge Philosophical Society; in Owen, *On the Nature of Limbs;* and in Struthers, *Osteological Memoirs, No.* 1, *The Clavicle.*

CLAVICO'RNÉS (Lat. club-horned), a great family of coleopterous insects, of the section *Pentamera,* distinguished by the club-shaped termination of the antennæ, which are longer than the maxillary palpi. Most of the beetles of this family feed on animal substances, and many of them, and particularly their larvæ, find their appropriate food in substances undergoing decay. It contains many genera, divided into groups (tribes), *Histeroides, Silphales, Dermestini,* &c. Burying Beetles and the Bacon Beetle may be mentioned as examples of it.

CLAVI'GERO, Francesco Saverio, a Mexican historian, was born in Vera Cruz, South America, about 1720, and entering the order of the Jesuits, was educated as an ecclesiastic. Sent as a missionary among the Indians in various parts of Mexico, he lived among them for 36 years, and made himself fully acquainted with the languages, traditions, and antiquities of the aboriginal tribes. On the suppression of the Jesuits in South America by Spain, in 1767, C. sailed for Italy, and with others of his brethren had the town of Cesena assigned to them by the pope as a place of residence, where he died October 1793. He wrote in Italian a *History of Mexico,* a comprehensive and valuable work, of which an English translation by C. Cullen was published in 1787, in 2 vols. 4 to.

CLAY (Ang.-Sax. *clæg;* of the same root as *clag, claggy*), a term applied, in a vague way, to those kinds of earth or soil which, when moist, have a notable degree of tenacity and plasticity. The clays are not easily distinguishable as mineral species, but they all appear to owe their origin to the decomposition of other minerals, and to consist chiefly of alumina in combination with silica and with a certain amount of water. See Alumina, Shale, Loam, Pipe-clay, Kaolin, &c. Common C., when, from the large proportion of alumina which it contains, it is sufficiently plastic, is of great use for making bricks (q. v.), tiles, &c.

C. is used by sculptors and others engaged in the production of works of plastic art, as a means of adjusting the form which is to be given to their work, in the harder or more enduring substance of which it is ultimately to be composed. As modelling C. is apt to crack in drying, it must be kept damp by sprinkling water over it, and covering it with a wet cloth when the artist is not engaged in his work.

Clay Soils derive their character from the alumina which they contain in a state of mixture, as well as in chemical combination with other substances. Some soils contain as large a proportion of alumina as 40 per cent., but generally the proportion is much smaller. The felspar which chiefly yields the alumina of clay soils contains also soda and potash, substances essential to vegetables, and which tend to render clays fertile when under cultivation. The physical characters, however, of the different varieties of clay soils arising from the varying proportions of silica, and other substances mixed with the alumina, are chiefly concerned in their relative fertility. Calcareous matter exercises a considerable influence on their powers of producing crops.

In Scotland, clay soils are chiefly found on the coal-measures, the boulder-clay, and as alluvium in the valleys. Those derived from the coal-measures are generally unkindly, being tenacious and difficult to labor. In the eastern counties, these are usually farmed on a five or six course shift, according to their quality. In the western, the moister climate is less suited for cultivating them to advantage, and dairy husbandry usually prevails where they are found under culture. The clay soils derived from the boulder-clays are also generally coarse and inferior in quality. The richest clay soils are found along the margins of the rivers, and go under the name of *carse* clays, which have already been described under that head. In the north of England, the aluminous shales of the coal-measures yield soils very similar in their properties to those in Scotland. England also abounds in clay soils derived from other geological formations. The chief of these are the London, plastic, weald, Gault, and blue lias clays.

The stubborn character of many of them is such that they are not suitable for tillage, but form excellent meadows and pastures. In the dry climate of Suffolk, strong clays are cultivated with great success on the four-course shift—1. Seeds, 2. Wheat, 3. Fallow or Roots, 4. Barley. Thorough drainage has greatly increased the value of clay soils under cultivation. Being so much sooner dry in spring, a longer period is obtained for preparing the land for putting in the crops. Weeds, too, are much more easily extirpated, and the strength of the soil is more entirely directed towards the raising of the crops. Wheat, beans, and clover are the crops which clay soils carry in the greatest perfection.. Clay soils have been long known to be retentive of moisture as well as of manure. Recent chemical investigations have shown, that clay soils have remarkable powers for absorbing ammonia, potash, and other substances, which constitute the food of plants. This property, it is now pretty well ascertained, arises from surface attraction.

CLAY, Cassius M., a zealous abolitionist, born in Kentucky, 1810, graduated at Yale College, 1832, and three years after was elected to the legislature of his native state. C. opposed the annexation of Texas, 1844; started *The True American,* a vigorous anti-slavery paper, the following year; volunteered in the Mexican war, 1846; supported Mr. Lincoln in 1860; and in 1862 was appointed U. S. Minister to Russia, a post he held till 1869.

CLAY, Henry, an American statesman of some distinction, was born April 12, 1777, in Hanover county, Virginia. He early devoted himself to the law, and fixing his residence at Lexington, Kentucky, soon obtained a lucrative practice and political influence enough to be elected to the state legislature. In 1806 he was elected to Congress, and again in 1809 he was chosen senator for a term of two years. In 1811 he was sent to the House of Representatives, where he was immediately elected Speaker. A strong advocate of nationality, he denounced the claims put forth by England as to right of search; he was a strenuous supporter of the war with that country, and in consequence was sent, in 1814, as one of the commissioners to sign the treaty of peace at Ghent, where his acuteness secured for America some advantages. On his return, he exerted all his talents in favor of the independence of South America, and labored hard to eradicate all European influence from the American continent. C., however, is best known as the author of the famous 'Missouri Compromise,' restricting slavery to the states south of 36° 30′ N. lat.; and also for the compromise of 1850, known as C.'s 'Omnibus' measure. He died June 1852. C. had undoubted talents, but he was by no means a comprehensive statesman. He was by far too fertile in compromises to be the author of any measure conferring lasting benefit on his country. He was very popular during his lifetime, and was two or three times proposed for the presidency, an honor, however, which he never succeeded in obtaining.

CLAY'MORE (meaning 'the great sword'), the Gaelic name for a kind of sword at one time much used, but not so well known at present. It had a double-edged blade, about 43 inches long by 2 inches broad; its handle was often 12 inches long, and its weight 6 or 7 lbs.

CLAZO'MENÆ, one of the twelve cities of Ionia. It was originally built on the Hermæan Gulf, westward from Smyrna; but the inhabitants having, through fear of the Persians, fled to a neighboring islet, and Alexander the Great having connected the islet with the mainland by a dike, the city subsequently extended over the peninsula thus formed. It is now called Vurla.

CLEA'NTHES, a Stoic philosopher, born at Assos, in Troas, about 300 B.C. His poverty was such, that he had to work all night at drawing water, in order to obtain money for his support, and to pay his class-fee while attending the lectures of Zeno. For nineteen years he listened patiently to the great Stoic, and, on his death, succeeded him in his school. He died of voluntary starvation when about 80 years old. C. differed, it is said, from the other Stoics, in regarding the sun as the governing principle of the world; but none of his writings are extant except a *Hymn to Zeus,* one of the purest and noblest pieces of poetry in the Greek language. It is an admirable union of religious feeling and philosophic thought, and impresses us very strongly in favor of the author, who, from all we can learn, was a man of stern and serious character. The *Hymn to Zeus* was published in Greek and German by Cludius (Göttingen, 1786), and re-edited by Merzdorf (Leip. 1835).

CLEAR, Cape, a headland of Clear Island, the most southerly extremity of Ireland, and locally belonging to Cork county. Cape C. is elevated more than 400 feet above the sea, and has a lighthouse, lat. 51° 26′ N., long. 9° 29′ W., with a bright revolving light 455 feet above the water-level.

CLEARANCE, in the mercantile marine, is a permission from the custom-house officers, or the emigration officers, or both, for the departure of a ship from a port, denoting that all the formalities have been observed, and all dues, &c., paid. If a foreign vessel, she must also be certified by the consul of the nation to which she belongs. Hence the expression *cleared out,* in reference to the departure of a particular ship.

CLEA'RING-HOUSE, in Banking. The business facilities afforded by bankers to their customers in collecting their bills, cheques on other firms, and like obligations, early imposed the necessity for an organized form of interchange of such securities, which would at once save labor and curtail the amount of floating cash requisite to meet the settlements of the bankers if effected singly.

This was first done by the clerks, when out collecting from the different banking-houses, meeting daily at the counter of one of the houses for the purpose; but about 1775, the building in Lombard Street, known as the 'Clearing-house,' was set apart for it,

under the direction of a committee delegated by the different firms, and the immediate management of two paid inspectors. The arrangement of the establishment may be briefly described: From time to time during the day each firm transmits to the C. cheques and bills which are payable by other bankers for classification, taking account of the obligations coming against their firm, so that, at the close of the day, they are the better able to make up their private books. At 4 o'clock the accounts are closed; each bank has till 4.45 to decide whether it will honor the drafts upon it; and by half-past 5, the officials are able to learn that the several houses are agreed between themselves, who has to pay money and who has to receive, and how much, by making up an account of the form subjoined. It is made up as between the particular bank receiving it and the C. representing every other bank with whom the former may have had any business on the day in question:

GLYN.

Debtors.	Balance.		Balance.	Creditors.
280,000	20,000	Barclay		260,000
50,000	10,000	Bosanquet		40,000
110,000		Commercial	10,000	120,000
115,000	5,000	Currie		110,000
50,000	5,000	Fuller		45,000
100,000	10,000	Hanbury		90,000
110,000		Hankey	5,000	115,000
280,000		Jones	20,000	300,000
150,000		Lubbock	10,000	160,000
200,000		Masterman	15,000	215,000
50,000		Olding	5,000	55,000
65,000	5,000	Spooner		60,000
165,000	5,000	Union		160,000
	60,000		65,000	

The comparatively small balance thus exhibited, used to be settled by each banking-house which owed money sending down to the C. the amount, and paying it, not to the officials there, but to any clerk whose house claimed a balance. But now, to avoid the risk of handling such a large amount of bank-notes, it is settled by means of a species of cheque on the Bank of England appropriated to the purpose, called *transfer tickets*, signed by each banking-house, and certified by an inspector of the clearing-house. A white one is used when the bank has to pay a balance to the C., and a green one when it has to receive a balance from it. By this means, transactions to the amount of several millions daily are settled without the intervention of a bank-note; and the importance of the arrangement may be assumed from the fact, stated in evidence before the House of Commons, that before the connection of the London and Westiminster Bank with the C., they were obliged to keep in hand £150,000 in notes for negotiating their exchanges.

CLEARING-HOUSE, The Railway, is an association instituted to enable railway-companies in England and Scotland, to carry on, without interruption, the through traffic in passengers, animals, minerals, and goods passing over different lines of railways, and to afford to the traffic the same facilities as if the different lines had belonged to one company. The arrangements are called 'the clearing system,' and are conducted by a committee appointed by the directors of the companies who are parties to it. The business is carried on in a building in Seymour Street, London, adjoining the Euston Station. The association is regulated by act of parliament, 13 and 14 Vict. 33 (25th June 1850), called 'The Railway Clearing Act, 1850.' Any railway-company may apply for admission to the system, and, on being accepted becomes a party to it. The companies are each represented on the committee by a delegate. Ten delegates form a quorum. The committee holds stated meetings on the second Wednesday in March, June, September, and December in every year, and at such other times as may be found necessary. The accounts of the clearing-system, and the balances due to and from the several companies, are settled and adjusted by the secretary of the committee, with appeal to the committee, whose decision is final. The expenses are defrayed rateably by the companies. The clerks at stations of the various companies send abstracts of all traffic monthly. The collected passengers tickets are also sent monthly. Number-men are employed by the C., who attend at each railway junction, and watch the arrival and departure of every train passing the junction. They note the number of every carriage, horse-box, wagon, van, and sheet or wagon-cover on the train going beyond the parent line, and also all damaged stock, and make weekly returns. The destination of each wagon is also noted. The returns from the companies' stations, together with those of the number-men, enable the accounts to be made up at the C., and, after examination, the companies are debited and credited, as the case may be. A debtor and creditor account is sent from the C. monthly to each company, showing, on the one side, what the company has to receive from others as their proportion of through passenger-fares, through goods rates and mileage of carriages, wagons, and sheets, and, on the other side, what the company has to pay to others out of monies drawn by them. The balance is struck, and, if against the company, a remittance must be made. If the balance is on the passenger traffic or stock, it is due five days after the date of the C. advice. The other balances must be paid within 23 days. Interest at the rate of 7 per cent. per annum is charged on outstanding balances. The cost of maintaining the C. with its officers and numerous clerks and number-men, is apportioned amongst the respective companies—(1.) In proportion to the number of entries at the credit of each in the mileage account; (2.) In the ratio of the number of vehicles and sheets recorded by the number-men; and (3.) According to the time occupied on the accounts.

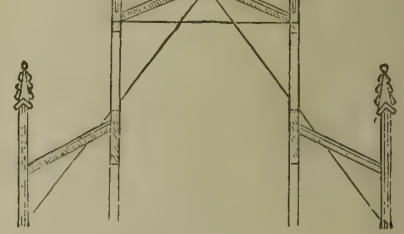
Regulations are published annually by the C. in January, for the guidance of the different companies in connection with the system. These determine the principles of classification of goods, division of rates, terminal allowances, payment for loss or damage of goods, and other points. A committee of general managers is appointed, whose duty it is to arbitrate on claims for damages to rolling-stock. A committee of goods' managers adjudicate cases of disputed liability which relate to goods' traffic. A committee of coaching superintendents perform a similar duty with reference to coaching or passenger traffic. The mileage of carriages is also regulated, being three-farthings per mile first class, and a half-penny for second. A varying rate for wagons and sheets is allowed according to distance, the charge for distances under 150 miles being about one half-penny for box-wagons, $\frac{2}{3}$ of a penny for open wagons, and $\frac{1}{3}$ of a penny for sheets. If carriages are detained beyond one clear day, demurrage is charged at the rate of 10*s.* per day for first-class carriages, and 6*s.* for second-class. If wagons are detained beyond two clear days, 3*s.* a day is charged. Sheets, after two days, are charged 6*d.* for the first day, and 1*s.* per day after. The terminal allowances are 8*s.* 6*d.* per ton in London, and 4*s.* in the country for carted goods; 1*s.* 6*d.* per ton when not carted.

The number of companies parties to the clearing-system was recently between 90 and 100, and the amount of business of an intricate kind which was involved may be judged of from the foregoing particulars. In short, the C. system of Great Britain is a vast organization, adapted, in an extraordinary degree, to save trouble in accounting, as well as to prevent petty disputes, among the individual companies concerned. The very circumstance of the great bulk of the used passenger-tickets in the kingdom being transmitted to a common center for adjustment as to the claims of one company against another, affords, in itself a remarkable instance of an ingenious system for elaborating simplicity out of what would almost appear a commercial chaos.—There is a similar railway C. system in Ireland, with its headquarters in Dublin.

CLEARING-NUT (*Strychnos potatorum*), a small tree of the same genus with the Nux Vomica (q. v.), abundant in the forests of India, and of which the seeds are much used for clearing water. They are sold for this use in the bazaars, and travelers commonly carry some with them. These seeds being rubbed on the inside of a vessel, muddy water put into it very quickly becomes clear, all impurities settling to the bottom. The tree has a deeply fissured bark; ovate, smooth, and pointed leaves; and a shining, black, pulpy fruit, with only one seed. The wood is very hard, and is used for various purposes.

CLEARNESS, a quality of art which is realized by a skilful arrangement of colors, tints, and tones. Where C. is to be obtained without sacrificing depth, a knowledge of *chiaroscuro* (q. v.) becomes indispensable.

CLEA'R-STORY, or CLERE-STORY. Originally this term was applied generally to the upper part of any building, which was lighted by several windows, or by a row of small windows or openings in the wall. Latterly, it came to be applied exclusively



Clear-story of Church.

to the upper part of the central aisle of a church, in which windows were found above the roof of the side aisles. The object of the C. in churches appears to have been to increase the light in the nave, but the windows in our existing churches are generally

so small as to effect this object very imperfectly. In many churches, the C. is a subsequent addition, and has often been added when the high-pitched roof, which indcluded the side aisles in its span, gave place to a flat one covering the nave only. The walls over the arches of the nave were then raised so as to receive the C. windows.

Cleat.

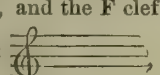
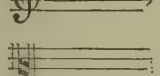
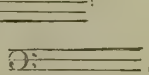
CLEATS, in Ship-building, are pieces of wood fastened to various parts of the vessel, and having holes or recesses for fastening ropes. There are several kinds, applied to various purposes, and bearing the names of *belaying*, *comb*, *mast*, *shroud*, *single*, *stop*, *thumb*, &c., cleats.

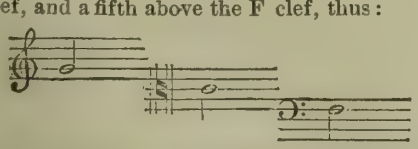
CLEAVAGE, or SLATY CLEAVAGE, is a condition of rocks in which they split easily into thin plates. The direction of these laminæ may be in the plane of stratification, but it much more frequently differs from it. C. is the result of an operation which is subsequent to, and entirely independent of, the original stratification of the rocks. It is impossible to determine what is the producing cause of this phenomenon. By some it has been considered to be due to crystalline agency, while others maintain that it arises from the pressure of mechanical forces at right angles to the planes of C., and yet others seek an explanation in a combination of these two agencies.

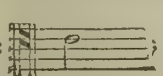
Professor Sedgwick, who has carefully examined the phenomena of C., has arrived at the following general results: 1. That the strike of the C. planes, when they were well developed, and passed through well-defined mountain-ridges, was nearly coincident with the strike of the beds; 2. That the dip of these planes (whether in quantity or direction) was not regulated by the dip of the beds, inasmuch as the C. planes would often remain unchanged while they passed through beds that changed their prevailing dip, or were contorted; 3. That where the features of the country or the strike of the beds was ill defined, the state of the C. became also ill defined, so as sometimes to be inclined to the strike of the beds at a considerable angle; 4. Lastly, that in all cases where the C. planes were well developed among the finer slate-rocks, they had produced a new arrangement of the minutest particles of the beds through which they pass.

C. though generally confined to clay-slate, yet occasionally occurs in lime and sandstone; but in proportion as the rocks are coarse, the C. planes become fainter and wider apart. In the fine-grained clay-slate, on the other hand, the laminæ are thin, smooth, and parallel; and as C. is always accompanied with more or less induration in the rock where it exists, clay-slate, thus altered, is of great economic value for roofing.

CLEAVERS, or GOOSE-GRASS (*Galium Aparine*), a species of Bedstraw (q. v.), a coarse annual, with whorls of 6—8 leaves, both stem and leaves rough with reflexed bristles, the fruit also hispid, and when ripe, very ready to adhere to any passenger who may brush against it; a very common weed in hedges and bushy places in Britain and most parts of Europe; but which has, from time to time, been brought into notice as possessing a remarkable specific power over some of the most formidable cutaneous diseases, including even lichen and leprosy, also over cancer. It is administered in the form of decoction or of extract. The whole subject of the properties of this herb seems to demand fuller examination.

CLEF, a musical character placed on the staff, by which the names of the notes are fixed. There are three kinds of clefs—viz., the G, the C, and the F clef. The G clef is placed on the second line, thus:  ; the C clef on the third line, thus:  ; and the F clef on the fourth line, thus:  . The C clef is a fifth below the G clef, and a fifth above the F clef, thus:



The C clef is also placed on the fourth line for some instruments, and for the tenor part in vocal music, thus:  ; and in old vocal music, the C clef placed on the first line was used for the soprano.

CLEG, a name given to some insects of the dipterous family *Tabanidæ*, the females of which are extremely troublesome to horses, cattle, and human beings in summer, piercing their skins by means of a curious apparatus of small lancets with which the mouth is furnished, and drinking their blood. The name C. is sometimes given in England to *Chrysops cæcutiens*, a fly frequent in most parts of Europe, but rare in Scotland, and which not unfrequently inserts its proboscis through the sleeve, or some other part of the dress, and thus makes man himself the object of its attack. It is about one-third of an inch in length, mostly black, with yellow markings on the abdomen, and very large eyes of the most beautiful green and golden colors. The insect always called C. in Scotland, is *Hæmatopota pluvialis*—a rather smaller fly, mostly of a gray color, but also remarkable for its very large and beautiful eyes, which are greenish, with waved purplish-brown bands. In England, it is sometimes called the *Stout*.

Cleg (*Chrysops cæcutiens*).

CLE'MATIS (Gr. *clema*, the shoot of a vine), a genus of plants of the natural order *Ranunculaceæ*, having four colored sepals, no corolla, and for fruit numerous one-seeded achænia with long—generally feathery—awns. The species are pretty numerous, herbs or shrubs, generally with climbing stems, natives of very different climates, and much scattered over the world. They possess more or less active caustic properties. The long awns give the plants a beautiful appearance even in winter. The flowers of many species are also beautiful. *C. Vitalba*, the common TRAVELER'S JOY (fancifully so named because of its ornamental appearance by the wayside), is the only native of Britain. It is common in the south, but becomes rarer towards the north, and is scarcely found in Scotland. The twigs are capable of being made into baskets. It rapidly covers walls or unsightly objects. The fruit and leaves are acrid and vesicant, the leaves are used as a rubefacient in rheumatism; and those of other species are also employed in the same way.—A number of species are commonly cultivated in our gardens. *C. flammula*, a native of the south of Europe and north of Africa, with white flowers, which have a very strong honey-like smell, is the species known as Sweet Virgin's Bower.

Clematis Vitalba.

CLE'MENS, TITUS FLAVIUS, a celebrated father of the Christian Church, was born probably at Athens, and resided during the greater part of his life in Alexandria, whence the epithet *Alexandrinus*. He flourished at the close of the 2d and the beginning of the 3d century. In his earlier years, he devoted himself with great zeal to the study of philosophy. His love of knowledge induced him to visit Greece, Italy, Syria, Palestine, and other countries. It is not known at what precise period he was converted from heathenism; but it is certain that after coming to Egypt, and listening to the prelections of Pantænus, he joined the Alexandrine Church, and was made a presbyter. Afterwards he became assistant to his master, who held the office of *catechist*. In 202 A.D., the persecution of the Christians under Severus compelled him to flee to Palestine. He is supposed to have returned to Alexandria about 206, and in 211 succeeded Pantænus. The year of his death is differently stated; some writers think it probable he died 213 A.D.; others, as late as 220. His most distinguished pupil was Origen.

C. was a very fertile writer. The chief productions of his which have survived are the *Protrepticus*, *Pædagogus*, and *Stromata*—which together form one large work. The first is an exhortation to the heathen to abandon idolatry; the second, an exposition of Christian ethics; and the third, a collection of treatises and brief observations on Greek and Christian literature. They show that C., when he became a Christian, did not cease to be a philoso-

pher; instead of railing at science, he felt himself bound to make use of it, wherever it was helpful in the elucidation of the higher questions of religion. Among the Fathers, *Biblical criticism*, in the strict sense of the term, was unknown, and speculative philosophy was the only critical instrument in their possession. It is not to be wondered at, therefore if much that is fantastic and absurd is to be found in their writings. C. certainly displays no lack of uncritical errors; but it is equally certain that the introduction of philosophy into Christianity helped to preserve the church from lapsing into the narrowness and ceremonialism of Jewish worship. The impression which we gather from C.'s writings, is that he was a man of broad, earnest sympathies, sincere piety, and liberal views in regard to the purposes of God's providence. This catholicity of mind procured him the accusation of heresy, and lost him the title of saint. C. was also a writer of Christian hymns, one of which, addressed to the Redeemer, is preserved. His collective works were first published at Florence in 1550.

CLEMENS, or CLEMENT, is the name of 17 popes, few of whom require any special notice. See POPES. CLEMENS ROMANUS, probably the C. mentioned in the Epistle to the Philippians, is assumed as the first of the series. He is accounted one of the apostolic fathers. He is said to have died as bishop of the church in Rome, in the year 102. Of his two *Epistles to the Corinthians*, the first and longest is undoubtediy genuine. But the Apostolical Canons and Constitutions attributed to him are spurious, as well as the fabulous account of his journeys with the apostle Peter. This last has come down to us in two forms: one in Greek, divided into 19 Homilies, under the title of *Clementina;* the other, a Latin translation by Rufinus, entitled *Recognitiones Clementis*. The Epistles have been edited by Muralt (Zurich, 1848), the Homilies by Schwegler (Stutt. 1847), and the Recognitiones by Gersdorf, in his *Biblioth. Patr. Eccl.*, vol. i. (Leip. 1837).

CLEMENT XIV., GIOVANNI VINCENZO ANTONIO GANGANELLI, was born in 1705 at St. Arcangelo, near Rimini, where his father was a physician. At the age of 18, he entered the order of Minorites, and studied philosophy and theology, which he then successfully taught. His merits were appreciated by the keen-sighted Benedict XIV., who appointed him to the important post of counsellor to the Inquisition, and under Clement XIII. he was made a cardinal. On the death of Clement XIII., he succeeded to the papal chair, May 19, 1769. No pope had ever been elected under greater difficulties. The kings of Portugal, France, Spain, and Naples were at variance with C., chiefly on account of his support of the Jesuits; Venice wished to reform the religious orders without his interference; Poland was seeking to diminish his influence; the Romans themselves were discontented. C. first set about reconciling the monarchs; he sent a nuncio to Lisbon, suspended the bull *In Cœna Domini*, and entered into negotiations with Spain and France. After several years of negotiation, he issued, 1773, the famous brief *Dominus ac Redemptor noster*, suppressing 'for ever' the society of the Jesuits. The motive assigned in the brief is, 'regard to the peace of the church.' From this time his life was made miserable by constant fear, and his strength gradually gave way. He died of a scorbutic disease, September 22, 1774. C. was remarkable for liberality of mind, address as a statesman, sound learning, and mildness of character. He cherished the arts and sciences, and was the founder of the Clementine Museum, which, by the additions of Pius VI. and Pius VII., became the chief ornament of the Vatican.

CLEMENTI, MUZIO, one of the best of pianists and composers far the pianoforte, was born at Rome in 1750 or 1752. His skill on the pianoforte, when only 13 years of age, secured for him the notice of a Mr. Beckford, an English gentleman traveling in Italy, with whom C. went to England, and in whose family he remained for several years, studying the works of the great composers, and where he also acquired an extensive knowledge of literature. His 'Opera 2' (composed in his 18th year) is considered the model on which the whole modern pianoforte sonatas have been founded. After traveling on the continent for some time, he returned to England, where he obtained the highest reputation as a teacher. Pecuniary misfortunes induced him, in the year 1800, to commence business as a music-seller and manufacturer of pianofortes. He died in London, March 10, 1832. His compositions, mostly pianoforte sonatas, are full of pleasant melody, and arranged in masterly style. For students, his classical *Introduction to Pianoforte Playing*, and his last work, the *Gradus ad Parnassum*, have been highly recommended. His style of playing was brilliant, and in improvisation he excelled all his predecessors.

CLEOMEDES, a Greek writer on astronomy. Nothing is known regarding his life, nor the period when he flourished. His treatise is entitled *The Circular Theory of the Heavenly Bodies*, and is remarkable as containing, amid much error and ignorance, several truths of modern science—such as the spherical shape of the earth, the revolution of the moon about its axis, its revolution round the earth, &c. C.'s treatise was first printed in Latin by Geo. Valla (Ven. 1498); in Greek, by Conrad Neobarius (Par. 1529). The two latest editions are those of Janus Bake (Lugd. Bat. 1820) and C. C. T. Schmidt (Leip. 1832).

CLE'ON, a famous Athenian demagogue, who flourished during a part of the Peloponnesian war, was originally a tanner, but having a strong bias towards politics, he gradually abandoned his business and became the champion of popular 'rights.' He first became prominent in the discussion regarding the fate of the Mytilenæan prisoners, 427 B.C. C. advocated the massacre of the males, carried his point, and more than 2000 perished; the rest were saved through the remorse of the Athenians. In 425 B.C., along with Demosthenes, he commanded an expedition against the island of Sphacteria, which was garrisoned by the Lacedemonians, and, much to the surprise of every one, succeeded in reducing the place; but the whole merit of this deed is usually attributed to his colleague. C. himself, however, was highly elated with his success, and his countrymen, or, at least, many of them, appear to have fancied that he really possessed military genius, for in 422 B.C. he was sent to oppose Brasidas, the Spartan general, in Macedonia and Thrace. On his way thither, he took Torone, a town in which Brasidas had left a small garrison and afterwards Galepsus.

But the great design of the campaign was the capture of Amphipolis, where Brasidas was stationed. C. somewhat reluctantly advanced, and began to reconnoitre. While he was so doing, Brasidas made an unexpected sally, and in the battle which ensued both leaders were slain. The Athenian army, however, was defeated, and obliged to retreat. The general opinion of C. is not favorable. He is painted both by Thucydides and Aristophanes as an ignorant, vain, blustering, and cowardly *mobocrat*. Most modern historians have accepted this estimate of the man; but Grote, in his *History of Greece*, has thrown very considerable doubt on its truth, and has labored to show that he was the rough but resolute champion of the people, and that his character has been vilified and abused by Aristophanes, who was—there can be no doubt—violently aristocratic.

CLEOPA'TRA, the daughter of the Egyptian king, Ptolemy Auletes, was born 69 B.C., and, according to the will of her father, should have inherited the throne along with her brother, Ptolemy Dionysus, who was also her husband. Her claim, however, being opposed, Julius Cæsar came to Alexandria, 48 B.C., to interpose in the quarrel, and in the Alexandrian War, Ptolemy Dionysus fell, and C., who was now married to her younger brother, Ptolemy, a boy of eleven years, was established upon the throne of Egypt. She bore a son to Cæsar, who was named Cæsarion. On her visiting Rome, Cæsar received her with great magnificence, and placed her statue in the temple which he had built to Venus Genitrix. In the civil war, after Cæsar's assassination, C. at first hesitated which side to take. After the battle of Philippi, Antony summoned her to appear before him at Tarsus, in Cilicia, to give account of her conduct. C., who had in the meantime got quit of the youthful Ptolemy by poison, appeared in the character of Venus Anadyomene, and so fascinated Antony, that he ever afterwards remained devoted to her. They spent the winter, 41—40 B.C., in Alexandria, in revelry; and Antony, although he had in the meantime married Octavia, the sister of Octavianus, returned to the embraces of C., who met him at Laodicea, in Syria, 36 B.C., and accompanied him to the Euphrates. His general residence from this time was with her at Alexandria. He bestowed upon her and upon her children great estates, which, however, he had no right so to dispose of. Upon this and other accounts, he became the object of great detestation at Rome, and war was declared against C., Antony being now regarded as her general. At her instigation, he risked the great naval battle of Actium (q. v.); and when she fled with 60 ships, he forgot everything else, and hastened after her. When Octavianus appeared before Alexandria, C. entered into private negotiations with him for her own security, which treachery becoming known to Antony, he vowed revenge; but a report coming to him that she had committed suicide, he thought it impossible to survive her, and fell upon his sword. Mortally wounded, and learning that the report which he had heard was false, he caused himself to be carried into her presence, and died in her arms. Octavianus, by artifice, succeeded in making her his prisoner.

Failing to make any impression upon him, and finding that he spared her life only that she might grace his triumph at Rome, she took poison, or, as is said, killed herself by causing an asp to bite her arm. Her death took place in August, 30 B.C. Her body was buried beside that of Antony, and Octavia brought up the children whom she had born to Antony as if they had been her own.

CLEPSY'DRA, an ancient Greek musical instrument, described by Athenæus as having pipes which were made to produce a soft sound by the agitation of water forcing air into them. There were levers for admitting the water, thus forming a kind of hydraulic organ.

CLEPSYDRA (Gr. *klepto*, I conceal, *hydor*, water), an instrument for measuring time by the efflux of water through a small orifice. Two kinds have been in use—one wherein the fluid is simply allowed to escape through the orifice; the other, in which the uniformity of the flow is secured by maintaining the fluid at a constant level in the instrument. The first would, like a sand-glass, give only an accurate measure of the time occupied in the escape of the whole fluid: of a shorter time it would be an inaccurate measure, as the pressure under which the escape takes place at the commencement is greater than at any instant thereafter, and constantly diminishes with the height of the fluid column. In the second, the flow must be nearly uniform; and if the water be received into a uniform graduated tube as it escapes, we have a tolerably good clock. The rate of the flow, however, is affected by the temperature and barometric pressure. The C. is supposed to have been used among the Chaldeans. The Romans employed it extensively. The invention of the pendulum has superseded it in modern times.

CLERC, Jean Le, better known as Johannes Clericus, was born at Geneva, March 29, 1657, where his father was a clergyman. From an early period, he showed a particular aptitude for the study of ancient languages, and in this department he is still a conspicuous name. He also paid great attention to theology, and his numerous controversial writings brought him no mean reputation during his lifetime. Before he was twenty, C. had imbibed heterodox opinions in religion. In 1678, he went as tutor to Grenoble, where he remained for two years; in 1680, he returned to Geneva, and was appointed to the clerical office. All the while his objections to the accepted theology of the day had been growing: the works of Curcellæus and of Episcopius confirmed this antipathy, and now he appeared as Liberius de St. Amore, the writer of eleven Letters against the Errors of the Scholastic Theologians—in short, as the partisan of the Dutch Remonstrants. In the latter part of 1681, C. left Saumur, whither he had gone to perfect his French, and went to Grenoble, and thence to London, where he preached six months to the Savoy congregation. Finally, he was appointed Professor of Philosophy, Classical Literature, and Hebrew at the Remonstrant seminary of Amsterdam. He died 8th January 1736. C.'s writings are very numerous; but his greatest service to posterity was the publication of a quarterly, the *Bibliothèque Universelle et Historique* (1686—1693, 25 vols., in 8vo.), followed up by the *Bibliothèque Choisie* (1703—1713) and the *Bibliothèque Ancienne et Moderne* (1714—1727). Other works of C.'s are—*Harmonia Evangelica* (1700); *Traduction du Nouveau Testament avec des Notes* (1703); *Ars Critica* (3 vols., 1712—1730); and *Traité de l'Incrédulité* (1733). The first two are Socinian in their tendency. C.'s rationalism is still more manifest in a work entitled *Sentimens de quelques Théologiens de Hollande touchant l'Histoire Critique du Vieux Testament*, in which the special inspiration of the Scriptures is denied. His editions of several of the ancient classics prove both his learning and acumen.

CLE'RGY (Gr. *cleros*, a lot, an inheritance), a term very generally applied to the ministers of the Christian religion, in contradistinction to the *Laity* (q.v.). This use of the term is very ancient, and appears to have gradually become prevalent, as the ministers of religion more and more exclusively, instead of the members of the Christian Church equally, began to be regarded as God's 'heritage' and 'priesthood' (1 Pet. ii. 9, and v. 3), consecrated to him, and peculiarly his. The distinction between the C. and the laity became more marked through the multiplication of offices and titles among the C., the ascription to them of a place in the Christian Church similar to that of the priests and Levites in the Jewish Church, with peculiar rights and privileges, their assumption of a peculiar dress and official insignia, the growth of monastic institutions, and the introduction of celibacy. In harmony with the notions on which this distinction is founded, is that of an indelible or almost indelible character derived from ordination, so that a renunciation of the clerical office is either viewed as an impossibility, or a sort of apostasy. These notions in their highest degree belong to the Church of Rome. In the Protestant churches, the distinction between C. and laity is much less wide; and although the same terms are often used, it is rather conventionally than in their full signification. The employment of official robes by the C. preceded their assumption of a peculiar ordinary dress, and is not so intimately connected with any peculiar pretensions. Among the privileges accorded to the C. by the Roman emperors, and in the middle ages, was exemption from civil offices; among the rights asserted by them, and which caused much dispute, was exemption from lay-jurisdiction, even in cases of felony. The C. were distinguished into the *higher C.* and the *lower C.*, the latter including janitors, acolytes, lectors, exorcists, &c. The term *Secular C.* is the designation of priests of the Church of Rome who are not of any religious order, but have the care of parishes. Monks who are in holy orders are designated *Regular Clergy*. See Benefit of Clergy.

CLERK, Ship's, is a civil officer on board a ship of war, under the immediate orders of the captain. He keeps all the captain's documents, which are very numerous; such as the ship's log, remarks on coasts and anchorages, the muster-book, &c.

CLERK, John, of Eldin, Mid-Lothian, Scotland, inventor of the modern British system of breaking the enemy's lines at sea, was the 6th son of Sir John Clerk of Penicuick, Bart. Though not a naval man, he studied deeply both the theory and practice of naval tactics, and in 1779 communicated to his friends a new manœuvre for 'breaking the enemy's line' in a naval battle. Visiting London the following year, he had some conferences on the subject with naval officers, among whom was Sir Charles Douglas, Lord Rodney's captain of the fleet in the memorable action of April 12, 1782, when the experiment was tried for the first time, and a decisive victory gained over the French. The principle was adopted by all British admirals, and led to many signal naval victories. In 1782, C. printed 50 copies of his *Essay on Naval Tactics*, for private distribution among his friends. It was reprinted and published in 1790; the 2d, 3d, and 4th parts were added in 1797; and the work was republished entire in 1804, with a preface explaining the origin of his discoveries. The manœuvre was claimed by Sir Howard Douglas for his father, Admiral Sir Charles Douglas, but C.'s right to it is indisputable. He died May 10, 1812.—His son, John Clerk (Lord Eldin), an eminent Scottish judge, born in April 1757, was educated for the profession of the law, and in 1785, was admitted advocate. Distinguished for great clearness of perception and admirable powers of reasoning, he had for many years the largest practice at the Scottish bar, and in 1823 was raised to the bench, when he assumed the judicial title of Lord Eldin. He possessed a quaint sarcastic humor, and a coarse but ready wit, which, with his lameness and other bodily peculiarities, rendered him one of the most remarkable Edinburgh characters of his time. He died in that city in June 1832.

CLERK, Parish, an official in the Church of England, who leads the responses in a congregation, and assists in the services of public worship, at funerals, &c., but is not in holy orders. There is usually one in each parish. In cathedrals and collegiate churches, there are several of these lay-clerks; and in some cases they form a corporate body, having a common estate, besides payments from the chapter. Before the Reformation, the duties were always discharged by clergymen.

CLERK TO THE SIGNET. See Writer to the Signet.

CLERMONT (in the middle ages, *Clarus Mons*, or *Clarimontium*) is the name of several towns in France. The most important is the capital of the department of Puy-de-Dôme, Clermont-Ferrand (the *Augustonemetum* of the Romans, in the country of the Arverni), which is finely situated on a gentle elevation between the rivers Bedat and Allier, at the foot of a range of extinct volcanoes, crowned by the peak of Puy-de-Dôme, about five miles distant from the town. It consists of the two towns of C. and Montferrand, upwards of a mile distant from one another, and connected by a fine avenue of trees. C. contains several remarkable buildings; the old Gothic cathedral, the Corn and Linen Hall, the Theater, and the Hôtel-dieu or Hospital. C. has several educational and scientific institutions, and a public library, in which are preserved some curious MSS. Pop. (1876) 37,074, who carry on the manufacture of linen, woollen, cloth, hosiery, paper, &c., and an extensive traffic in the produce of the district, and in the transit trade between Paris and the south of France. There are two mineral springs in the town, which are used for bathing. That of St. Alyre is most remarkable, having deposited in the course of ages an immense mass of limestone; and the deposit at one part forms over a rivulet a natural bridge 21 feet long. The whole district abounds in such springs. A multitude of Roman antiquities attest the Roman origin of the city. In the middle ages C. was the residence of the counts of the same name, and became the seat of one of the oldest bishoprics in France. Several ecclesiastical councils were held here, the most remarkable of which was that in 1095, at which the first Crusade was instituted by Urban II. A statue has been erected to Pascal, who was a native of Clermont.

CLERMONT-DE-LODEVE, a town in the department of Herault, 23 miles W.-N.-W. of Montpellier, agreeably situated on the declivity of a hill, crowned by the ruins of an old castle. It has extensive manufactures of woollen cloth. Pop. (1876) 5685.

CLE'RUS, a genus of insects of the order *Coleoptera*, section *Pentamera*, and of the great family or sub-section *Serricornes*. They are beautiful beetles, generally found on flowers, and often on those of umbelliferous plants, but their larvæ feed on the larvæ of different kinds of bees: those of *C. apiarius*—a rare insect in Britain, but common in some parts of Europe—on the larvæ of the hive-bee. It is about half an inch long, greenish, the wing-cases scarlet with purplish blue bands. How the larvæ of this and other insects should be able to carry on their ravages with impunity in a bee-hive, has never yet been satisfactorily explained.

CLE'VELAND (Cliff-land), a wild mountainous district, with some picturesque fertile valleys, forming the east part of the N. Riding of Yorkshire between Whitby and the Tees. Geologically it consists of inferior oolite, but the coast and west border are formed of lias. In the south the hills rise 1300 to 1850 feet. An extraordinary change has been wrought in the aspect of the country by a rich discovery of ironstone in the C. hills; since 1851, lonely hamlets have become populous towns. The ironstone is chiefly an argillaceous carbonate, inferior in quality to the ironstone of the coal measures. See MIDDLESBOROUGH.

CLEVELAND, next to Cincinnati the most commercial city in Ohio, stands on the south shore of Lake Erie, at the mouth of Cuyahoga, in lat. 41° 30′ N., and long 81° 47′ W. The harbor is one of the best on the coast; and has been rendered still more available by extending a pier on either side into deeper water. By means of this secure and commodious haven, C., with the aid of artificial works in both directions, has navigable communications with the Atlantic Ocean on the one hand, and with the head of Lake Superior on the other; while to the south it connects itself with the basin of the Mississippi and the Gulf of Mexico through a canal which enters the Ohio at Portsmouth, about 200 miles below Pittsburg. C. is also the terminus of railways converging from almost every quarter. With so many advantages in its favor, it could hardly fail to grow and prosper. It is celebrated for its ship-building, and is becoming rapidly more and more important for its manufactures. Among these are copper-smelting, iron-rolling, coal-oil refining, the making of iron from ore, nail manufactories, &c. In 1874, the imports and exports were valued at 1,876,108 dollars. C. was founded in 1796, but it does not appear to have attained anything like its present rate of progress before 1840. Between that year and 1850, the population increased from 6,071 to 17,034; in 1860, it was 43,147; in 1870, it was 92,829; and in 1880 it was 160,142. Many of the streets of C. are lined with trees, whence it is called 'Forest City.' C. has numerous public schools, colleges, public buildings, charitable institutions, 100 churches, 50 newspapers and periodicals, &c. Magnificent works were erected at the cost of about 800,000 dollars to supply the city with water from Lake Erie.

CLEVES (Ger. *Kleve*), a town of Rhenish Prussia, 48 miles north-west of Düsseldorf. It is situated on three gentle elevations, about 2½ miles from the Rhine, with which it communicates by canal, in the midst of a rich and beautiful country. It is divided into an upper and lower town, is well built in the Dutch fashion, and surroudned by walls. It has a fine old castle, partly-built on a commanding rock, in which Anne of Cleves, one of the wives of Henry VIII., was born, and which is now converted into public offices. In the collegiate church, which dates from the 14th c., are some good monuments to the counts of Cleves. C. has manufactures of woollen and cotton fabrics, silks, hosiery, tobacco, &c. Pop. (1880) 10,000. C. was anciently the capital of a duchy extending alongboth banks of the Rhine, and which passed by marriage to the reigning House of Prussia.

CLEW is a name given to the lower corner of square sails, and the aftermost lower corner of stay-sails. *Clew-lines* are the names of ropes for managing these corners; *clew-garnets* are only applied to the *courses*, or largest sails of a ship; and to *clew-up*, is to haul up the C. of a sail.

CLEW BAY, an inlet of the Atlantic, on the west coast of Mayo county, Ireland, 15 miles deep by 8 broad. Some of the mountains on the north rise 1200 to 2500 feet, but the land on the east is lower, and leads to Westport, Newport, and Castlebar. Old red sandstone, carboniferous limestone, and Cambrian strata form the shores of the bay, which are generally bold and rocky, but have many small harbors and fishing-stations. The upper part of the bay contains an archipelago, 300 fertile and cultivated islets. At the entrance of the bay is Clare Isle, 4½ by 2 miles, composed of old red sandstone and Cambrian rocks, and rising 1520 feet.

CLICHÉ (Fr.), the impression made by a die in melted tin, or other fusible metal. It is the proof of a medallist's or die-sinker's work, by which they judge of the effect, and ascertain the stage of progress which they have reached before the die is hardened. The same term is applied by the French to stereotype casts from wood-cuts.

CLICHY, a town of France, in the department of Seine, about four miles north-west of Paris, of which it forms a suburb. It has manufactures of white-lead and chemical products. Pop. 14,366.

CLI'CK-BEETLE, the proper name of many species of coleopterous insects of the tribe *Elaterides* (see ELATER), the parents of the destructive larvæ too well known to the farmers by the name of WIRE-WORMS (q. v.). They derive the name C. from the sound which they make when, being laid on their back on any hard substance, they regain their feet by a spring, in the manner characteristic of the tribe to w hich they belong. The British species are numerous, the largest not quite half an inch long; none of them brilliantly colored; all very similar in form, and rather elongated. SKIP-JACK is another popular name for them. The Striped C. (*Agriotes* [*Cataphagus* or *Elater*] *lineatus*) is the parent of a very destructive kind of wire-worm.

CLI'ENT. See AGENT AND CLIENT. See also PRINCIPAL AND AGENT, PATRON, COUNSEL.

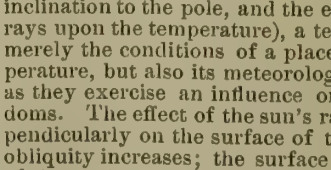
CLIFFORD, WILLIAM KINGDON, F.R.S., late Professor of Applied Mathematics and Mechanics at University College, London, and one of the foremost mathematicians of his time, was born at Exeter, May 4, 1845. He was educated at a school in his native town, at King's College, London, and at Trinity College, Cambridge. While at Trinity, he did not confine himself to examination subjects, but read largely in the great mathematical writers, and was second Wrangler in the Mathematical Tripos of 1867. At this time, while excelling in gymnastics, he would also solve and propound problems in the pages of the *Educational Times*, and could discuss with ease complicated theorems of solid geometry without the aid of paper or diagram.

A High-Churchman at first, C. before taking his degree threw off all his conventional restraints, and eagerly discussed some of the religious questions of the day. In August 1871 he was elected to the chair of Mathematics and Mechanics at University College, London, which post he retained until his untimely death at Madeira, March 3, 1879. C. first established his reputation as an original thinker with the faculty of expressing scientific thought in plain and simple language by a lecture at the Royal Institution, *On Some of the Conditions of Mental Development*. He was a valued member of the London Mathematical Society, contributing to the *Proceedings;* for a time he acted as Secretary, and afterwards Vice-president of the Mathematical and Physical section of the British Association; he also lectured to the Sunday Lecture Society on such subjects as *Ether*, *Atoms*, and *the Sun's Place in the Universe*. The versatility of his mind for philosophical and scientific discussion was further shown by his varied contributions to periodical literature. Besides these articles, he issued the first part of a larger text-book, *Elements of Dynamic* (1878). A selection from his *Mathematical Papers* appeared in 1881.—See Clifford's *Lectures and Essays*, edited by Stephen and Pollock, 1879.

CLI'FTON, a beautiful favorite watering-place in the south west of Gloucestershire, forming the western suburb and part of the parliamentary borough of Bristol. It is built on the sides and top of a carboniferous limestone hill, 308 feet high; commands fine picturesque views; and is separated from a similar cliff by a deep chasm on the south, through which flows the navigable Avon. The rock abounds in fossils and quartz or Bristol diamonds. It has a tepid spring of 73° F. which contains carbonic acid and salts of magnesia, and was brought into notice about 1695; but the former popularity of the spa has declined, and the pump-room has been destroyed. At the time of the great Lisbon earthquake, this water became red; and the Avon, which rises here 35 feet at high water, suddenly turned back. On Clifton Down are some remains of a Roman camp, 510 by 300 feet. An extensive camp is in good preservation on the opposite side of the gorge, with which C. is connected by a suspension bridge, 275 feet above low water, and 702 feet in span. C. College ranks among the best English schools. See BRISTOL.

CLIMA'CTERIC YEAR. It was long believed that certain years in the life of man had a peculiar significance to him, and were the critical points, as it were, of his health and fortunes. The mystical number 7 and its multiples (e. g., 35, 49) constituted crises of this kind. The most important of all was the 63d year, called, by way of eminence, the 'climacteric year' or 'grand-climacteric,' which was supposed to be fatal to most men; its influence being attributed to the fact, that it is the multiple of the two mystical numbers 7 and 9.

CLI'MATE (from the Greek *klima*, a slope or inclination, afterwards applied to a tract of country, with reference to its supposed inclination to the pole, and the effect of the obliquity of the sun's rays upon the temperature), a term now employed as including not merely the conditions of a place or country with regard to temperature, but also its meteorological conditons generally, in so far as they exercise an influence on the animal and vegetable kingdoms. The effect of the sun's rays is greatest where they fall perpendicularly on the surface of the earth, and diminishes as their obliquity increases; the surface which receives any given amount of the sun's rays increasing with their increased obliquity, as *a'b'* is greater than *ab* in the annexed figure; whilst at the same time the oblique rays being subjected to the influence of a greater number of particles of the atmosphere, as *c'a'* is longer than *ca*, a greater amount of their heat is absorbed before they reach the surface of the earth at all. The greater or smaller extent of surface receiving a certain amount of



heat, also makes important differences to arise from *exposure* by slope towards the equator or towards the nearest pole. *Elevation* is a most important cause of differences of climate. As we ascend from the level of the sea to the greatest mountain altitudes, even at the equator, the temperature gradually diminishes, owing to the diminished density of the atmosphere, and we reach a region of perpetual snow, as in approaching the poles. The progressive diminution of the temperature is, however, affected by many other causes, so that the line of perpetual snow is far from being at the same elevation in all places of the same latitude. Thus, the snow-line on the southern side of the Himalaya is depressed by the moisture of the aërial currents from the Indian Ocean; and that on the northern side is elevated by the radiation of heat in the vast dry table-lands of Central Asia, and the consequent ascending streams of warm dry air; so that the difference between the two is not less than 4000 feet in favor of the *northern* side of the mountain-ranges; and Humboldt says, 'millions of men of Tibetian origin occupy populous towns in a country where fields and towns would, during the whole year, have been buried in snow, if these table-lands had been less continuous and less extensive.' As the actual temperature of the atmosphere depends not so much upon the direct rays of the sun as upon the radiation from the heated surface of the earth, the diversities in the character of that surface are productive of great effects in modifying climate. A sandy desert, a tract of country clothed with luxuriant vegetation, and an expanse of water, absorb and radiate heat in very different degrees. A newly ploughed field both absorbs and radiates heat much more rapidly than a field covered with grass.

A sandy desert heats the atmosphere above it much more than either a fertile tract or a watery expanse, and a watery expanse still less than a fertile tract; but, on the other hand, the desert cools sooner by radiation; whilst the heat absorbed by the water being diffused through a larger mass—partly by reason of the motion continually taking place in the fluid substance—and affecting greater depths, the influence of the ocean, of seas, and of great lakes, is very powerful in maintaining a greater equality in the temperature of the atmosphere. Thus maritime places, and particularly islands and peninsulas, have a more equal temperature, with less diversity of the extremes of summer and winter, than more inland or continental places otherwise similarly situated. The effect of the sea is modified by many circumstances, and particularly by currents, of which the Gulf Stream (q. v.) affords a notable instance, the heated water conveyed by it from the equatorial to the polar regions having a great influence on the C., particularly of the north-west of Europe. The temperature of Europe is also in part dependent on the warm south winds, which have absorbed heat from the great sandy deserts of Africa; and over the world generally, atmospheric currents must be regarded as exercising even a greater influence on the C. than oceanic currents. The quantity of rain or snow that falls in the course of a year, and the times and manner of its falling, are circumstances which have a great effect on climate. These are circumstances much influenced by the distribution of land and water, and by the elevation and character of the surface of the land, which, doubtless, also influence electric and other meteorogical conditions, less understood, but certainly not unimportant.

The relations of C. to vegetation are determined not merely by the mean annual temperature, but in a great measure also—and, with regard to many plants, entirely—by the duration and C. of summer. Thus, maize, which may be mentioned as an important example, succeeds well in climates of which the winter-cold is severe, the summer season alone being sufficient for its whole life; whilst, on the other hand, such plants as fuchsias, some kinds of laurel, and even the common hawthorn, which succeed well enough where maize would scarcely put forth an ear, would perish from the colder winters of countries where it is profitably cultivated. The polar limit of particular species of animals, except those which hybernate, is generally determined by the decree of winter-cold which they can bear without injury.

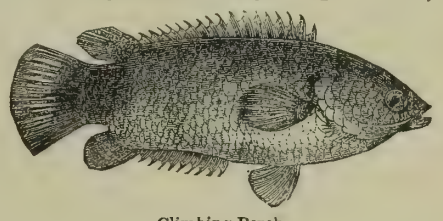
Bogs and marshes exercise an unfavorable influence on C., cooling the air and causing fogs, as clay-soils also to some extent do, through their retentiveness of moisture; whilst marshes of some kinds, and in some situations, abound in exhalations very unfavorable to health. Similar remarks apply to large tracts of forest. The clearing, drainage, and cultivation of land have generally favorable effects on C.; although plantations are often beneficial for shelter; and a too complete removal of natural forests may prevent the deposition of moisture from the atmosphere to such a degree as to cause droughts, a result strikingly exemplified in some of the smaller West India Islands, and the tendency to which is said to be manifested on the great scale in the eastern part of the continent of North America.

The important and difficult subject of C. will be found further elucidated in some of the principal geographical articles, and in the articles AGRICULTURE; ARBORICULTURE; ATMOSPHERE; METEOROLOGY; MONSOONS; RAIN; SEASONS; STORMS; TRADE-WINDS; WIND.

CLI'MAX, a Greek word signifying primarily a *stair*, and in Rhetoric, that artifice which consists in placing before the mind of the reader or hearer a series of propositions or objects so arranged that the least forcible strikes it first, and the others rise by successive gradations in impressiveness.

CLIMBERS (*Scansores*), in Ornithology, an order of birds generally characterized by having two toes before opposed by two toes behind, so as to adapt their feet in a remarkable degree for the purpose of grasping the branch of a tree or any similar object. Many have not two toes permanently directed backwards, but have the power of turning one of the front toes backwards at pleasure. Some have only three toes, but yet on other accounts are unhesitatingly ranked in this order. The families of the C., however, differ very much in many respects, although agreeing in the structure of their feet. To this order belong parrots, toucans, trogons, barbets, woodpeckers, and cuckoos. It has been objected to the name C., that although very descriptive of the habits of some birds of this order, as woodpeckers, it is not very applicable to others, as cuckoos, whilst there are birds of the other orders, as creepers, which possess this habit in the greatest degree; and the name has been changed by some ornithologists into *Yoke footed* or *Zygodactylous Birds*. It is generally the outer front toe which is directed backward in this order; but in the trogons, the first and second toes are opposed to the third and fourth.

CLIMBING PERCH (*Anabas scandens*), the only well-ascertained species of a genus of fishes, from which the family *Anabasidæ* (q. v.) derives its name. It is a native of rivers and ponds in most parts of the East Indies. It is about six inches long. In general form, it somewhat resembles a perch, and the resemblance is increased by the large scales and the spiny dorsal fin. That this fish climbs trees, has been asserted by observers whose veracity and accuracy cannot easily be questioned; yet others,



Climbing Perch.

who have enjoyed ample opportunity of observation, express great doubt concerning this habit. In climbing, the fish is said to suspend itself by its spiny gill-covers, and by fixing its anal fin in cavities of the bark, urging its way upwards by distending and contracting its body. There is no doubt that it often leaves pools when they are in danger of being dried up, and travels in search of water. Though these fish are sometimes compelled in their distress to travel by day, and have been met in the glare of noon toiling along a dusty road, their migrations are generally performed at night or in early morning, whilst the grass is still wet with dew. Climbing perches are plentiful in the Ganges, and the boatmen have been known to keep them for five or six days in an earthen pot without water, using daily what they wanted, and finding them as lively as when just caught.

CLIMBING PLANTS, or CLIMBERS, are, in the most extensive and popular sense of the term, those plants which, having weak stems, seek support from other objects, chiefly from other plants, in order to ascend from the ground. This, however, is accomplished in very different ways. Some climb by means of small root-like processes growing from the stem, as the ivy; some by means of *cirri* or tendrils, which twine round branches of trees, &c. (see CIRRUS); some by adhering disks, of which a beautiful instance is to be seen in the well-known Virginian Creeper; and many by the twining of their own stems around those to which they cling. Twining plants generally turn only in one direction, either from right to left, or from left to right. The scarlet-runner and passion-flower are examples of the former; the honeysuckle and hop of the latter. Twining plants are not always included under the designation climbing plants. The woody twining plants, which form one of the most remarkable features of tropical forests, are often called *Lianas* (q. v.).

CLI'NCHER-BUILT, or CLINKER-BUILT, is a name applied in Ship-building, when the lower edges of the side-planks overlap the row next under them, like slates on the roof of a house. If the planks are all smooth, meeting edge to edge, the construction is called *carvel-built*. This construction requires that the seams should be very close, and caulked with oakum. Boats are often *diagonal-built;* two layers of planking, rising in opposite directions from the keel at an angle of 45°. In iron ships, the clinker arrangement is called *lap-jointed;* and the carvel arrangement, *jump-jointed*.

CLI'NIC BA'PTISM (Gr. *kline*, a bed), in the ancient church, baptism administered to a person on a sick-bed or death-bed. The practice and the term alike indicate notions concerning baptism which have no foundation in Scripture, and which, although once extremely prevalent, have now almost entirely disappeared.

CLINIC ME'DICINE, is that department of the art which is occupied with the investigation of diseases at the bedside, or individually.

CLI'NKSTONE, or PHO'NOLITE, is a grayish green felspathic rock, remarkable for its tendency to lamination, which is sometimes such that it affords tiles for roofing. It is a compact homogeneous rock, passing gradually into gray basalt. The slabs give a metallic ring or 'clink' when struck with a hammer, whence its name. It occurs in volcanic districts.

CLINO'METER, an instrument for the purpose of taking the dip and strike of a stratum. It consists of a compass provided with a small spirit-level, and on the lid—which can be fixed at right angles to the compass-box—there is a small graduated quadrant, and a plumb-line.

CLI'NTON, DE WITT, an American statesman of English origin, son of a major-general in the United States army, and descended, on his mother's side, from the Dutch family of De Witt, was born in 1769, at Little Britain, state of New York. Being admitted to the bar, he became private secretary to his uncle, General George Clinton, till the end of his administration in 1785. In 1797, he was elected a member of the New York legislature, and in 1801, chosen a senator of the United States. Subsequently, he was elected mayor of New York, from which office the violence of political parties occasioned his retirement in 1815. Between 1817 and his death in 1828, he was repeatedly governor of New York state. The formation of the great canal trom Lake Erie to the Hudson was mainly owing to his persevering endeavors. He was a member of most of the literary and scientific institutions of the United States, and of several of those of Great Britain and the continent of Europe. Besides various fugitive pieces, his productions consist of speeches, governor's messsages, discourses before various institutions, addresses to the army, communications regarding Lake Erie Canal, and judicial opinions.

CLINTON, HENRY FYNES, a very distinguished classical scholar, was born January 14, 1781, at Gamston, in Nottinghamshire; educated at Southwell School, and afterwards at Westminster. In 1799, he went to Oxford, and in 1805 took his degree of M.A. Next year, he entered parliament as member for Aldborough, which he continued to represent until 1826. He died October 24, 1852. C.'s two great works are the *Fasti Hellenici* (1824—1834), and *Fasti Romani* (1845—1850). They are known to all European scholars, and contain an immense store of learning.

CLI'O, in Grecian mythology, the daughter of Jupiter and Mnemosyne, the mother of Hyacinthus and Hymenæus. She was the Muse of History and Epic Poetry, and was represented as bearing a half-opened roll of a book.

CLIO, a genus of shell-less Pteropodous mollusks, of which one species, *C. borealis*, is extremely abundant in the Arctic seas, and constitutes a principal part of the food of whales, so that indeed the name *whale's food* is often given to it by whale-fishers. It is scarcely an inch long; the head is furnished with six retractile tentacula; the organs of locomotion are two delicate fins, attached

Clio Borealis

to the neck, and which in swimming are brought almost into contact, first above, then below. It is an active little creature, often coming for an instant to the surface of the water in calm weather, and then suddenly diving away into the depths. Myriads are seen together, and the water is sometimes so full of them, that a whale cannot open its mouth without engulfing them in great numbers. *C. australis* is almost as abundant in the southern seas as *C. borealis* in the northern.

CLIPPER, is a name familiarly given to a ship built expressly for speed. The requirements of trades in which the merchandise carried was of a perishable nature, and rendered a quick passage desirable, were probably among the first causes which directed scientific attention to the *lines* of vessels for the purpose of ascertaining the form adapted to offer least resistance to the water. For many years the fruit-clippers have been celebrated for their rapid passages; and the opium-clippers, and slavers, have attained an unenviable notoriety for speed. The modifications of the old form of vessel have been gradual, the desideratum aimed at being the combination of the greatest carrying capacity with the form best adapted for speed. Perhaps the most successful improvements have been those of the Aberdeen builders, the Americans, and Mr. Scott Russell. A C., as compared with an ordinary sailing-ship, is longer and narrower (though of late the tendency has been to increase the beam); very sharp at the bows, which are generally hollowed more or less below the water-line; gracefully fined away towards the stern, which is usually elliptical; and, altogether, presenting the contrast of the race-horse to the beast of burden.

Some of the C. ships now running from Liverpool to America and to Australia are among the most magnificent vessels in the

English Clipper.

world. The *Lightning*, during a voyage from Melbourne to Liverpool, ran 2550 English miles in one week, or at the rate of 15¼ miles an hour during the whole period. The Americans have fully done their part in introducing rapid C. ships, both for ocean and for river navigation, for steamers and for sailing-ships.

CLIPPING THE COIN. See COINING.

CLI'THEROE, a parliamentary and municipal borough in the west of Lancashire, on the left bank of the Ribble, 28 miles north of Manchester. It lies on a low eminence of carboniferous limestone, at the base of Pendle Hill, which is 1803 feet high. Pendle Forest is celebrated as the locality of the exploits of the Lancashire witches. The main street runs along the ridge of the eminence, and at its south end are the ruins of a castle, founded in the time of William Rufus by the Lacys. C. has printworks, cotton manufactures, and limekilns. It sends lime to all parts of the kingdom. About 5 miles west of C., lies Stonyhurst College, the principal seat of the Jesuits in England. Pop. (1881) of the parliamentary borough, 14,463. It returns one member to parliament.

CLIVE, ROBERT, LORD, Baron of Plassey, one of the greatest warrior-statesmen of whom England can boast, the founder of British supremacy in India, was born at Styche, in Shropshire, 1725. At school he exhibited little aptitute for learning, but was noted for his mischievous propensities and his fearless disposition. The monotony of a clerkship in the India Civil Service at Madras, where he arrived in 1744, had literally been the death of him; it was with great joy, therefore, that he abandoned the pen for the sword, when some three years after his arrival the troubles accumulating upon the English in India gave him an opportunity of doing so. C. had now found his true sphere. The bold, fearless character had now scope enough for its development; and the intellect which, chained to the desk, had seemed of the dullest and most commonplace kind, in the freedom of the field became at once quick, comprehensive, and original. When C. grasped the sword, English influence in India, was almost extinct; the French and their allies had scarcely left them even a material footing.

Yet in less than half-a-dozen years after C. had, in August 1751, with 200 English infantry and 300 sepoys, marched out of Fort St. David on his hazardous enterprise to attack Arcot, a city of 100,000 inhabitants, and garrisoned by 1200 or 1500 of Chunda Sahib's best troops, amply supplied with artillery, the decisive battle of Plassey had been fought, and English power established on the ruin of that of France and the native princes. The daring displayed in the capture of Arcot, and the intrepidity and fortitude exhibited in its defence by C. and his little band, reduced to 200 men, against an army of 10,000, was the foundation of England's subsequent greatness and glory in India. C.'s name henceforward was a tower of strength in India, where he was surnamed by the natives *Sabat Jung*, or 'the Daring in War.' Victory marched with him alike against native warriors, French, and Dutch. Unscrupulons as to his means, he would undoubtedly have found himself involved in many difficulties had not his questionable actions been invariably crowned, and thus—in the lax political notions of the time—justified, by success. Nothing re-

maining for him to do in India, he returned to England in 1760, and received the warm thanks of the Company and an Irish peerage from the government for his services. His wealth, arising from shares in various spoils, presents and grants of territory from native princes, was enormous. After his departure from India, the company's affairs, through the dishonesty of its servants, high and low, fell into a state of the greatest confusion, and C., in 1764, was chosen to set them right. He proved himself as competent an administrator as he was a warrior. Uncompromising and resolute, he bore down every opposition to his plans, all the more sternly that he found it in some cases assuming the form of threats. In less than 18 months, he had 'restored perfect order and discipline in both the civil and military services, and brought back prosperity to the well-nigh ruined finances of the Company.' He returned to England in 1767, and was received with the distinction to which his important services entitled him. But the energetic way in which he had righted matters in India, gave offence to those who suffered from the supression of dishonest practices, many of whom were not without considerable influence in the mother-country. This influence they employed to stir up ill-feeling against C.; and his proceedings in India were made the subject of animadversion in parliament in 1772, and in the following year, matter for the inquiry of a select parliamentary committee; who, however, failed to find that C. had acquired his great wealth by abuse of power, as his enemies had asserted. The form of acquittal, however, was not quite satisfactory to C., who never got over the disgrace implied in the trial; and ended his life by suicide, November 22, 1774. See Malleson's *Clive* (1882).

CLOA'CA. See the article BIRDS. A similar anatomical arrangement is found in one order of mammals, the monotremata (q. v.), in all reptiles, and in many fishes.

CLOACA MA'XIMA. This was a subterranean passage of vast extent, by which the whole, or a great part, of the fifth of ancient Rome was conveyed to the Tiber. Drains from the lower parts of the city around the Forum, and from the other valleys, were commenced by Tarquinius Priscus; but the construction of the C. M. is attributed by Livy to Tarquinius Superbus. Niebuhr is of opinion, that it was at first intended to drain the valley of the Forum; but it appears to have been subsequently extended, and connected with the smaller cloacæ. Running from the Forum past the temple of Vesta, it terminated at the Tiber, where the mouth of it is still visible. It consisted of three large arches, one within the other. The space enclosed by the innermost vault was upwards of 13 feet in width, and of a corresponding height. The arches were built of large blocks of stone, fixed together without cement, of the uniform size of rather more than 5 feet 5 inches long and 3 feet high. The species of stone used bears evidence to the antiquity of the construction, being the material which was employed in the most ancient public edifices. The sewer was kept in a state of efficiency by a continual stream of superfluous water from the aqueducts. Large portions of this and of the other cloacæ remain, in some places still visible, but generally buried, by the accumulation of soil, at a considerable depth below the present level of the streets. During the Republic, the surveillance of the Roman cloacæ was one of the duties performed by the censors. The C. M. was subjected to repair by Cato and his colleague in the censorship. Agrippa, when ædile, obtained praise for his exertions in cleansing and repairing the cloacæ, and is recorded to have passed through them in a boat. Under the empire, officers called *curatores cloacarum urbis* were appointed for their supervision. So thoroughly was the city undermined by these large sewers, that Pliny calls it *urbs pensilis*, a city suspended in the air rather than resting upon the earth. Drains of the same description, but of smaller dimensions, existed in some others of the ancient Roman cities.

CLOCK BE'LL-METAL is principally an alloy of copper and tin, with smaller quanties of bismuth, antimony, lead, and zinc. A common alloy is 80 parts of copper, 10 tin, 5¼ zinc, and 4½ lead. The bismuth and antimony make the bell more brittle, but they communicate a better tone; and where the proportion of tin rises as high as 20 per cent., or 1 part of tin to 4 of the other metals, a very much more sonorous bell is obtained.

CLOCKS. See HOROLOGY.

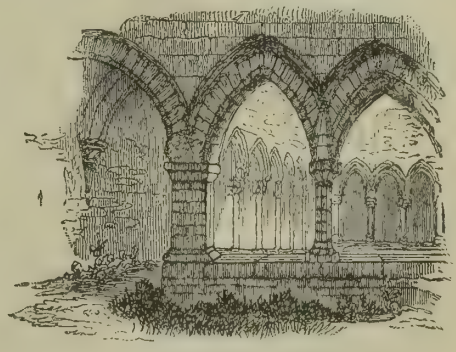
CLOGHEE'N, a town in the south-west of Tipperary county, 14 miles west-south-west of Clonmel, in lat. 52° 17′ N., and long. 7° 57′ W. Pop. (1881) 2924. The rich limestone soil of Tar vale produces fine wheat crops, and there are extensive flour-mills here. Six miles north-west of C. are the famous limestone caves of Mitchellstown, with beautiful limestone concretions. The caves consist of galleries and vaults, 800 by 570 feet.

CLO'GHER, a decayed episcopal city of Ireland, in the south of Tyrone, on the Launy, a tributary of the Blackwater, 104 miles north-north-west of Dublin. The see is now united to that of Armagh. St. Patrick is said to have been the first bishop of C., in 444. Pop. (1871) 1515; (1881) 1397.

CLOG A'LMANAC, the name given in England to a primitive kind of calendar or almanac, called also a 'rim stock' and 'prime staff.' In Scandinavia it was called a 'Runic staff,' from the Runic characters used in its numerical notation. It was generally of wood (whence its name of 'clog,' *i. e.*, log or block), but was sometimes of brass, of bone, or of horn. When of wood, it was most commonly of box; but elm, fir, and oak, were also employed. 'This almanac'—says Dr. Plot, in his *Natural Histoto of Staffordshire*, written in 1686, when it was still in use among the common people of that county—'is usually a square piece of wood, containing three months on each of the four edges. The number of days in them are expressed by notches: the first day by a notch with a patulous stroke turned up from it, and every seventh by a large sized notch. Over against many of the notches are placed on the left hand several marks or symbols, denoting the golden number or cycle of the moon. The festivals are marked by symbols of the several saints issuing from the notches. Some are perfect, containing the dominical letters as well as the prime and marks for the feasts, engraven upon them, and such are our primestaves in the Museum at Oxford: others imperfect, having only the prime and the immovable feasts on them, and such are all those I met with in Staffordshire; which yet are of two knds also, some public, of a larger size, which hang commonly here at one end of the mantle-tree of their chimneys, for the use of the whole family; and others private, of a smaller size, which they carry in their pockets.' Examples of the C. A. may be seen in the British Museum (one cut apparently towards the end of the 17th c.); in the Ashmolean Museum, and the Bodleian Library, at Oxford; in St. John's College, Cambridge; and in the Cheetham Library, at Manchester. The Flemish antiquary, Gruter, delineates one at Rome, which he believes to have been used by the Goths and Vandals; but there is no reason to suppose that the C. A. was known to any European nation before its conversion to Christianity. It is described by the Swedish historian, Olaus Magnus, in the 16th c.; and by the Danish antiquary, Olaus Wormius, in the 17th c. It has been found in France and elsewhere. In Denmark it seems to have been generally flat, divided into six columns; but six-sided examples are not unfrequent. Some of the clog almanacs show a peculiar numerical notation. The first four digits are marked by dots; the fifth, by a sign like the Roman numeral V; the next four, by this sign and additional dots; and the tenth, by the sign +.

Clog Almanac for month of January.

CLOI'STER (Fr. *cloître*, *claustrum*, an enclosure), a covered passage, or ambulatory, running round the walls of certain portions of monastic and collegiate buildings. The C. usually surrounded, or ran along three sides of a quadrangular area, which



Cloister:—Kilconnel Abbey.

was called the *C. garth*. The roof of the C., which was often vaulted, was supported on the side next to the quadrangle by pillars and arches, which were frequently ornamentally combined like trifolial arches, and, like them, occupied by tracery. The upper portions of these arches above the mullions were often glazed; and sometimes latterly even the whole arches, so that they became a row of windows, as at Gloucester. Cloisters were used for exercise and recreation by the inmates of the religious houses. Occasionally, when wholly glazed, they had cells or stalls for study on the inner side; and very frequently a stone-bench may still be seen, which runs along the same side. Many of the larger monasteries had more cloisters than one; and so characteristic were they of the religious houses, that the term C.

came to be used in a general sense for the whole establishment, which is still the sense of the word *kloster* in German. See MONASTERY.

CLONAKI'LTY, a town in the south of Cork county, Ireland, at the head of a small inlet. 26 miles south-west of Cork. Its chief export is grain. Pop. (1871) 3568; (1881) 3676.

CLONES, a market town of Ireland, in the county of Monaghan, 12 miles west from the town of that name. It is situated on a rising ground on the high-road between Monaghan and Belturbet, and near the Ulster Canal, and is in general well built, and has some ancient remains, including the ruins of a monastery, dating, it is said, from the 5th c., and of a round tower. It has manufactures of linen, corn-mills, and a brewery, and is the seat of a poor-law union. Pop. (1881) 2216.

CLONME'L (Vale of Honey), a parliamentary and municipal borough in the south of Tipperary county, with a little in Waterford, on both banks of the Suir, and two islands, 14 miles south-south-east of Cashel. It chiefly stands on the Tipperary side of the Suir, and on one of the isles in the river. One of the bridges over the Suir has 20 arches. The main street is a mile long, and parallel to the river. Pop. in 1871, 10,112, of whom 8729 were Roman Catholics, 1119 Protestant Episcopalians; the population in 1881 was 10,112. C. returns one member to parliament. It has manufactures of cotton, and large flour-mills. The chief exports are agricultural produce and cattle. Barges of 20 to 50 tons ply on the Suir to Waterford. C. had formerly walls, of which one gate remains. In 1650, Cromwell besieged the town, and demolished the castle. C. gave birth to Sterne and Lady Blessington, and was the chief scene of O'Brien's attempted rising in 1848. Here Mr. Bianconi first established the cheap and rapid car traveling over the south-west of Ireland; and C. is now a great center for Irish tourists.

CLONTA'RF, a town of Ireland, in the county of Dublin, about 3 miles east-north-east of Dublin city. It is much frequented during the summer months for sea-bathing, and there are many handsome villas in the vicinity. C. is celebrated in history as the place where, in 1014, Brian Boroimhe (q. v.) won a great victory over the Danes. Pop. (1871) 3442; (1881) 4210.

CLOOTS, JEAN BAPTISTE, BARON, better known as Anacharsis Cloots, was perhaps the most singular of all the enthusiasts brought to the surface of society by the French Revolution. He was born near Cleves in 1755, and from his 11th year was educated in Paris. Through ardent study of the ancients, his imagination, naturally extravagant, became so heated with the political constitutions of Greece, that he undertook the mission of spreading the democracy of Sparta and Athens throughout the world; and with this view he traveled through most of the countries of Europe, under the name of Anacharsis, everywhere expending upon his philanthropic schemes large sums of his very considerable private fortune. The union of all nations in one family was the ultimate aim of all his cosmopolitan schemes. The breaking out of the French Revolution brought his enthusiasm to a head, as he saw in it the fulfilment of his dreams and plans.

He returned to Paris, constituted himself the 'orator or advocate of the human race,' and presented numerous petitions to the National Assembly. On the 19th of June 1790, he appeared at the bar of the Assembly at the head of a number of strangers, dressed in the costumes of different nations, as the representatives of the whole earth, and presented an address of thanks for the stand made against the tyrants of the world, and a request that all the strangers then in Paris should be made French citizens. As a member of the Constituent Assembly, he offered to raise a Prussian corps, to be called the Vandal Legion; proposed to lay a price on the head of the Duke of Brunswick; called the king of Prussia the Sardanapalus of the north; and eulogized Count Ankarstrom for having assassinated the king of Sweden. What is singular is, that these extravagances were received often with storms of applause. He called for the apotheosis of Gutenberg in the Pantheon, as the 'creator of the word,' and also for that of an apostate priest. On the occasion of the general armament of France, he deposited 12,000 francs on the altar of the country. In 1792 he was elected a member of the Convention, and continued to weary the house with his extravagant motions. He hated Christianity no less than royalty; declared himself the enemy of its founder; and, as an adherent of the worship of Reason, preached downright materialism. At the trial of Louis XVI., he gave his vote for death, 'in the name of the human race,' and took occasion at the same time to pass sentence on the king of Prussia. Some time after, on the motion of Robespierre, he was excluded from the Club of the Jacobins, on the ground that he was wealthy and a nobleman. Robespierre hated and feared the enthusiast; and when St. Just brought his impeachment against Herbert and his adherents, C. was involved in it, was condemned to death, and executed March 23,1794. He heard his sentence with the greatest composure, comforted the companions of his fate, and continued to preach materialism to his friend Herbert on the way to the place of execution. At the foot of the scaffold he requested that his turn might be last, in order that he might have time to establish a few more principles, while the heads of the others were falling. He then laid his head with equinimity on the block, after asserting his innocence, and protesting against his sentence, 'in the name of the human race.' He left a number of writings, all of the same extravagant character of which we may mention here *Certitude des Preuves du Mohammédisme* (Lond. 1780), *L'Orateur du Genre Humain* (1791), and *Base Constitutionnelle de la Republique du Genre Humain* (1793).

CLOSE, in Heraldry. When the wings of a bird are down and close to the body, it is described as Close. The term is used only with reference to birds addicted to flight, such as the eagle, falcon, &c. Of dunghill cocks, and other domestic fowls, it is understood that their wings are in this position. Barnacles, and bits for horses, are said to be *close* when they are not to be understood as extended.

CLO'SE-HAULED, in Seamanship, is the mode in which the sails are arranged, in order to make the ship move in a direction the nearest possible towards that point of the compass from which the wind blows. Fore and aft vessels, especially cutters, sail closer to the wind than square-rigged ones. Ships of some sizes and shapes can attain this result better than others; but it is a quality scarcely to be calculated beforehand.

CLO'SET, in Heraldry, the half of the bar (q. v.).

CLOTAIRE I. and II., kings of the Franks. See MEROVINGIANS.

CLO'THES-MOTH, a name common to a number of species of small moths of the genus *Tinea*, the larvæ or caterpillars of which are extremely destructive to woollen clothes, furs, stuffed quadrupeds and birds, &c. *Tinea destructor* is one of the most annoying of these insect pests. It is of a satiny buff color, the wings deflexed when at rest. The larva is about a quarter of an inch long, with only a few hairs, white, with a slate-colored line down the back, an ochreous head, and 16 legs. *T. tapezana* has the upper wings black at the base, the rest of the wing white. *T. sarcitella* is another very common species, of a silky gray color; the head, thorax, and base of the superior wings white; the wings folded flat on the back when at rest. The larva is covered with scattered hairs. These moths are most abundant in the warmer seasons of the year, but their larvæ carry on their destructive operations even during winter. Guided by instinct, the female moth lays her eggs where the larvæ may find their appropriate food, consisting of substances indigestible to almost every other creature; and the larvæ, being furnished with minute but strong and sharp jaws, not only begin to eat as soon as they are hatched, but to cut the fibres of the substances on which they feed into little bits, and to unite them by means of a glutinous silk of their own producing, so as to form for themselves cases, lined internally with silk; and in these they constantly abide, adding to them at the anterior end as their own increase of size requires, and also widening them, by slitting them down the middle, and mending them with additional materials. All this may be beautifully observed by transferring the same moth-larva to different pieces of flannel in succession, of different colors. The larva of *Tinea tapezana* works its way through woollen stuffs in an arched gallery, carrying its little case with it. *T. pellionella* makes similar tunnels in furs. *T. granella* is destructive to books as well as to grain. See CORN-MOTH. The best means of preventing the ravages of moths are perfect cleanliness, frequent inspection of articles, and their exposure to light and air. Spirit of turpentine is used for killing them; the vapor arising from a sponge dipped in this liquid is fatal to such as it sufficiently reaches; they are also killed by the heat of a brisk fire or of an oven.

CLOTHING, ARMY, is one of the departments of the British military system into which, within recent years, much change and improvement have been introduced.

In the time of Henry VIII., the soldiers' dress was principally white, with green or russet for special corps. In Queen Elizabeth's reign, a sum of 1*s.* 8*d.* was allowed weekly for each soldier's clothing. The uniform then consisted of a cassock of Kentish broad-cloth, a canvas doublet, kersey stockings, trousers of kersey broad-cloth, neat's leather shoes, and holland shirt. In 1678, an infantry soldier's dress was valued at £2, 13*s.*, and a dragoon's as high as £6, 10*s.* At one time, lords-lieutenant attended to the C. of the troops, each in his own county; but the duty was afterwards transferred to the state. Captains of companies clothed the men, stopped the money out of the pay, and made a profit on the transaction. The privilege afterwards passed to the colonels of regiments. The sum provided by the state every

year was for the 'effective' strength of the regiment; and any vacancies put an additional sum into the pockets of the colonel. From 1746 to 1855, soldiers' pay was debited with 'off-reckonings,' as a means of paying for the clothes supplied to the men. Under this system, the colonel received from the state so much money annually for clothing his regiment, and then contracted with wholesale tailors for a supply on the lowest terms. In 1854, just before a change was made in the system, the colonel's profit on the C. for a private in the line, was 15*s*. 3*d*. per man.

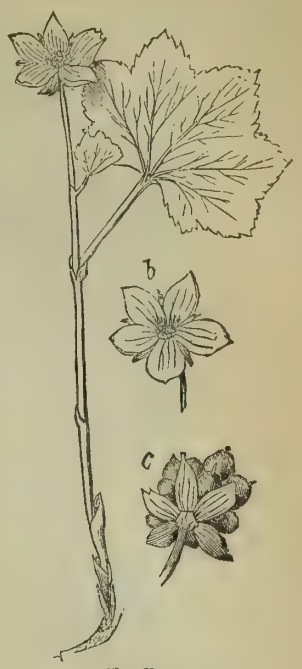
The disasters during the early months of the Crimean war having created a national demand for reforms in military matters, a change in the mode of army C. was one of the results. By a royal warrant, dated June 21, 1855, the colonels of regiments were awarded certain annual sums of money in lieu of off-reckonings. These sums varied from £1200 to £500, and were to be given in addition to the pay. From that date, all the troops have been clothed by the government, the off-reckonings being calculated nearly as before, but paid by the country to the colonels. When the War Office was remodelled about the same time, a clothing department was added to it; and it was now found that the C. for a full regiment of 1091 non-commissioned officers and rank and file, in the line, cost about £2500 per annum. The C. is now contracted for more openly than under the former system; and better materials are hence obtained without any increase in cost. The government has a factory on its own account, but a large part of the supply is obtained by contract. Formerly, soldiers' coats were too often made of very loose spongy materials; but now the inspection is rendered much more severe; and the cloth provided for privates is as good as that worn by sergeants a few years ago, while the cloth worn by sergeants now is correspondingly improved.

The net amount of the parliamentary vote for army clothing in 1881–82 was £780,000 (of which a proportionate part is repaid by the Indian government). The cost of a suit of uniform varies from £2, 15*s*. 4*d*. for a private in the line, to £8, 15*s*.. for a life-guardsman. The issue of new uniforms takes place on the 1st of April in each year. Under some circumstances, the men may receive money instead of C., at a certain price for each garment.

CLOTHING, Navy. The seaman of the royal navy are provided, while on the ship's books, with C. by the government; but a certain sum is subtracted from their pay, to defray the greater part of the cost. The navy estimates group 'victuals and clothing' together. The total vote under this head for the year 1881–82 amounted to £1,014,481, of which sum £262,606 was the amount allotted to thus provide for the fleet, the coast-guard service, &c. Cast-off seamen's C. is among the 'marine stores' sold by auction every year by the Admiralty. In 1859, when there was a strong desire to facilitate the manning of the navy, the Admirality offered improved terms to sailors who would enter the royal service; and among other items the following arrangements were made in reference to C.: 'To every man on his first entering the navy for ten years' continuous service, and to all boys on being advanced to man's rating, a suit of clothes consisting of the following made-up articles, to be furnished free of charge: A blue cloth jacket (No. 2 cloth), 17*s*. 8*d*.; a pair of blue cloth trousers, do., 11*s*. 7*d*.; a blue serge frock, 8*s*. 6d.; a duck frock, 2*s*. 9*d*.; a pair of duck trousers, 2*s*. 7*d*.; a black silk handkerchief, 2*s*. 10*d*.; and a pair of shoes, 6*s*. 7*d*. In the case of a seaman being already provided with clothes approved by his captain, a corresponding amount in money is to be placed to his credit.' The above figures will about show the market-value of the usual kinds of seamen's clothing.

CLO'THO, a genus of spiders, of which the only known species *C. quinquemaculata*, a native of the south of Europe and north of Africa—about half an inch long, long-legged, brown, with black abdomen, marked with five yellowish spots—is interesting on account of its habits and the sort of tent which it spins for itself. This curious structure is in shape like a limpet shell, about an inch in diameter, and is fastened to the under side of stones or in crevices of rocks, not by its whole circumference, but by seven or eight points only. Within this the eggs are deposited in several bags of lenticular form. The parent creeps in and out under the edges of her tent, and supplies the young with food for some time.

CLOUD, St., a town of France, in the department of Seine-et-Oise, situated on the declivity of a hill near the Seine, 5 miles west of Paris. Its present name is said to be a corruption of St. Clodoald, the name of a grandson of Clovis, who retreated to the little village of Novigentum, to escape the fury of his uncle, Clotaire, and became a monk. After his death, the village took the name of the pious prince, whose relics were sacredly preserved, and whose tomb was the scene of many miracles. St. C. figures often in the wars of the middle ages. Henry III. was assassinated here in 1589, by the fanatical monk Jacques Clement. St. C. was long famous on account of its magnificent château, built by Mazarin, and embellished by successive dukes of Orleans, who possessed it till 1782, when it passed into the hands of Marie Antoinette. Here Bonaparte, in 1799, was named First Consul; and in this place Charles X. signed the ordinances which produced the revolution of 1830. But during the siege of Paris, on the 13th October 1870, the château was set on fire and almost entirely destroyed by the French artillery from Mont Valerien; apparently because it was supposed to be the headquarters of the German staff. Pop. (1876) 4747.



Cloudberry:
b the flower; *c* the fruit.

CLOU'DBERRY (*Rubus Chamæmorus*), a plant of the same genus with the bramble, although of very different appearance, having a herbaceous single-flowered stem destitute of prickles. The plant is of humble growth, 8—10 inches in height; the leaves few, large, lobed, and somewhat kidney-shaped; the flower large and white, male and female flowers on separate plants, the female plant producing an orange-red fruit equal in size to a bramble-berry, and of an agreeable flavor. It is a native of the northern ports of Europe, Asia, and America. In Britain, it is chiefly confined to elevated moors; in Norway and Sweden, it is much more abundant, and the fruit is highly valued and made into excellent preserves. Unfortunately, the plant is of difficult cultivation, and no attempt to make it produce fruit freely in our gardens has yet been successful.—Somewhat similar to the C. is *Rubus geoides*, which yields a very agreeable fruit as large as a raspberry, one of the few native fruits of Terra del Fuego and the Falkland Islands.

CLOUDS are masses of fog, consisting of minute particles of water, often in a frozen state, floating in the atmosphere. When air saturated, or nearly so, with vapor, has its temperature lowered, either by ascending and becoming rarer, or by meeting a colder current, a portion of the vapor loses its gaseous form, and becomes condensed into minute specks of water. See Evaporation, Dew, Rain, Snow-line. A cloud, therefore, does not consist of vapor, in the proper sense of the word, but of water in the form of dust, as it were. How this water-dust is suspended in the atmosphere—why the particles do not descend as soon as formed, has never been satisfactorily explained. It has been assumed that the watery particles are hollow, like blown bubbles. But there is no proof of this; nor would the hollowness of the particles account for their floating, unless it could be shown that they must be filled with a gas lighter than the surrounding air. Professor G. G. Stokes holds that they are prevented from falling mainly by the friction and drag of the air-particles, just as fine powders remain suspended in liquids of much less specific gravity than themselves. But, as Sir J. Herschel says, rising and horizontal air-currents must also oppose the fall of C.; for at night, in the absence of rising currents, they often descend to, and dissolve in lower and warmer levels. The conditions under which C. are formed, and afterwards deposited in rain, are more fully considered under Evaporation, Dew, Rain, Snow-line. The present article is confined to a description of the various kinds of C., and of the weather they indicate.

A general haze of precipitated vapor covering the sky, and coming down to the earth, is termed a *Fog* or *Mist;* and the term Cloud is usually confined to masses of fog floating in the higher regions, and not descending to the ground. They are mostly within a mile of the earth's surface; and none are more than five or six miles above it. They rise higher in the equatorial regions than towards the poles. C. spread and move with the wind in varied, often grand forms; they are generally disposed in beds parallel to the earth's surface; vertical C. occur rarely, if at all.

Mr. Luke Howard's classification of C., proposed in 1802, into three primary forms—Cirrus (Ci.), Cumulus (Cu.), and Stratus (St); three intermediate—Cirro-cumulus (Ci.-cu.), Cirro-stratus (Ci.-st.), and Cumulo-stratus (Cu.-st.), and one compound form, Nimbus (Ni.)—has been universally adopted, and holds good in all climates and atmospheric conditions.

Cirrus, or curl cloud, consists of parallel, curling, flexuous, diverging, and partly straight fibres, increasing in any or in all directions by elongation, branching, or addition of new fibres. It is the highest and least dense of C.; forms at least three miles

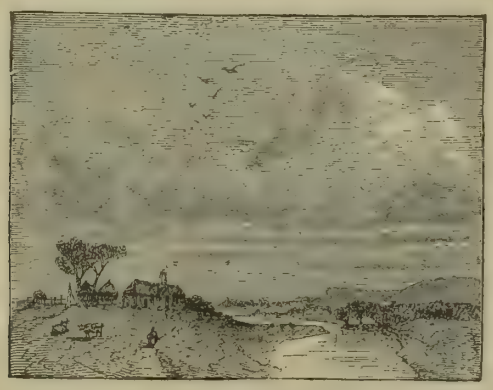
above the earth; varies most in extent, direction, and shape; retains longest its varied outlines; and is the longest illuminated after sunset and before sunrise.

It resembles a mare's or cat's tail, a lock of hair, fine trellis-work, or thin silvery streaks, and it may cover all the sky. Cirri seem to arise from the mixing of parallel air-currents, or are the relics of dissolving clouds drawn out in fibres by wind. Threads and groups of Ci., during gentle wind after severe weather, pre-

Cirrus.

sage serene settled weather. But after a long tract of fair days, whitish filaments or parallel bands of Ci. crossing the sky, with the ends converging by prospective in each horizon, and traveling longitudinally, though seemingly stationary, fortell a change to wet. Ci., being so high, must consist of minute snow crystals, whose refractions and reflections produce the halos, coronæ, and mock suns and moons almost restricted to this cloud and its derivatives the Ci.-st. and Ci-cu. The fibres often wave back and fore, or to and from each other. Ci., especially with fine tails, varying much in a few hours, presage rain or snow, and windy variable weather.

Cumulus, ball of cotton, day or summer cloud, consists of dense, convex, hemispherical, or conical heaps of small roundish C., piled or stacked on each other. The heaps enlarge upwards from a horizontal base, and have crenated tops; they sometimes unite into stupendous white-topped mountains. It forms, says Sir J. Herschel, in summer calms by the rise of columns of vapor from marshes, lakes, and rivers, into the colder and quickly saturable lower regions of the air; for one liquid traverses another in cylinders. Cumuli begin after sunrise as a few scattered specks in the clear sky; these specks enlarge and unite to form C., which often nearly cover the sky in the afternoon, and generally decrease and vanish about sunset; but rain follows if they increase in number and darkness in the evening. Their tops become Ci. in very dry air. Cu., of pleasing forms, dispositions, and colors, and of moderate size, presage fine dry warm and calm days; but cold, rain, and tempest follow dark, abrupt, dense, shaggy Cu., covering the sky, and rolling on each other. Hemispherical, silvery white Cu. presage thunder.



Cumulus.

Stratus, fall or night-cloud, the lowest of C., is a widely extended, horizontal sheet, of varied thickness, of white mist touching or near the earth. In density, it is between Ci. and Cu., and it increases from below. It is common in summer and autumn often from sunset to sunrise, and is densest at or after midnight. It arises in calm clear evenings, after warm days, from the cooling of moist air on damp ground, marshes, lakes, rivers, or from the cooling of moist air mixed with smoke enveloping great cities. From a height, it is seen spreading around like a sea, and creeping up hillsides. After sunrise, it rises from the ground, breaks up into Cu., and vanishes with the increasing heat, to be followed by a serene day; but it may quietly accumulate in layers, and become a Ni. It does not wet objects it touches, and thus differs from a variety of Ci.-st. of like external aspect.

Cirro-cumulus, or sonder-cloud, consists of Ci. sinking in the air, and compressed into dense roundish-white cloudlets, or woolly irregular tufts, generally at great heights. It often forms a beautiful sky in beds like flocks of sheep at rest. It is often seen through breaks in lower C. moving differently. It may vanish or pass into Ci. or Ci.-st. Solar and lunar coronæ appear in it. It occurs in warm dry weather, and between summer showers, and presages increased heat. Ci.-cu. very dense, round, and close, and with Cu.-st., presages a storm or thunder. In winter, it precedes a thaw and warm wet weather.

Cirro-stratus, or vane-cloud, consists of long, thin, horizontal clouds, with bent, or undulated edges. It often resembles shoals of fish, or has a barred appearance—the mackerel-backed sky. It alone, or with Ci.-cu., forbodes rain, snow, and storm. Waved Ci.-st. generally attends heat and thunder; it often forms an extended shallow bed or thin veil, through which the sun and moon shine faintly. This variety oftenest presents the finest solar and lunar halos, parhelias and paraselenes, and it is the surest prognostic of rain and snow.

Cumulo-stratus, or twain-cloud, is a Ci.-st. mixed with Cu. heaps, or a wide flat base surmounted by a bulky Cu., with fleecy protuberances or rocky and mountain masses. It resembles a thick-stemmed fungus, with a flat, anvil-shaped, or cirrose top. It is much denser than Cu., though the air is not dry enough to round off sharply its tops. It often forms vast banks of cloud, with over-

Stratus.

hanging masses. It is common towards night in dry windy weather, when it has a leaden hue. It generally arises from Cu. becoming denser, wider, and protruding in large irregular projections over the base. It tends to overspread the sky, and partly or wholly to become Ni., and fall in showers. Cu.-st. is intermediate between clouds indicating fair, and those indicating rough, rainy weather, and attends sudden atmospheric changes. Distinct Cu.-st. forms before thunder. Cu.-st. increases the grandeur of mountain scenery, and drops on and envelops mountain-tops like a curtain.

Nimbus, or Cumulo-cirro-stratus, the black rain-cloud, is a cloud or mixed system of clouds, ending in showers of rain, snow, or hail. It is a dense, continuous, horizontal black or gray sheet, with fringed edges, a cap of Ci., and Cu. on the sides and below. Before rain, vast towering masses of Cu. often pass into Cu.-st., which, increasing in density, darkness, irregularity, and extent, become Ni. capped by Ci.-st. Thunder-storms are always accompanied by Ni. in its most perfect form.

The term *scud* has been applied to loose vapory fragments of C. driven by wind, and *cumulonus* to shaggy cumuli.

The formation and height of C. vary with the quantity of vapor in the air, the course and height of air-currents, the climate, season, temperature, disposition, and extent of sea and land, and the height of land. Cloud-strata on the Pyrenees vary in average thickness from 1600 to 3400 feet. The lower surfaces of considerable masses of clouds in all climates are probably 2500 to 3000 feet above the earth. Remarkable cloud-rings prevail over the calm zones of the equator, and over those of Cancer and Capricorn. Clouds, viewed from above in bright sunshine by the aëronaut or mountaineer, appear as dense volumes of steam or masses of white cotton. Kaemtz regards the usual height of Ci. as 10,000 to 24,000 feet; Cu., 3000 to 10,000; Ni., 1500 to 5000; but Ci. may descend to 2000 or 3000 feet, and Ni. to within a few hundred feet of the earth.

C. moderate the sun's rays during day, and the earth's radiation during night. They always exhibit positive or negative electricity, but of greatest tension in thunder-storms. They are the

sources of the moisture required by plants; of the water of springs, lakes, and rivers; and of the polar, glacial, and winter snows, which cover temporarily or permanently parts of the earth.

In Britain, six or seven tenths of the sky is on an average daily obscured by clouds. There is most cloud in winter, and about mid-day, and least in May and June, and during night. Summer and autumn nights are freest of clouds. All the forms of C. may be seen in one day, often very much commingled.

CLOUDY BAY. See NEW ZEALAND.

CLOUTED or CLOTTED CREAM is obtained by heating milk in a shallow wide pan on a hot plate or over a slow charcoal-fire. The milk must be strained, as soon as it comes from the cow, into the pan, where it must stand for 24 hours before heating. It usually takes from half an hour to three-quarters of an hour to heat the milk completely; but it must not boil. It then stands for 24 hours, when the cream is skimmed off, and a little sugar thrown on the top. The result is C. C., which, mixed with new milk, is eaten with strawberries, raspberries, tarts, &c. Devonshire is famous for its clouted cream.

CLOVE BARK, another name for CULILAWAN BARK (q. v.). —Another bark which occurs in commerce under the name of C. B. is that of the *Myrtus caryophyllata*, a native of Ceylon and the Mascarene Isles. It is in sticks two feet long, formed of several pieces of very thin hard bark, rolled up one over the other, of a deep brown color, and of a taste similar to that of clove. It possesses properties analogous to those of cinnamon.

CLO'VER, or TR'EFOIL (*Trifolium*), a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, containing a great number of species, natives chiefly of temperate climates, abounding most of all in Europe, and some of them very important in agriculture as affording pasture and fodder for cattle. The name C. is indeed popularly extended to many plants not included in this genus, but belonging to the same natural order, and agreeing with it in having the leaves formed of three leaflets, particularly to those of them which are cultivated for the same purposes, and sometimes collectively receive from farmers the very incorrect designation of *artificial grasses*, in contradistinction to *natural grasses*, i. e., true grasses. See MEDICK and MELILOT. The true clovers (*Trifolium*) have herbaceous, not twining stems; roundish heads or oblong spikes of small flowers; the corolla remaining in a withered state till the ripening of the seed; the pod enclosed in the calyx; and containing one or two, rarely three or four seeds. About 17 species belong to the flora of Britain.

The most important of all to the British farmer is the COMMON RED C. (*T. pratense*), a native of Britain and of most parts of Europe, growing in meadows and pastures. It is perennial, but is generally treated as if it were a biennial. Its heads of flowers are oval or nearly globular, very compact, about an inch in diameter, purple, more rarely flesh-colored or white; the tube of the calyx is downy; the stipules run suddenly into a bristly point. The leaflets have very often a whitish horseshoe mark in the center. This plant was formerly reputed very noisome to witches; knights and peasants wore the leaf as a potent charm against their arts. It is supposed that C. found its way into England from the Netherlands about the time of Queen Elizabeth; but it was not until the close of last century that it was introduced into Scotland, where it is now universally prevalent. The ZIGZAG C. (*T. medium*), also called MEADOW C., MARL-GRASS, and COW-GRASS, much resembles the Common Red C., but is easily distinguished by the smooth tube of the calyx, and by the broader, less membranaceous, and gradually acuminated stipules. The stems are also remarkably zigzag, and more rigid than in *T. pratense;* the heads of flowers are larger, more lax, more nearly globose, and of a deeper purple color; and the leaflets have no white spot. It is a common plant in Britain and most parts of Europe.—WHITE or DUTCH C. (*T. repens*) is also a common native of Britain and of most parts of Europe. When a barren heath is turned up with the spade or plough, White C. almost always appears. It is said to be a native also of North America, where, however, it is perhaps only naturalized. The flowers of all kinds of C. are the delight of bees, but those of this species perhaps particularly so.—

Red Clover (*Taifolium pratense*).

White Clover (*Trifolium repens*):
a, head of flowers when the pods are ripening.

ALSIKE C. (*T. hybridum*), a perennial, regarded as intermediate in appearance between the Common Red C. and the White C., has of late attained a very high reputation.

It was introduced into Britain from the south of Sweden rather more than twenty years ago.—CRIMSON C., or ITALIAN C. (*T. incarnatum*), an annual, native of the south of Europe, with oblong or cylindrical spikes of rich crimson flowers, is much cultivated in France and Italy, and has of late been pretty extensively grown in some parts of England, producing a heavy crop.—MOLINER'S C. (*T. Molineri*) very much resembles Crimson C., but is biennial, and has pale flowers. It is cultivated in France and Switzerland.—ALEXANDRIAN C., or EGYPTIAN C. (*T. Alexandrinum,*) an annual species, a native of Egypt, universally cultivated in its native country, where it is the principal fodder for cattle, has been tried in Britain, but the colder climate has been found to render it less luxuriant and productive. It is supposed to be one of the best kinds of C. for many of the British colonies. It has oval heads of pale-yellow or whitish flowers. YELLOW C., or HOP TREFOIL (*T. procumbens*), is very common in dry gravelly soils in Britain, but not much esteemed. It has smaller leaves and heads than any of the cultivated species. Its flowers are yellow.

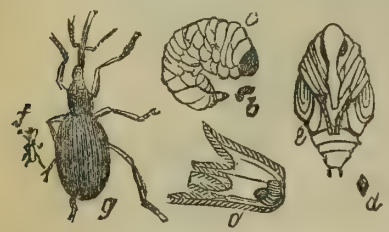
It is little more than a century since clovers were introduced into field-culture in Britain. They are now universally cultivated on large farms in alternation with grain crops. The kinds most generally sown are the *Common Red, Cow-grass, Dutch White, Yellow,* and *Alsike.* The *Common Red* is the finest and most valuable, but it is difficult to grow unless on naturally rich soils. In America it grows well on sandy loams, though sown every alternate year on the same land. But in Britain the land is thought to become 'clover-sick' when sown too frequently with this crop. An interval of not less than eight years is thought advisable. From 6 to 20 lbs. of seed per acre is the quantity sown. Red C. is most esteemed for being mixed with rye-grass for the making of hay. When it grows well, it bears to be cut more than once in a year. *Cow-grass* much resembles the common Red Clover. It is coarser but hardier, and better suited for pasture, as it bears more herbage, and comes better up after being eaten close down by stock. *Dutch White C.* is only esteemed for pasture; it grows short and thick on the ground, but throws out fresh stems and flowers during the most of the growing season. In the south of England, it is sometimes sown with but little rye-grass seed along with it; in Scotland, as much as a bushel or a bushel and a half of rye-grass is mixed with it for pasture. *Yellow C.* is chiefly sown on ground where neither the white nor red grows freely. It is not sown so frequently as it probably ought to be, for it rises early in spring, and a mixture of it with other clovers forms good pasture on all grounds.

Alsike C. has been recently introduced; it rises much higher than White C., and offers to be a useful addition to our pasture-plants. Land must be thoroughly cleaned of perennial weeds be-

fore it is sown with C., as the land cannot be subjected to cultivation while it is under this plant; C., therefore, is always sown in the end of the rotation, or as near the fallow or turnip crop as possible. It is sown early in spring among the winter-wheat, or with the barley crop, and slightly harrowed in; for the seeds being small are not difficult to bury. Farmyard manure is as good as any for clover. A well-manured soil greatly assists in keeping the plants from dying out in spring. Clovers, like grasses, play a most important part in restoring fertility to land which has been exhausted by grain-crops. Their leaves gather food—carbonic acid and ammonia—from the atmosphere, which they store up in their roots and stems; and these, on decomposing, afford food for cereals or other crops which are more dependent on a supply within the soil.

The caterpillars of a number of species of moth feed on the leaves of different kinds of C.; but the insects most injurious to C. crops are weevils of the genera *Apion* and *Sitona*. See CLOVER-WEEVIL and PEA-WEEVIL.

CLO'VER-WEE'VIL (*Apion*), a genus of small pear-shaped weevils (coleopterous insects, section *Tetramera*, family *Rhynchophora*), different species of which feed on the leaves, and their larvæ on the seeds of clover, some also on those of tares and other leguminous plants. Like the other weevils, the perfect insect has the head very much elongated into a sort of muzzle. *A. apricans* often does much injury to fields of common red clover, particularly interfering with the production of seed. It lays its eggs among the flowers, and the little grubs eat their way through the calyx into the pod. It is of a bluish-black color, little more than a line long. *A. flavipes* is attached in like manner to white clover, and other species of clover have their particular weevils.



Red Clover Weevil (*A. apricans*):
a, maggot in calyx, slightly magnified; *b*, larva; *c*, larva, magnified; *d*, pupa; *e*, pupa, magnified; *f*, female beetle; *g*, female beetle, magnified.

CLOVES (Fr. *clou*, a nail) are the flower-buds of the Clove-tree (*Caryophyllus aromaticus*). The genus to which this tree belongs is of the natural order *Myrtaceæ;* the calyx has a cylindrical tube and 4-cleft border; the corolla consists of four petals united by their tips; the stamens are in four clusters; and their fruit is an oblong dry berry with one or two cells and as many seeds. The clove-tree is from 15 to 40 feet high, with a beautiful pyramidal head.

The leaves are large, ovate-oblong, acuminated at each end, evergreen: the flowers are small, but produced in great profusion in cymes. Leaves, flowers, and bark have an aromatic odor. The ripe fruit in shape resembles an olive, but is not quite so large; it is of a dark-red color; it sometimes appears in commerce in a dried state, under the curious name of *Mother Cloves;* it has an odor and flavor similar to C., but much weaker; the broken fruit-stalks are sometimes also used for the same purposes as C.; but the flower-buds themselves are the principal product of the tree. They are gathered, and are dried by exposure to the smoke of wood fires, and afterwards to the rays of the sun, or by the latter, alone. When first gathered, they are reddish, but become of a deep-brown color. The unexpanded corolla forms a little round head at the end of the calyx tube, which is about half an inch long, and thus the appearance is not unlike that of a little nail, whence the name. The clove-tree is a native of the Moluccas, and the Amboyna C. are still esteemed the best; but the tree is now cultivated in Sumatra, Bourbon, Mauritius, and some parts of the West Indies, and will probably soon be common in many other tropical countries. The Dutch, in order to secure to their own colonists a monopoly of the trade in this spice, destroyed the trees in the other Molucca Islands, and confined the cultivation of them to the isle of Ternate. It is not deemed quite certain that C. are the *karyophyllon* of the ancient Greeks; but before the discovery of the Spice Islands, eastern merchants brought them from Arabia, Persia, and Egypt, to the harbors of the Mediterranean, from which the Venetians and Genoese diffused them over Europe.

Cloves:
a, a branch with leaves, buds, and flowers; *b*, a bud.

The Wild Clove-tree of the West Indies is *Myrcia acris*. See MYRCIA.

The properties of C. depend chiefly on an essential oil, *Oil of C.*, which forms one-fifth or one-sixth of their whole weight. They are used for flavoring dessert dishes and articles of confectionary. They have a hot taste and a characteristic odor. The oil of C. is obtained by repeatedly distilling C. with water, when two oils pass over, one of which is lighter, and the other is heavier than water. The oil has a hot acrid taste, is of a light yellow when pure, and brown red when not so carefully prepared. It has a well-known odor, and is soluble in ether, alcohol, and the fixed oils. It is useful in medicine to check nausea and griping, caused by the administration of purgatives. It is also employed in the scenting of soap, and by the distiller. *Tincture of C.* is obtained by treating C. with alcohol for several days, and then straining, or by a solution of the oil of C. in spirits of wine. It is added, in medicine, to stomachic, tonic, and purgative mixtures.

CLOVIS (old Ger. *Chlodwig*, i. e., 'famous warrior;' modern Ger. *Ludwig*, Fr. *Louis*), king of the Franks, was born 465 A.D., and by the death of his father, Childeric, became king of the Salian Franks, whose capital was Tourney. His first achievement was the overthrow of the Gallo-Romans under Syagrius, near Soissons. He then took possession of the whole country between the Somme and the Loire, and established himself in Soissons. In 493, he married Clotilda, daughter of a Burgundian prince. His wife was a Christian, and earnestly desired the conversion of her husband, who, like most of the Franks, was still a heathen. In a great battle with the Alemanni, at Tolbiac, near Cologne, C. was hard pressed, and as a last resource, invoked the God of Clotilda, offering to become a Christian, on condition of obtaining the victory. The Alemanni were routed, and on Christmas Day of the same year, C. and several thousand of his army were christened by Remigius, Bishop of Rheims. Most of the Western Christian princes were Arians, but C. was strictly orthodox, and, in consequence, was saluted by Pope Anastasius as the 'Most Christian King.' In 507, love of conquest concurring with zeal for the orthodox faith, C. marched to the south-west of Gaul against the heretic Visigoth, Alaric II., whom he defeated and slew at Vouglé, near Poitiers, taking possession of the whole country as far as Bordeaux and Toulouse; but was checked at Arles, in 507, by Theodoric, king of the Ostrogoths. C. now took up his residence in Paris, where he died in 511. His great aim was the subjugation of all the Frankish princes, and the union of the whole Frankish people into a single powerful kingdom. The means he employed to secure this end were cruel and unscrupulous, but the end itself would have been very beneficial, if he had not frustrated it at his death by re-dividing the newly organized realm among his four sons, and exposing it to the very perils from which he himself had rescued it.

CLOYNE, an ancient episcopal town, in the S.-E. of Cork county, 15 miles E. by S. of Cork. The see was founded in the 6th c. by St. Colman, the abbey in 707, and the cathedral in the 13th century. Near the cathedral is a round tower, 92 feet high. About 1430, the see was united to that of Cork, separated in 1678, and reunited in 1835. There are valuable marble quarries near. Berkeley was born here, and was bishop of C. in 1678. Brinkley the astronomer was also Bishop of Cloyne. Pop in 1861 was 1713, but in 1871 had fallen below 1500, and in 1881 was only 1126.

CLUB. The word is probably allied to *cleave* (Ger. *kleben*), 'to adhere,' so as to form one body or mass. Among other significations, it is used to mean a company or association met for some common purpose, whether of hilarity, literature, politics, or economy. C., in its usual English acceptation, means a body of persons meeting for social or recreative purposes, and consisting of members belonging for the most part to some one class or occupation. Occasionally, other meanings are given to the word. Societies for political objects are sometimes called clubs; and *Benefit Clubs* are another name for *Benefit Societies*. What is known as club-life, as exhibited in London, had its origin in the days of Elizabeth, when the Mermaid Tavern, in Fleet Street, enlivened by the wit and wisdom of Shakspeare, Raleigh, Ben Jonson, Beaumont, and Fletcher, became the home of a sort of club. Ben Jonson afterwards founded a second C. at the Devil Tavern, in the same street. Such clubs were meetings for social recreation, to which all were welcome who could bring wit and humor with them. In subsequent reigns, meetings of a similar racy character were very frequently held in taverns, but without much club formality. In last century, Brooks's and White's clubs, and

a few others named after the proprietors of the houses in which the meetings were held, were established by politicians of opposite parties, as the head-quarters for parliamentary tactics.

The modern clubs of London, in which the *restaurant* or dining-room is an important feature, arose after the termination of the great war in 1815. Many naval and military officers, being no longer needed for war, were placed upon half-pay; and this half-pay was insufficient to support them without careful economy. If they could dine together at a C., it would be cheaper than if each maintained a separate establishment. Hence originated the United Service C.; and the success of this speedily led to the founding of others for different classes of society, and for persons of different political opinions. At the present time, there are about 100 such clubs in the metropolis, of which the following may be named: Alpine, Army and Navy, Arthur's, Athenæum, Brooks's, Carlton, Civil and Military, Conservative, East India United Service, Garrick, Guards', Junior Carlton, Junior United Service, Naval and Military, New University, Oriental, Oxford and Cambridge, Reform, Travelers', Union, United Service, United University, White's, Whitehall, and Windham's. All these, and some of the others, combine the *tavern* system with the *club* system. There are also about 20 working-men's clubs. Clubs are not confined to the metropolis.

Each principal C. comprises a certain definite number of members; it may be, for instance, 500, 1000, or 1500, and this number cannot be exceeded without a formal change in the rules. In some clubs, the managing committee are empowered to admit distinguished persons to membership; but the general mode of admission is by ballot, each member having a vote. In some clubs, one single black ball or 'No' suffices to exclude a candidate; but, generally, the rules are not so stringent. The members pay a sum of money on entrance, and then an annual subscription—the amounts varying much in different clubs. The entrance-money may be required as capital, to assist in building the club-house, &c.; while the annual subscriptions, after paying current expenses, leave a surplus for future contingencies. The more important clubs comprise morning or news rooms, libraries, coffee-rooms, dining-rooms, drawing-rooms, and a very complete culinary establishment. There are no arrangements for the members to sleep at the club-houses; except at certain establishments called club-chambers, which, however, are not properly clubs. Some of the clubs are furnished with bath-rooms, card-rooms, billiard-rooms, and smoking-rooms. The *restaurant* department is usually very complete; everything is of the best, and is supplied to the members as nearly as can be at prime cost. In nearly all the clubs, hard-drinking is discouraged. It has been ascertained at two or three of them, that the average cost of dinners is about half-a-crown, and that the wine scarcely exceeds half a pint to each diner.

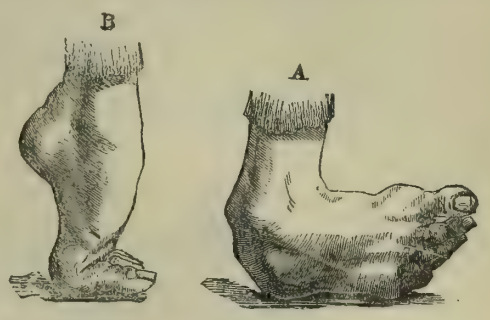
It may here briefly be mentioned, that some of the club-houses rank among the most elegant modern buildings in London. The Carlton, the Reform, the Conservative, and the Army and Navy club-houses are especially to be named in this respect.

Before the first Revolution, it was attempted to get up political clubs in Paris on the English plan, but they were prohibited by the police. With the meeting of the National Assembly, and the outbreak of the Revolution, political societies, about 1789, sprang into unwonted activity. These associations mostly assumed the English name—such as the Club des Feuillans and the Jacobin Club; but they had quite a different character; they were popular societies. In them were concentrated the great political parties of the nation, by means of systematic organization and affiliation. The Jacobin Club thus came in the end to embrace all France, and to rule it. Similar associations sprang up in Germany, Italy, Spain, and wherever the Revolution took any root. In Germany, these unions were prohibited in 1793 by a law of the empire; and the prohibition of all political unions and meetings was renewed in 1832 by an act of the Germanic Confederation. The suppression of the clubs in France followed the extinction of the Revolution, and their place has since been taken by secret societies. After the revolution of 1848, clubs revived in great force in Italy and Germany, after the style of the first French Revolution, but speedily came to an end along with that which had given them birth.

CLUBBING, in cabbages, turnips, and other plants of the genus *Brassica*, a diseased growth of tubercular excrescences in the upper part of the root or lower part of the stem, caused by the larvæ of the Cabbage Fly (q. v.), and of other insects, by which the vigorous growth of the plant is prevented, and crops are often much injured. It is common for gardeners to cut away these excrescences, with their contained larvæ, in planting out young cabbages, &c.; and where they are not so numerous that the injury done by the knife is necessarily great, this plan succeeds very well. Dressings of quick-lime, wood-ashes, &c., have been recommended, and appear to have proved partially successful in preventing this evil, probably by deterring the parent insect from approaching to lay her egg; but change of crop, when practicable, is of all things the most commendable. C. is sometimes confounded with Anbury (q. v.), from which it is quite distinct.

CLU'B-FOOT (Lat. *talipes*) is a distortion or twisting of the foot by one or more of its muscles being permanently shortened. It may exist from birth, or occur in early childhood after convulsive fits. Surgeons recognize four varieties of C.: turning inwards (*varus*), outwards (*valgus*), downwards with elevation of the heel (*equinus*), or upwards with depression of the heel (*calcaneus*).

As age advances, the bones alter in form from the pressure exerted upon them, the ligaments shorten, and the foot becomes



Club-feet:—A, Talipes Varus; B, Talipes Equinus.

rigidly moulded in its unnatural position. It cripples the person's movements, and in many instances has proved a great affliction. Lord Byron's whole life seems to have been embittered by one of his feet being inverted.

Although Lorenz, in 1784, cut the tendo Achillis to lower the heel in talipes equinus, yet, owing chiefly to the dangers of cutting across tendons, C. was practically incurable till 1831, when Dr. Little of London, having himself a C., after seeking relief from many surgeons at home and abroad, found his way to Dr. Stromeyer, at Erlangen. This ingenious surgeon introduced a narrow-bladed knife, and divided the tendons of the contracted muscles with such a small external wound that scarcely any inflammation resulted. Dr. Little being cured, published a treatise on the subject, and at the present day no deformity of the foot is considered irremediable. However, it must be remembered that the division of tendons must be followed by judicious manipulations, and generally by the application of some suitable apparatus to prevent the foot returning to its former position. Of such apparatus, Scarpa's Shoe, as it is termed, may be mentioned as the one most frequently in use.

CLU'B-MOSS. See LYCOPODIACEÆ.

CLU'B-RUSH. See SCIRPUS.

CLUNCH, a name given locally by miners to any tough indurated clay, such as is sometimes found in the coal-measures, or in the newer strata. The term has also been applied to the lower and harder beds of the cretaceous rocks, which are sometimes used for the stone-work of the interior of ecclesiastical buildings.

CLUPE'IDÆ, an important family of Malacopterous (q. v.) fishes, nearly allied to the *Salmonidæ*, and differing from them chiefly in the want of an adipose fin. They are all scaly fishes, but the scales are very easily detached. None of the fins have any spinous rays. The ventral fins are nearly in the middle of the body. The dorsal fin is always solitary. The gill-openings are very large. The teeth are small and generally numerous. The maxillary bones are composed of three pieces easily separated. The body is generally elongated, and much compressed; the belly thin, and almost reduced to a sharp edge, frequently denticulated by the edges or points of a series of small bones attached to the skin. The air-bladder is always large; the roe consists of a vast number of eggs. The fishes of this family are almost exclusively marine, only a few of them ascending rivers. They generally congregate in shoals and some of them periodically visit certain coasts in vast multitudes. They are very widely diffused over the world; some of the particular species have a wide geographic range. To this family belong the Herring, Pilchard, Sprat (Garvie, Kilkie), Anchovy, Sardine, White-bait, &c. See these articles. The Herring may be regarded as the type of the order, and of the genus *Clupea*. But the genera most important in an economical point of view have been very differently distinguished by different ichthyologists.

CLUPESO'CIDÆ, a family of Malacopterous fishes, so named from being regarded as exhibiting characters intermediate between those of the *Clupeidæ* (Herring, &c.) and of the *Esocidæ* (Pike, &c.). Some of them are marine, and some are fresh-water fishes. They are mostly tropical; none are British. To this family belongs the interesting genus *Arapaima* (q. v.), and the

genera *Heterotis* and *Butirinus*, containing fishes of very curious structure and appearance, highly prized for the table.

CLU'SIA (named in honor of the great botanist L'Ecluse or Clusius) a genus of tropical trees and shrubs of the natural order *Guttiferæ* (q. v.) or *Clusiaceæ*, some of which are commonly called Balsam trees, from their resinous or balsamic products.

They are very often *epiphytes*, growing on larger trees, over the bark of which their roots spread in search of chinks or decayed parts where they may obtain nourishment; and if it cannot be obtained in sufficient quantity, a root is sometimes sent straight down to the ground, and in due time becomes a kind of stem. The fruit is very curious, a subglobular capsule, with a number of cells, opening as by meridian lines from top to base. *C. rosea*, a native of the West Indies and tropical parts of America, yields an abundant resin, which is used as an external application in veterinary medicine, and for covering boats instead of pitch. A great quantity of resin exudes from the disk of the flowers of *C. insignis*, the WAX-FLOWER of Demerara, which is used to make a gently stimulating and soothing plaster. This is one of the productions of Demerara, to which the colonists, in preparation for the 'Great Exhibition' (of 1862), sought to draw general attention.

Clusia Rosea: 1, an expanded flower; 2, a calyx seen from below; 3, the ovary, with a part of the calyx cut away; 4, a transverse section of a fruit.

CLUSO'NÉ, a town of Lombardy, Northern Italy, situated near the left bank of the Serio, 17 miles north-east of Bergamo. It has manufactures of linen, a trade in corn and iron, and in the neighborhood are vitriol works and copper foundries. Pop. 3000.

CLU'STERED CO'LUMNS, or, as they are sometimes called, Compound Piers, form one of the richest features in Gothic ecclesiastical architecture. The columns or shafts are sometimes attached to each other throughout their whole length, sometimes only at the base and capital. When surrounded by floriated fillets, they have been very aptly compared by Sir Walter Scott, to "bundles of lances that garlands have bound.'

CLWYD, a river of North Wales, rises in the Brombanog Hills, is in the south-west of Denbighshire, and runs 30 miles, first south, then east-north-east, and lastly north, through Denbigh and Flint shires, past Ruthin, St. Asaph, and Rhuddlan, into the Irish Sea. Below Ruthin, and between barren hills, lies the fertile, populous, and level vale of the C., 15 by 5 to 7 miles. At St. Asaph, the C. receives the Elwy, 20 miles long, from the west, and increases much in size. It then enters the fertile and extensive marsh of Rhuddlan, and falls into the sea by a small estuary. It is navigable for vessels of 70 tons up to Rhuddlan, a distance of two miles from its mouth.

CLYDE, a river in the south of Scotland, the only great British river, besides the Severn, flowing west. Commercially it is the most important river in Scotland, and the romantic beauty of its scenery is widely celebrated. It rises by several large streams in the semicircular range of the Lead, Lowther, and Moffat Hills, and drains the shires of Lanark, Renfrew, and Dumbarton. The main and southmost source, the Daer, runs north, and receives the Powtrail, the Clyde (a smaller stream after junction with which the main stream is called the C.), and other streams, preserving its mountain character to Roberton, upwards of 20 miles below the sources of the Daer. The C. then bends round Tinto Hill towards Biggar,* from whence it flows north-west west, and south-west, to about 4 miles above Lanark, thence, pursuing a north-west course through Lanarkshire, and between Dumbarton and Renfrew shires, past Lanark, Hamilton, Glasgow, Renfrew, and Dumbarton, near which town it opens into the Firth of Clyde. In this course, it receives a number of streams, and flows through a rich fertile, wooded valley, often extending into level plains, and often with bold wooded banks. From 2 miles above to 4 miles below Lanark occur the celebrated Falls of the C., a series of cascades and rapids, the largest in Scotland for quantity of water—the total descent, in the course of six miles, being 230 feet over old red sandstone rocks, amid very picturesque scenery. Three of the Falls are above, and one below Lanark. Bonniton Linn, two miles above Lanark, is a cascade of 30 feet, with some parts only 4 feet broad. Corra Linn, half a mile below the last, is the grandest fall, forming three distinct leaps—in all, 84 feet high. Dundaf Fall is 10 feet high. Stonebyres Linn, two miles below Corra Linn, forms three distinct falls—in all 70 feet. Below Glasgow, the C. expands into an estuary, navigable by the largest vessels, and at Greenock it attains a breadth of about 4 miles. Opposite this point it communicates with the Gareloch, and a little below, with Loch Long on the north. Its course, which from Glasgow has been west-north-west, now turns suddenly south, in which direction, inclining a little to the west, it continues to flow between Argyle and Bute, and Cantire on the west, and Renfrew and Ayr shires on the east, until it becomes identified with the North Channel at Ailsa Craig, where its breadth is about 30 miles. The C. from its source to Glasgow is, by its windings 75 miles long, and from Glasgow to the south end of Cantire, 48 miles. Its basin occupies 1500 square miles and consists of carboniferous strata and trap rocks, the latter chiefly forming the bordering mountains. Floods sometimes raise its waters 20 feet, and it has changed its course at Renfrew, which was once close to it. Clydesdale, or the valley of the C., is noted for its coal and iron mines, orchards, and horses. Bell, in 1812, launched on the C. the first boat in Europe successfully propelled by steam.

* In very high floods, the waters of the Clyde sometimes overflow in the boggy ground there, and a portion runs into the Biggar Water, and so into the Tweed.

CLYDE, LORD. See CAMPBELL, SIR COLIN.

CLY'STER (Gr., from *klyzo*, I wash out), called also *enema*, a medicine administered in the liquid form by the rectum, or lower end of the intestine. It is used either for the purpose of procuring evacuation of the bowels, or of conveying stimulating or nourishing substances into the system. For the latter purpose, wine, and beef-tea, or milk, in quantities of a few ounces at a time, are employed; for the former, simple warm or cold water in sufficiently large quantities to distend the bowels, and produce evacuation; or in special cases, various cathartics may be used in addition, such as colocynths, aloes, caster oil, or turpentine made into an emulsion with yolk of egg, and sometimes carminatives to expel air. Narcotic clysters are also employed, but should only be used under medical superintendence. An injecting syringe, with a flexible tube, and a double-action valve, is usually employed for the administration of this remedy.

CLYTEMNE'STRA, in Homeric legend, the daughter of King Tyndareus and of Leda, and the twin-sister or Helena, became the wife of Agamemnon, and bore him a son, Orestes, and two daughters, Iphigenia and Electra. During the absence of Agamemnon on his expedition to Troy, she formed a connection with Ægisthus, murdered her husband on his return, and reigned for seven years with Ægisthus, till she was murdered by her own son, Orestes.

CNI'DUS, or GNIDOS, a city on the promontory of Triopion (now Cape Krio), in Caria, in Asia Minor, a Lacedæmonian colony, and one of the six cities of the Doric league. C. (according to Strabo) had two ports, one of which could be closed. In front of what was the town, lies a lofty island, about 600 yards long, which was connected with the mainland by a causeway (now a sandy isthmus). The southern port was formed by two moles, carried into the sea to the depth of nearly 100 feet, one of which is nearly perfect at the present day. The city was famous for several temples of Venus, who was therefore sometimes called the Cnidian goddess. One of these temples contained the famous statue of the naked Venus by Praxiteles. It was of Parian marble, and so beautiful, that Nicomedes, king of Bithynia, offered, in return for this master-piece of Grecian sculpture, to pay the entire debt of the city, which was very large. The Cnidians, in the excess of their devotion to art, refused. During the wars in ancient times, C. was often mercilessly plundered. The site of the city is 'covered with ruins.'

COACH is a general name for a vehicle drawn by horses, designed for the conveyance of passengers, as distinguished from a wagon or cart, for the conveyance of goods. Coaches or enclosed carriages, drawn on wheels, and intended for passengers, were inventions which have been claimed by Hungary, England, Italy, France, Spain, and Germany. The name is derived by Wedgwood from Fr. *coucher*, to lie, which becomes in Dutch *koetsen*, whence *koetse* or *koets-wagen*, a litter or carriage in which you may recline. The earliest record found by Beckmann relates to about the year 1280, when Charles of Anjou entered Naples, and his queen rode in a *caretta*—apparently a small but highly decorated car, from which the modern *charet* or *chariot* was derived, as well as other vehicles named *chares* and *chariettes*. It is believed that most of these vehicles had broad wheels, the only form suited for the wretched roads of those ages; and it is certain that all those of early date were open overhead. Many of the coaches used by the continental princes and nobles in the 16th c. were closed only to this extent—that they had canopies supported by ornamental

pillars, and curtains of cloth, silk, or leather, which could be drawn easily aside. A *glass* C., or C. with glass windows, is specially mentioned as being used by an Infanta of Spain in 1631. The traces of these coaches were at first made of rope; those only belonging to the highest personages were made of leather. It is believed to have been in the time of Louis XIV. that coaches were first suspended by leathern straps, in order to insure ease of motion.

The first C. ever seen in England is said to have been one made in 1555 by Walter Rippon for the Earl of Rutland; and in 1564, the same builder made a showy vehicle for Queen Elizabeth. Later in the reign, the royal carriages had sliding panels, so that the queen could show herself to her loving subjects whenever she desired. During the closing years of Elizabeth's reign, and early in the 17th c., the use of pleasure-carriages extended rapidly in England. The coaches had first to struggle against the opposition of the boatmen on the rivers, and then against that of the sedan owners and bearers; but they gradually came into very general use. The successive steps whereby the coaches of those days gave way to the elegant vehicles of the present, need not be traced in detail, even if there were the means to do so.

The following are some of the chief kinds of pleasure-carriages. The *Dennet* is a two-wheeled vehicle for one horse, with a jointed hood or head covered with leather, and a driving-box. The *Stanhope* bears some resemblance to the dennet. The *Tilbury* is in like manner a two-wheeled vehicle for one horse; but it has pliable leathern braces between the springs and the body of the vehicle, together with suspension brackets. The *Cabriolet* belongs to the same class as the tilbury. The name *Cab* is an abbreviation of cabriolet, but it has come to be applied to a four-wheeled vehicle. The *Curricle* is a two-wheeled vehicle for two horses; there are no shafts; but a pole, fixed to a frame which supports the body, passes between the horses, and is suspended from a metal bar resting on their backs. The *Phaeton* is a four-wheeled vehicle which may be drawn either by one or two horses; its front body is something like that of a dennet or stanhope, and behind this is an open seat, supported on a kind of large box. The *Coach* is a closed four-wheeled vehicle for two or more horses, with two seats inside, and

State Carriage of Queen Elizabeth :– From Hoefnagel's print of Nonsuch Palace.

a skilfully constructed arrangement of springs to insure ease of motion. The *Chariot*, or chaise of modern days, usually differs from the C. in having only one seat. The *Landau* is a C. made to open occasionally. The *Barouche* is permanently open, with only a leathern hood or head over it. The *Britzschka* is a kind of small barouche. In addition to these, our age has witnessed the manufacture of the *Brougham*, a miniature coach usually for two persons, but in which four may be accommodated; and the *Clarence*, a pair-horse carriage with movable glazed panels and hood, and for two or more persons.

The manufacture of carriages, whether pleasure-vehicles or omnibuses, ranks in the highest class of mechanical labor. There is a necessity for the best materials and the best workmanship: since, owing to the severe strains and jerks to which the vehicles are subject, cheap construction is in the end unprofitable. Many different kinds of wood are employed in the construction. The body of the C. is made by one set of workmen, the under-framing by another; the former partaking more than the latter of the nature of cabinet-work. The steel-spring making is delicate work, owing to the necessity of combining strength with lightness and elasticity; and the various pieces of iron-work require careful adjustment, especially the axles. The covering of the upper part of a body of a C. with leather is one of the most difficult parts of the manufacture; one single hide is employed, the leather being worked round the corners by repeated currying while wet; and all must be rendered smooth, without even a puncture. The best coaches receive as many as 20 to 30 coats of oil-paint; and the polishing processes are numerous and carefully conducted. The carving, gilding, herald-painting, lace and fringe work, metal ornamentation, &c.—all are among the best examples of their respective handicrafts.

English carriages are considered to be the best in the world; none else combine so much strength with an equal degree of beauty. The artisans employed in this trade, especially coach-body makers and coach-spring makers, command a very high rate of wages.

COACH-DOG, or DALMATIAN DOG, a variety of dog apparently allied to the hounds, although it is said to be deficient both in keenness of scent and in sagacity. It is often kept in stables, becomes attached to the horses, and may be seen running after carriages. Its general light color and numerous dark brown or black spots are constant characteristics; as are also its short hair, tail destitute of brush and inoffensive disposition. Its origin is uncertain; the name Dalmatian is probably altogether misleading; and it is supposed that it may have been brought from India, where a very similar kind of dog exists.

COADJU'TOR (Lat.), a fellow-worker not as principal but as second, an assistant. Technically, it is applied in ecclesiastical law to one appointed to assist a bishop, whom age or infirmity has disabled. By 52 Geo. III. c. 62, coadjutors to bishops and archbishops in Ireland are empowered to exercise all the powers of their principals except that of presenting to benefices. See EXECUTOR.

COAGULA'TION, the amorphous (q. v.) solidification of a liquid, or part of a liquid, as when the caseine of milk is solidified by rennet in making Cheese (q. v.), or the white of an egg by boiling. The process varies in various substances. Albumen, or the white of an egg, coagulates at a temperature of 160°. Milk is coagulated or curdled by the action of rennet or by acids. The fibrin in the blood, chyle, and lymph of animals is coagulated by the separation of these fluids from the living body. See BLOOD.

COAHUI'LA, a state of the Mexican Confederation, is separated from Texas, in the United States, by the Rio Bravo del Norte, in lat. 24°—30° N., and long. 100°—103° E. It contains 50,000 square miles, and (1873) 98,397 inhabitants. The capital is Saltillo, with a population of 8105; there are besides the towns of Coahuila and Santa Rosa. It possesses some silver mines; but it is valuable chiefly for its pasturage.

COA'ITA. See ATELES.

COAL, in the sense of a piece of glowing fuel (and hence a piece of fuel, whether dead or alive), is a word common to all the languages of the Gothic stock (Icel. *kol*, Ger. *kohle*), and seems allied to the Lat. *caleo*, to be hot; as also to *glow*, and *kiln*. The different sorts of fuel are distinguished by prefixes, as *char*coal, *pit*-coal, *sea*-coal; but in England, owing to the absorbing importance of mineral or pit-coal, the word C. alone has come to be used in this special signification (Ger. *steinkohlen*, Fr. *charbon de terre*).

C. is one of the most important of all minerals; it consists chiefly of carbon, and is universally regarded as of vegetable origin. Its geological relations are noticed in the article CARBONIFEROUS SYSTEM. It generally occurs in strata or beds; it is always of a black or blackish-brown color; some of the varieties have a very considerable degree of vitreous or resinous lustre, and some are very destitute of lustre; some have a shell-like fracture, and some have a sort of slaty structure, and are readily broken into cubical or rhomboidal fragments.

The precise characters of C. as a mineral species are not easily defined, and both in Britain and other countries important cases have occupied courts of law, in which this difficulty was strongly felt, as in the great Scottish lawsuit concerning the *Torbanehill Mineral* (q. v.). C., indeed, is rather a commercial than a scientific term, but in a general way we may define it as a fossil fuel of black color and stony consistency, which, when heated in close vessels, is converted into coke with the escape of volatile liquids and gases. The variety known as blind coal or anthracite no doubt gives off scarcely any volatile matter, but this is because it has undergone a natural distillation through metamorphism or other cause. We may therefore divide C. into two primary divisions, namely, (1) *Anthracite*, which does not, and (2) *Bituminous C.*, which does flame when kindled. Anthracite (q. v.) sometimes

contains as much as 94, and if we exclude the ash, 98 per cent. of carbon, and as this element decreases in amount it graduates into a bituminous coal. The term anthracite is, however, still applied to some coals which do not contain more than 80 per cent. of carbon. Various synonyms, such as stone C., glance C., culm, and Welsh C., are also used to designate this substance, which is used chiefly for smelting purposes and for raising steam. It is difficult to kindle, but gives out a high heat in burning. Bituminous C. includes an almost endless number of varieties, one of the best marked being *cannel* or *parrot C.* Cannel C. is so called from burning with a bright flame like a candle, and the name parrot C. is given to it in Scotland from the crackling or chattering noise it makes when burned. That of different localities varies much in appearance, but it is most commonly dull and earthy, or with only a slight lustre; some examples are, however, bright and shining. In texture it is nearly always compact, and certain beds of it admit of being polished in slabs of considerable size, which approach black marble in appearance. Of this material vases, inkstands, boxes, &c., are made. Cannel C., from the large percentage of ash which it contains, is not suitable for house fires, and is for the most part consumed in making gas, of which it yields from 8000 to 15,000 cubic feet per ton. When distilled at a low red-heat it yields paraffine oil. The other varieties of bituminous C. are so numerous that, as an Admiralty report states, there are as many as 70 denominations of it imported into London alone. Still, among these there are three leading kinds—1. *Caking C.*, which cakes or fuses into one mass in the fire. It breaks into small uneven fragments, and is found largely at Newcastle and some other localities. 2. *Splint or hard C.*, occurring plentifully in Scotland, which is hard, and has a kind of slaty fracture. It is not very easily kindled, but when lighted makes a clear lasting fire. 3. *Cherry or soft C.*, which breaks easily into small irregular cubes, has a beautiful shining lustre, is readily kindled, and gives out a cheerful flame and heat. It is common in Staffordshire. Brown C. or Lignite (q. v.), though inferior to true C., is nevertheless an important fuel in some countries in default of a better kind.

The use of C. does not seem to have been known to the ancients; nor is it well known at what time it began to be used for fuel. Some say that it was used by the ancient Britons; and at all events it was to some extent an article of household consumption during the Anglo-Saxon period as early as 852 A.D. There seems to be reason for thinking that England was the first European country in which C. was used to any considerable extent. About the end of the 13th c., it began to be employed in London, but at first only in the arts and manufactures; and the innovation was complained of as injurious to human health. In 1316, the parliament petitioned the king, Edward II., to prohibit the use of C., and a proclamation was accordingly issued against it; but owing to the high price of wood, its use soon became general in London. It was for a long time known there as *Sea-C.*, because imported by sea.

Several theories as to the mode of the origin of C. have been put forth from time to time. The one now generally believed in is that the rank and luxuriant vegetation which prevailed during the carboniferous age grew and decayed upon land but slightly raised above the sea; that by slow subsidence this thick layer of vegetable matter sunk below the water, and became gradually covered with sand, mud, and other mineral sediment; that then, by some slight upheaval of the sea bottom or other process, a land surface was once more formed, and covered with a dense mass of plants, which in course of time decayed, sank, and became overlaid with silt and sand as before. At length, thick masses of stratified matter would accumulate, producing great pressure, and this, acting along with chemical changes, would gradually mineralize the vegetable layers into coal. Some experiments made by Dr. Lindley a few years ago, showed that of a large number of plants kept immersed in water for two years, the ferns, lycopodiums, and pines were those which had the greatest powers of resisting decay, and C. appears to be mainly composed of the substance of the ancient representatives of these three orders of plants. The interesting fact has also been lately proved by Huxley, Morris, Carruthers, and others, that in many instances the bituminous matter in C. is almost wholly formed of the spore cases and spores of plants allied to our club-mosses and ferns.

As will be seen from the following table, wood, peat, lignite, or brown C., and true C. indicate by their own composition the changes which vegetable matter undergoes by decay and pressure; and a table in which a considerable number of examples of each substance could be given would show how gradually these substances pass into each other :

	Wood.	Peat.	Lignite.	Coal.
Carbon	50·0	60·0	65·7	82·6
Hydrogen	6·2	6·5	5·3	5·6
Oxygen	43·8	33·5	29·0	11·8
	100·0	100·0	100·0	100·0

In each of these bodies there is usually a small precentage of nitrogen, which in the above table has not been separated. In passing from wood or peat to C., the proportion of oxygen and hydrogen decreases, these substances being given off in the form of marsh-gas and carbonic acid in the process of decay.

Since the prosperity of our great national industries, as well as much of our domestic comfort, depends on the continuance of an abundant supply of cheap fuel, much anxiety has arisen in Great Britain of late years regarding the future supply and price of coal. Since the fall of 1872, a great rise has taken place in its price. This is partly owing to the unusually high rate of miners' wages which has prevailed, and partly to the fact that some of the richest and most easily worked English coal-seams are becoming exhausted. There is therefore some cause for apprehension, yet, as the following figures taken from the estimate in the report of the royal commission on C., dated 1871, will show, we have still vast supplies of fossil fuel.

Taking into account the coal which probably exists under the Permian, New Red Sandstone, and other superincumbent strata in the United Kingdom, the coal commissioners increase their estimate of the quantity still available for use to 146,480 millions of tons. (The quantity raised in 1881 was 154,000,000 tons from 3813 collieries.) But, as may be supposed, the estimates which have been put forth regarding the probable duration of our coal-fields are very various, some authorities asserting that, owing to increase in population, and the increasing consumption of coal in manufactures, about 100 years will suffice to exhaust them. Between this and the other extreme of about 1000 years, formed on the assumption that hereafter the population of the country will but slightly increase, there are innumerable conjectures and estimates.

AVAILABLE COAL IN THE CHIEF BRITISH COAL-FIELDS, AT DEPTHS NOT EXCEEDING 4000 FEET, AND IN SEAMS NOT LESS THAN 1 FOOT THICK.

	Tons.
South Wales	32,456,208,913
Midland (Yorkshire, Derbyshire, and Nottinghamshire)	18,172,071.433
Northumberland and Durham	10,036,660.236
Lancashire and Cheshire	5,546,000,000
Bristol	4,218,970,762
North Staffordshire	3,825,488,105
Lesser English coal-fields	5,952,740,019
Total of Scottish coal-coals	9,843,465,930
Total of Irish coal-fields	155,680,000
Grand total	90,207,285,398

On the continent of Europe, productive coal-fields occur in Belgium, France, various parts of Northern Germany, Spain, and Russia. By far the largest in area are those of Russia, and they are known to contain many valuable beds of C., although, as yet, comparatively little has been worked. C. is also found in India, China (where the coal-fields are estimated to cover 400,000 square miles), Japan, and the Malayan Archipelago, in Australia and New Zealand, and in Africa. Turning to the New World, there is evidence of promising coal-deposits in several South American countries, but, owing to the great supply of wood in their forests, there is little temptation to work them. In Canada, Nova Scotia, New Brunswick, and Newfoundland, there are small, though valuable, coal-fields; but in the United States, enormous fields of fossil fuel are found. The entire area of these is about 200,000 square miles, being 38 times greater than the area of the coal-fields of Great Britain. But although the coal-measures of the States are of vast extent, and contain many valuable coal-seams—a few of them 40 and even 50 feet thick at certain places—it has been doubted whether the amount of workable C. in them is not greatly exaggerated by American writers. In proportion to the extent of the seams, the quantity of C. annually raised in the States is small, being only about 70,000,000 tons.

Coal-trade.—The production and sale of C., like every other important branch of industry, was long fettered with legislative regulations. At a very early period, the corporation of the city of London undertook the duty of either weighing or measuring the C. brought into the port, and by a series of statutes, commencing with 7 Ed. VI. c. 7, the mayor and aldermen of London, and the justices of the counties, were empowered to fix the price of C. to be sold by retail; and in case of refusal by the parties to sell at the prices fixed, to enter their wharves, or other places of deposit, and to cause it to be sold at the prices which they had set. In addition to the general supervision which they thus possessed, and the sums which they were empowered to exact for their trouble, the corporations of London and other towns have exacted, and still continue to exact, dues on C. for local purposes. These were first imposed in London in 1667, after the great fire, in order to enable the corporation to repair the ravages which it had committed; and they have been since continued as a fund for civic improvements, though, as Mr. M'Culloch has remarked, no im-

provement could be equal to a reduction in the price of coal. In the reign of William III., a general tax, payable to government, was laid on all *sea-borne C.*—a tax which was in the highest degree unjust to places which were dependent for their supply on the coasting-trade, and oppressive to the whole country, inasmuch as it amounted to more than 50 per cent. on the price paid to the owner at the pit's mouth. The tax varied in amount, not only at different periods, reaching its highest point of 9*s.* 4*d.* per chaldron during the great war, but also in different parts of the country, being higher in London and the south of England, and lower in Ireland and Wales, whilst Scotland for a considerable period was altogether exempt.

The tax itself, with all its inequalities, was abolished in 1830, and there is now no tax on C. except that collected for local purposes in London, and a few other towns. The repeal, in 1845, of the duty on C. exported to foreign countries, was a measure of much more doubtful policy. The average annual quantity of C. exported from Great Britain during the three years ending 1880 was above 14,000,000 tons.—For the provisions of the recent statutes for the regulation and inspection of mines (23 and 24 Vict. c. 151, and 35 and 36 Vict. c. 76), see MINES. The circumstances in which coal-mines are regarded as a pertinent of land, and those in which they form a separate estate, are stated under MINES.

Coal-note, a particular description of promissory-note, used in the coal-trade in the port of London (3 Geo. II. c. 26, ss. 7, 8). See COAL-SUPPLY, and the article MINING.

COA'L-BEDS. See CARBONIFEROUS SYSTEM.

COA'LBROOK DALE, an English coal-field in the valley of the Severn, which supplies considerable quantities of coal and iron. The group of strata which includes the coal-beds is from 700 to 800 feet thick.

COA'L-FISH (*Merlangus carbonarius*), a fish of the same family with the Cod and Haddock (*Gadidæ*), and of the same genus with the Whiting. It is not unlike the whiting in form, and in its fins, which, however, are not proportionally so large; but is of a very different color, the upper parts being nearly black. It attains, also, a much larger size, being often two or three feet in length. It is celebrated among fishermen for its voracity; and is commonly found in large shoals, which, when attracted by bait, will keep near a boat till great numbers are taken. It is rather a coarse fish, but is much used in the northern parts of the world, both fresh and salted, or dried. It is found in the most arctic regions, even on the shores of Spitzbergen, and both on the European and American sides of the Atlantic. It is very plentiful on the British coasts, and in Scotland is generally known as the *Sethe*. The fry are taken in great numbers by juvenile fishers stationed on rocks, and are called *podleys* on the east and west coast of Scotland, *sillocks* and *cuddies* on some of the Scottish coasts, and *coalseys* in the north-east of England. This fish forms an important part of the food of the Orkney and Shetland islanders, and of the inhabitants of some of the Hebrides. Vast numbers of the fry are sometimes caught by means of blankets in the mouths of streams in the Hebrides. The liver of the C. abounds in oil, which is used for lamps.

COALI'TION, in Politics, is applied to the union of two parties, or, as it generally happens, portions of parties, not of the same opinion, who yet agree to sink their differences, and act in common. Pitt the elder, when he took office in 1757, coalesced with the Whig aristocracy represented by the Duke of Newcastle. The ministry always spoken of, however, as the Great C. was formed in 1782, when Fox, the leader of the Reformers, took office along with Lord North, the leader of the opposite party. When Lord Derby's ministry resigned in 1853, there was a short C. between the Whig party, under Lord John Russell, and the more moderate of the Conservative party, under Lord Aberdeen.

COAL-SUPPLY. Referring to CARBONIFEROUS SYSTEM and COAL for various details connected with the localities of coal-beds, the diversity of qualities, and the modes of working, we shall treat here of a question which has recently been accepted as one of great importance to the welfare of the nation—viz., the amount of available supply. All the coal now existing was formed untold ages ago, when the conditions of temperature and moisture on the earth's surface were different from those now prevailing. Coal is not a growth annually renewable, but an accumulation which we are gradually spending. We are living, not on the interest of our coal, but on the capital. This is a truth which scientific men have recognized for some time past; but statesmen and manufacturers, mine-owners and merchants, have paid singularly little attention to the subject, under the supposition that the existing stock will last for so great a period as to relieve us from all anxiety on the matter. John Williams in 1789, Sir John Sinclair in the *Statistical Account of Scotland*, Robert Bold in 1812, and Dr. Buckland in 1830, were almost the only writers, until recently, who cautioned England that her supply of coal will not last forever. Two volumes on the *Coal Question*, however, by Mr. Hull and Mr. Jevons respectively, effectually roused public attention to the matter.

At the Newcastle meeting of the British Association in 1864, Sir W. G. Armstrong, as chairman, forcibly urged the subject on the attention of scientific and practical men. He said: 'Contemplating the rate at which we are expending those seams of coal which yield the best qualities of fuel, and can be worked at the least expense, we shall find much cause for anxiety. . . . We have already drawn from our choicest mines a far larger quantity of coal than has been raised in all other parts of the world put together; and the time is not remote when we shall have to encounter the disadvantages of increased cost of working, and diminished value of produce.' He urged especially that we ought not to squander our coal as at present. We waste nearly all the smoke, heated air, and heated gasses from our furnaces; we waste sadly in our open fireplaces; and there is a vast quantity of small-coal recklessly burned at the pit's mouth. Various statistics as to supply and consumption had furnished Sir W. G. Armstrong with his data. So widely have estimates differed as to available quantity still in store, that between 1792 and recent times, the conjectures, for Northumberland and Durham alone, varied from 200 years to 1700 years, as the period during which the whole nation could be supplied from this one coal-field; but more earnest attempts have been made in late years to arrive at approximate figures. In 1857, M. De Carral, a Prussian mining-engineer, estimated the coal-mining of that year in all countries at 125 million tons, with an average value of 7*s.* per ton at the pit's mouth; he credited Prussia with enough unexhausted coal to supply all the world for 900 years.

In 1861, Mr. Robert Hunt ascertained, by reliable mineral statistics, that Great Britain raised 86 million tons in the year; that the quantity was increasing by nearly three million tons every year; and that we were working our mines at thrice the rate which had been in force 20 years before. These facts had much influence in drawing the attention of public men to the subject. The produce of Great Britain in 1861 was from 3052 collieries; and the different districts joined in the supply as follows: Durham and Northumberland, 19 million tons; Lancashire, 12; Yorkshire, 9; Staffordshire and Worcestershire, 7; South Wales, 7; Derbyshire and Nottinghamshire, 5; Scotland 11: all other districts, 16—amounting to a total of 86 million tons. M. Burat, in his *Situation de l'Industrie Houillère en* 1864, estimated the coal produce of the world at 141 million tons, of which he credited Great Britain with about four-sevenths. In the same year, Sir W. G. Armstrong, taking Mr. Hull and Mr. Hunt as his authorities, estimated the available stock of coal in the United Kingdom at 80,000 million tons, rejecting all seams below 4000 feet as too deep to work, and all less than two feet thick as too thin to work. Taking 1864 as a standard of consumption, it would last 930 years; but at the rate of increase of recent years, it would only last 212 years, because this rate would be geometrical and not merely arithmetical in its progression.

In the year 1866, the question came into the arena of the British parliament. On April 17, during a discussion in the House of Commons on the malt-tax, Mr. J. Stuart Mill dwelt on the fact, that coal is one of our greatest sources of national wealth; and he accepted as trustworthy the calculations of Mr. Jevons—that in three or four generations, we shall have scarcely any usable coal at a less depth than 4000 feet, a depth which will either be unworkable, or workable only at a greatly increased cost. This speech made a great impression on the House; and the government, a few days afterwards, undertook to ascertain what facts the officers of the Geological Survey possessed on the subject. On May 3, the Chancellor of the Exchequer, Mr. Gladstone, made his financial statement for the year, in which he accepted Mr. Mill's views, based as they were on the opinions of Sir Roderice Murchison, Sir John Herschel, Sir W. G. Armstrong, Dr. Percy, Mr. Hull, Mr. Jevons, and other authorities. He assented to the probability that by the year 1970, if matters go on at their present rate, we shall have no coal left. 'I disbelieve and disapprove,' he added, 'of all attempts to limit by law the consumption of coal. In vain would it be to think of stopping the consumption of coal in this country; in vain would it be to think of diminishing that consumption by the imposition of a tax; and it would be more vain still to think of prohibiting its exportation.' In other words, the remedy, if any, can *not* be by legislation. The question was brought to a decisive point on June 12, when Mr. Hussey Vivian moved an address to the crown, praying for the appointment of a royal commission to investigate the whole matter.

In an elaborate speech, he stated his reasons for believing that the forebodings of Mr. Hull and Mr. Jevons are too gloomy—that advancing science will enable miners to contend against the temperature and pressure of deeper mines than have hitherto been thought practicable; that we shall be better able than ever to ventilate and drain the deep workings; that the area of coal workable even with our present means is larger than has been estimated; that the magnesian limestone and new red sandstone beds are

likely to afford an opening for new stores of coal quite incalculable in amount; that the theory of an increase of consumption in a geometrical ratio is not tenable; and that we shall probably economize consumption in future years by the adoption of new processes, new furnaces, new stove-grates, smoke-consuming apparatus, and the utilization of waste heat and gases. Although entertaining these favorable views, he nevertheless suggested official inquiry. The government assented; and a Royal Commission, comprising the Duke of Argyle, Sir Roderick Murchison, Sir W. G. Armstrong, Mr. Vivian, Mr. Prestwich, Dr. Percy, Mr. Jukes, Mr. Robert Hunt, and several other experienced men, was appointed in July 1866.

The Coal Commissioners gradually collected a large body of information concerning the quantity of coal raised annually in the United Kingdom; the probable future rate of increase; the quantity still remaining at available depths underground; and the best means of economizing coal in future. They obtained a great mass of evidence, which was published in 1871, with maps, plans, and diagrams. They reported that the deepest of our mines are about 2000 feet, but that 4000 feet might possibly be worked with improved lifting and ventilating appliances. 'They estimated the coal of the United Kingdom, at all depths down to 4000 feet, at 90,207 million tons—viz., 46,000 millions in England; 34,000 millions in Wales; 10,000 millions in Scotland, and a mere trifle in Ireland. The largest single coal-field they found to be that of South Wales, 32,000 million tons. With deeper deposits, the total was 146,480 millions of tons. Later calculations are given by Dr. Edward Hull in his *Coalfields of Great Britain* (4th ed. 1881). He has corrected the estimates of the Commissioners down to 1880, and obtains the following results for the visible coal-fields: In England and Wales, 69,216 millions of tons; in Scotland, 9643; in Ireland, 150; total, 79,009 millions of tons. The summary by Professor Ramsay of the probable amount of coal under Permian and other formations, at a depth of less than 4000 feet, with 40 per cent. deducted for loss and other contingencies, is upwards of 56,000 millions of tons, so that the total available coal in visible and concealed coal-measures amounts, according to this calculation, to 136,000 millions of tons, a supply which Dr. Hull thinks would be sufficient to last for more than a thousand years.

The coal-harvest of Great Britain in 1872 was 123,000,000 tons; in 1873, 127,000,000 tons; and in 1880, 146,818,622 tons, or an increase of 12 millions of tons upon the previous year. The value was £62,395,000; the number of collieries, 3880.

COAL-TAR. See GAS-TAR.

CO'AL-WHIPPING, the name given to a mode of unloading coal from vessels at anchor in the Thames. About 2,000,000 tons of coal are annually transferred from vessels in the river to barges, which convey them to the wharves. The operation is called C., and the men, *coal-whippers*—names, the origin of which does not seem to be known. The men work in gangs of nine—a *basket-man* and eight others. Some of them shovel the coal from the hold of the ship into baskets or boxes; some haul up the boxes by ropes and pulleys; and some empty the contents into the barges.

This is all the operation—a mere example of muscular labor of the coarsest kind. It would not have called for notice in this work, had not legislative interference given a factitious importance to it. Some years ago, when the number of these men was about 2000, public-house keepers got into the habit of acting as middlemen, a position which gave them the power of compelling the men to spend nearly all their earnings in drink. The trade fell into such a state, that the men were virtually slaves to the publicans. They asked for the interference of the legislature; and this was granted in 1843. An act was passed expressly for these 2000 coal-whippers. A Coal-whippers' Board was formed, comprising members named by the Board of Trade, others named by the Corporation of London, and one by the Shipowners' Society. This Board assumed the functions of a middleman or master coal-whipper; contracted for the whipping of ships of coal, and employed the men. No one but men registered on the books of the Board was allowed to work on the Thames as a coal-whipper, with the exception of the crews of the ships and the servants of the coal-owners. This exceptionally-protected trade was maintained on the same basis by other acts passed in 1846 and 1851. In 1856, however, a further renewal was refused; and a committee of the House of Lords, in 1857, while sympathizing with the men, declined to recommend any further special legislation for them. The coal-owners agreed with the Board of Trade to maintain a Whipping Office, to give the men a refuge from the publicans, but without interfering with the liberty of coal-shippers to employ whom they pleased; and this plan has since been acted on. The office is at the Coal Exchange, with a men's rendezvous near Ratcliff. The necessity for coal-whippers has been much lessened of late years by the use of a floating derrick in the Thames, by which the contents of a coal-ship can be transferred to the barges in a few hours by steam-power.

COA'MINGS, in a Ship, are small frameworks on the deck, to prevent sea and rain water from running down the hatchways, ladder-ways, and scuttles.

COA'NZA, a river of Lower Guinea, Western Africa, which, after a course of about 500 or 600 miles, enters the Atlantic south of St. Paul de Loando, in lat. about 9° 10' S. It is navigable for a considerable distance, but a bar at its mouth renders it inaccessible save to small vessels.

COA'ST-GUARD, an organization formerly intended to prevent smuggling merely, but now constituted so as to serve as a defensive force also. The old coast-guardsmen were in the employment of the Customs department; they were posted along the shore at spots commanding extensive views of the beach, and were expected to be always on the look-out for smugglers. In 1856, the C. was transferred to the Admiralty, and under this arrangement, the Admiralty may, from time to time, issue orders for the augmentation of the C., not to exceed 10,000 men in all. Lands, not exceeding three acres each, may be bought by the Admiralty for C. stations. The coasts of the United Kingdom have been divided into 11 districts. Each district is under a navy captain, who has an iron-clad guard-ship at some port in the district. All the revenue cruisers and defence gun-boats are attached as tenders to the ships, and are manned therefrom. The able seamen, borne on the ships' books, and employed on shore in C. service, are in three classes—chief boatmen, commissioned boatmen, and boatmen. They receive high sea-pay, besides 1*s.* 4*d.* per day in lieu of provisions, and house-rent and medical attendance free. In war-time, all of these men may be called upon to serve as regular sailors on board ship, but their families are allowed to live rent-free during this time. The C. are taught naval gunnery, gunboat exercise, and the serving of land-batteries. The guard-ships are also employed as training-ships for the navy. The whole of the C. comprised, in 1880, 4000 men; and the charge for their maintenance and that of their ships is about £460,000.

COAST VOLUNTEERS, or ROYAL NAVAL COAST VOLUNTEERS, was a corps organized for the special defence of the coasts of the United Kingdom, separate from, but in connection with the Coast-guard (q. v.). By an act of parliament passed in 1853, the Admiralty was empowered to raise a number, not exceeding 10,000, of C. V., to consist of seafaring men and others, to be entered for five years' service, and to be exercised 28 days in each year, either on shipboard or on shore; but not to be sent more than 50 leagues from the coasts of the United Kingdom, unless in cases of emergency, when the distance might be extended to 100 leagues. One year's active service entitled them to discharge in ordinary cases. Their pay and rank during exercise and active service were the same as able seamen's. An act passed in 1875 invested the command of the C. V. in the Coast-guard, the officers of which were to superintend the training and exercising. As a matter of fact, the force was always a very small one and a failure; and it was ultimately abolished. Its place may be regarded as having been amply filled by the Royal Naval Reserve (see NAVAL RESERVE), 20,000 strong; and to some extent by the Naval Artillery Volunteers (see VOLUNTEERS), a new force established in 1873.

COASTING-TRADE, the commerce carried on by sea between the different ports of the same country. In Great Britain, 'coastwise' is defined to mean 'from any one part of the United Kingdom to any other part thereof.' Vessels engaged in this commerce are subject to different rates and regulations from oversea traders, and the masters must keep books showing that their cargoes come strictly within the definition of coasting-trade. Formerly, no goods or passengers were allowed to be carried from one part of the United Kingdom to another, except in British vessels; but this restriction was repealed in 1854, and the C. of Great Britain is now open to all the world. In other countries, the exclusive policy still prevails. The regulations under which the C. are conducted are contained in the Customs Consolidation Act, 16 and 17 Vict. c. 107 (see M'Culloch's *Commercial Dictionary*).

COAT OF ARMS, in the military trappings of the middle ages, held the place of the *paludamentum* of the ancient Roman captains. It was a coat worn by princes and great barons over their armor, and descended to the knee. It was made of cloth of gold or silver, of fur or of velvet, and bore armorial insignia. The 'coat of arms,' as understood by heraldry in the present day, is nothing more than a relic of the ancient armorial insignia, divested of the coat on which it used to be embroidered. See SHIELD, HERALDRY.

COAT OF MAIL, in the armor of the middle ages, was a suit made of metal scales or rings, linked one within another. See ARMOR.

COA'TBRIDGE, a rising and prosperous town of Scotland, in the parish of Old Monkland, about eight miles directly east of Glasgow, on the Monkland Canal and Caledonian Railway. The

town is straggling, has some good houses, and a number of small villages or suburbs on its outskirts. There are six churches besides the parish church, two academies, and several other schools, banks, &c. The town is in the center of a mineral district, is surrounded by about fifty smelting-furnaces, and contains eight malleable iron works, one tin-work (the only one in Scotland), and several other works connected with the iron manufacture. C., owing to the great increase in the iron trade, has grown very rapidly in size and prosperity within the last 30 years. Pop. (1841) 1599; (1851) 8564; (1861) 10,501; (1871) 13,802; (1881) 17,500.

CO'ATI, or COATI-MONDI (*Nasua*), a genus of quadrupeds of the family *Ursidæ* (the Bear family); by some naturalists referred to *Viverridæ* (the Civet family), although their *plantigrade* character allies them rather to the former. They are most nearly allied to the racoons, and, like them, are exclusively American. They are chiefly remarkable for the elongation of the snout, which is a sort of flexible proboscis, and is turned about in search of food, and employed in rooting up the earth to obtain worms and insects. They are often domesticated in South America, and are very affectionate, active, troublesome, and amusing.

CO'BALT (from *Cobalus*, a malicious sprite or gnome) is a metal of no use in the arts and manufactures, but which forms compounds of commercial importance. C. (symbol Co) is found naturally in combination with arsenic (As) as *Speiss* (CoAs); in combination with arsenic and sulphur, as *C. Glance*, the arsenide and sulphide of C. (CoS_2,CoAs), in ores of Nickel (q. v.); and in the metallic state, it is found in meteoric stones or Aërolites (q. v.). The metal had been obtained in laboratory experiments, and presents a gray color with a reddish tinge, is highly magnetic, and is as hard and infusible as iron, It is a brittle metal, and forms no alloys of commercial use. The protoxide of C. (CoO) is employed in painting on porcelain, for producing a rich blue color. *Zaffre* is the impure oxide obtained by partially mixing C. ore with two or three times its weight of fine sand. *Smalt* is the term applied to the deep blue glass, which owes its color to the presence of oxide of C., and which, when reduced to very fine powder, is employed occasionally by laundresses to correct the yellow color of newly washed linen, and by paper-makers as a blue pigment for staining writing paper. Smalt is also used in the production of of the blue colors in porcelain, pottery glass, encaustic tiles, fresco-painting, &c., and forms the principal ingredient in *Old Sevres Blue*, *Thenard's Blue*, *Turquoise Blue*, and *Variegated Blue*. See BLUE. A compound containing the oxides of C. and zinc is of a beautiful green color and is known as *Rinman's Green*. The chloride of C., dissolved in much water, may be employed as a sympathetic ink. In dilute solutions, it is of a faint pink color, which is not observable when it is used for writing upon paper; but when heated before the fire, it loses water, and becomes blue, and the writing is then capable of being read. On allowing the paper thereafter to lie in a damp place, or exposing it to the vapor or steam from a kettle, water is again absorbed and the writing returns to its invisible state. The addition of a little perchloride of iron to the ink, makes the writing appear green; a solution of zinc imparts a red tint; and a salt of copper, a yellow shade.

COBA'N, a town of Central America, Guatemala, in the dep. of Vera Paz, in a fertile valley on the Rio Dolce, 55 miles north of the town of Guatemala. The inhabitants are nearly all Indians, are generally industrious and some of them wealthy, and possess plantations of sugar-cane, bananas, pimentos, and various kinds of fruit-trees. Pop. estimated at 14,000.

CO'BBETT, WILLIAM, a celebrated English political writer, was born in March 1762, at Farnham, in Surrey, where his father was a small farmer. From his infancy, he was trained in habits of industry and self-dependence. Taking a dislike to rural occupations, he went to London, where he was employed a few months as a copying-clerk—a kind of employment so distasteful to him, that he enlisted into the 54th Foot, and with it went out to Nova Scotia shortly after. In this regiment he remained about eight years, in the course of which time his uniform good conduct, activity, and intelligence, had secured him the high promotion of sergeant-major. During his soldier-years, he indulged in none of the dissipations common to barrack-life, but devoted the whole of his leisure to the work of self-education. On his return to England about the end of 1791, he obtained his discharge, married, and went to America in the following year. He settled in Philadelphia, where he commenced his career as a political writer. Under the signature of 'Peter Porcupine,' he was at this early stage as keen a Tory as in later life he was a Radical, and he lashed French republicanism and American democracy with a scorn as coarse and personal sometimes as it was always bitter. In America he was twice prosecuted for libel. He left America in June 1800, and returned to England. In January 1802, appeared the first number of his famous *Weekly Political Register*, which he continued without intermission until his death in 1835. At first, Tory, the *Register* gradually changed its politics, until at last it became the most fierce and determined opponent of the government, then presided over by Pitt, and the most uncompromising champion of Radicalism. In 1810, having previously been twice tried and found guilty of libel on certain members of the government, he was sentenced to imprisonment for two years in Newgate, and to pay a fine of £1000, for having in the *Register* made some severe remarks upon the flogging of five militiamen. In 1817, in consequence of pecuniary embarrassments, and the dread of being sent to Newgate again, under the Six Acts for the suppression of freedom of discussion, C. went once more to America, where he remained more than two years, his articles for the *Register* being transmitted with unfailing regularity across the Atlantic. In 1829—1830, C. delivered political lectures in several of the principal towns of England and Scotland, and everywhere met with a most enthusiastic reception as the boldest and most powerful advocate of the people's rights. In 1832 he was returned to the first reformed parliament as one of the members for Oldham. His speeches in parliament, however, did not add to his reputation.

He died June 18, 1835. Among C.'s best known works are his *English Grammar*, *Rural Rides*, *Cottage Economy*, *Advice to Young Men and Women*, and *Parliamentary History*. C. was by no means a man of the first order of intellect; he was shut out altogether from the higher and more refined departments of human thought. But in dealing with matters of common sense merely, he exhibited a native vigor far surpassing that of any writer of his day. Nor can there be any doubt that, in spite of his crotchets, he rendered lasting service to the cause of the people. See Smith's *Life of C.* (1878).

CO'BDEN, RICHARD, an eminent English politician, who was very aptly designated 'the Apostle of Free Trade,' was born at Dunford, near Midhurst, Sussex, 3d June 1804. His father, who was the owner of some little property, which he cultivated himself, died while the subject of this article was yet young, leaving his family in comparatively poor circumstances. Richard was received into a wholesale warehouse belonging to his uncle, where he soon exhibited great aptitude for business. After some time, he became a partner in a Manchester house, his presence here being speedily made manifest by the superior quality and tastefulness of the printed calicoes of the firm. In 1834—1835, C. traveled in Turkey, Greece, and Egypt, and also visited the United States, the result of his travels appearing in two pamphlets, entitled respectively *England, Ireland, and America*, and *Russia;* the latter intended as an antidote against the 'Russophobia' then prevalent. In these pamphlets, he also ridiculed the workings of diplomacy, and asserted England's mission to be the avoidance of war and the extension of commerce. In 1837, he contested unsuccessfully, on free-trade principles, the borough of Stockport; and in 1838 he carried in the Manchester Chamber of Commerce a motion to petition parliament for the repeal of all duties on corn. This was followed by similar action all over the country; and in the following year, petitions bearing some two millions of signatures for the repeal of the corn-laws were carried to London by 200 delegates. The motion of Mr. Villiers for repeal being rejected by a large majority of the House of Commons, the friends of free trade determined to form the Anti-corn-law League (q. v.), of which C. became the most active and prominent member. To his lectures all over the country, and his speeches in parliament (to which he was returned in 1841 by the constituency which rejected him in 1837), all characterized by great information, clearness, and acute and convincing reasoning, was in great part due, as Sir Robert Peel acknowledged, the abolition of the corn-laws at so early a period as 1846. Having accomplished this great work, C. again visited the continent, and during his absence he was elected both for Stockport and the West Riding of Yorkshire.

He chose the latter constituency, which he continued to represent till 1857, when, on an appeal to the country by Lord Palmerston to support him in his Chinese policy, of which C. was a strenuous opponent, he was rejected. Shortly after the repeal of the corn-laws, the public testified its gratitude to him for the services he rendered in this matter by subscribing for him a magnificent testimonial of between £60,000 and £70,000. C. now gave up business, and devoted himself exclusively to politics. He continued to labor assiduously for the extension of free-trade principles, for parliamentary and financial reform, for repeal of the taxes on knowledge, and was particularly earnest in enunciating national and international peace views; and to this feeling with regard to war, he owed his rejection at the general election of 1857. In 1859, having in the interval, on account of ill health, retired from politics altogether, he was, during his absence in America, elected for Rochdale. Lord Palmerston, who was at this time called upon to form a new ministry, with a just appreciation of the great services which C. had rendered to his country, offered him a seat in the cabinet, which C., as the uncompromising opponent of the noble lord's foreign policy, felt bound to decline.

After his election for Rochdale, the state of his health did not permit him to take any part in parliamentary proceedings, but as her Majesty's plenipotentiary, he (1859—1860) arranged and concluded a treaty of commerce with France. C. spoke out strongly in favor of the North, during the American civil war. He died April 2, 1865. See his *Life* by John Morley (1880).

COBI'JA, a town of Bolivia, claims notice chiefly as being the only seaport of the republic. It is situated in lat. 22° 34′ S., long. 70° 21′ W., and forms the capital of the department La Mar. Its population is less than 3000, and its trade inconsiderable, for, besides the disadvantage of an open roadstead, to seaward, there extends inland the almost impracticable desert of Atacama. Hence most of the maritime commerce of the state (see BOLIVIA) passes, and that in the face of transit-duties, through the Peruvian harbors to the northward.

COBI'TIS. See LOACH.

CO'BLE, or CO'BBLE, is a low flat boat with a square stern, mostly used by salmon-fishers.

COBLENZ, a city of Rhenish Prussia, beautifully situated at the junction of the Rhine and the Moselle, the former of which is here crossed by a bridge of boats, and the latter by a fine stone bridge. Being a bulwark of Germany against France, C. is defended by extensive fortifications, forming a fortified camp capable of affording accommodation for 100,000 men. For defence-purposes, C. is connected with the almost impregnable castle of Ehrenbreitstein (q. v.), on the opposite side of the Rhine. Several detached forts also guard the city at various points. In the old town of C., many of the streets are irregular, narrow, and dirty; but in the new town they are generally well built, moderately wide, and cleanly.

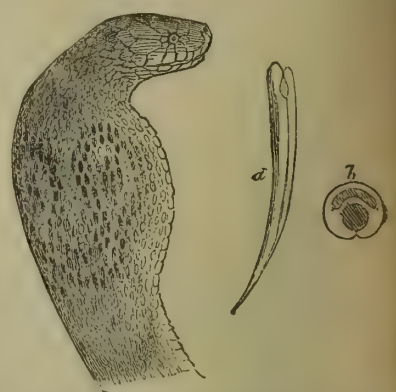
Among its principal buildings are the Church of St. Castor, founded early in the 9th c.; the town-hall; the old castle of the Electors of Treves, repaired in 1845; and the old Jesuit College, now a *gymnasium*. The favorable position of C. secures it an active commerce in wine, corn, mineral waters, &c. It manufactures champagne, cigars, japan-ware, and furniture. Many of the inhabitants are employed in vine culture. Pop. (1880), with Ehrenbreitstein and a garrison of 4600, 36,240. C. was known to the Romans as *Confluentes*. Till 1796, it belonged to the Elector of Treves. In 1798 it was made the capital of the new French department Rhine-Moselle, and in 1815 was given to Prussia.

CO'B-NUT, a name given to some of the largest and finest cultivated varieties of the HAZEL-NUT (q. v.)—In the West Indies, the name C. is given to the fruit of *Omphalea triandra*, a tree of the natural order *Euphorbiaceæ*. It is also called Hog-nut. The tree has a white juice, which turns black in drying, and in Guiana is used instead of ink. The fruit is a three-celled capsule, each cell containing one seed or nut, which, if the embryo is retained, has very cathartic properties, but after its extraction, is wholesome and pleasant.

CO'BURG, a town of Central Germany, in the duchy of Saxe-Coburg-Gotha, picturesquely situated on the left bank of the Itz, a tributary of the Regen, in lat. 50° 15′ N., and long. 10° 58′ E. In the market-place are some striking old buildings, but the general appearance of the houses is one of cleanliness and comfort. C. is one of the chief ducal residences, and the palace, a Gothic edifice, erected in 1549, is one of the principal buildings in the town. The old castle of the Dukes of Coburg, now partly used as a house of correction and prison, occupies a commanding height more than 500 feet above the town. The rooms, and the bed which Luther occupied when in concealment here in 1530, are still exhibited to the visitor, as well as the pulpit from which he preached in the chapel of the castle. During the Thirty Years' War, the castle was ineffectually besieged by Wallenstein. C., which is the seat of all the high courts of the duchy, has manufactures of woollen, linen, cotton, marquetry, baskets, porcelain, furniture, and carriages, and exports beer. Pop. (1880) 15,791.

COBRA DA CAPELLO ('hooded snake'), the Portuguese name of *Naja tripudians* (sometimes extended to the whole genus *Naja*), very venomous serpents of the sub-order *Colubrina*, remarkable for the faculty of dilating the back and sides of the neck, which they do when excited. The dilatation depends on the length of the ribs from the head to the tenth vertebra; when at rest, these ribs are directed backward, but spread out the integuments of the neck when drawn forward and arranged horizontally. It is usually three or four feet long, of a pale rusty-brown color above, and bluish or yellowish-white below, and is characterized by a singular mark on the back of the neck, closely resembling the figure of an old fashioned pair of spectacles, from which the animal sometimes receives the name of the *Spectacle Snake*. The C. da C. preys on lizards and other small animals. It is usually a sluggish creature, and is easily killed, even by means of a small stick or whip. Its venom is extremely powerful, its bite causing death in two hours or less. Yet it is little disposed to use its fangs, except for the purpose of providing itself with food. The C. da C. is often to be found in the vicinity of human dwellings in the East Indies, and even in the houses themselves, attracted apparently by the young of the domestic poultry, and by the moisture of the wells and drainage. When one is found in or near a house, its mate is seldom far off. The Singhalese, when obliged to leave their houses in the dark, carry a small stick with a loose ring, the noise of which, as they strike it on the ground, warns the snake to leave the path.

The poison of the C. da C. is secreted in a large gland in the head of the serpent, which, when the animal compresses its mouth upon any object, flows through a cavity of the tooth into the wound. The poison, though most deadly when introduced into the system through a wound, possesses the curious property of being perfectly harmless if taken internally. Olive oil applied externally, and ammonia taken internally, cauterizing, and ligatures immediately applied, may save the life; but the poison is so deadly, that instances of recovery of bitten persons are very rare. See Buckland's *Curiosities of Natural History*, and Fayrer's *Thanatophidia of India* (London: Churchill). The other species of *Naja* are found in the warm parts of Asia, Africa, and Australia.



Head and Neck of Cobra, showing the Hood: *a*, fang of Cobra; *b*, transverse section.

COBURG PENINSULA, the most northerly part of Australia to the west of the Gulf of Carcentaria, runs out in a north-west direction towards Melville Island, from which it is divided by Dundas Strait. On its north-east side is the bay, known as Port Essington, at the head of which, about lat. 11° 22′ S., long. 132° 10′ E., was established in 1839, the settlement of Victoria—abandoned, on account of its insalubrity, six years thereafter.

CO'CA (*Erythroxylon Coca*), a shrub of the natural order *Erythroxylaceæ*, of which the leaves are much used by the inhabitants of Peru and Bolivia as a narcotic and stimulant. The dried leaves are chewed with a little finely powdered unslaked lime, or with the alkaline ashes of the quinoa (q. v.), or certain other plants. An infusion is also occasionally used. The properties and effects of C. resemble those of opium, although it is less narcotic, whilst it possesses the property of dilating the pupil of the eye, which opium does not possess. It also lessens the desire for ordinary food, and for some time, at least, enables the person who uses it to endure greater and more protracted exertion than he otherwise could, and with less food. It is especially remarkable for its property of preventing the difficulty of respiration, so common in the ascent of long and steep slopes at great elevations. But when used habitually and in excess, it weakens the digestion, produces biliary and other disorders, and finally induces a miserable ruin both of body and mind. It has been in use from a very remote period among the Indians of South America, and was extensively cultivated before the Spanish conquest. Many of the Indians of the Peruvian Andes are to this day excessively addicted to it, and its use is quite general among them, besides prevailing to a considerable extent among the other inhabitants of the same regions. Its culture and use have extended into Brazil and the countries on the banks of the Amazon, and it is supposed that about 30,000,000 lbs. of the dried leaf are consumed in a year, about 10,000,000 of the human race partaking in the indulgence.

COCCE'JI, HEINRICH FREIHERR VON, born at Bremen, March 25, 1644, studied jurisprudence and philosophy in Leyden from 1667 to 1670, and went from thence to England. In 1672, he was made professor of the law of nations at Heidelberg; in 1689, he accepted the professorship of jurisprudence at Utrecht; and, in the following year, was appointed to a similar office at Frankfort-on-the-Oder. In 1713, the emperor named him a baron of the realm, on account of his good management of several important affairs. C. died August 17, 1719. As an erudite jurist, C. was the oracle of many courts, and his work on German civil law (*Juris publici prudentia*, 1695) was almost universally used as an academical text-book for this branch of jurisprudence.—His youngest son, SAMUEL, born at Heidelberg in 1679, acquired no less renown. He, too, in 1703, became professor at Frankfort-on-the-Oder, and afterwards filled several honorable state-offices. At last, he was appointed great chancellor, in which function he died, October 22, 1755. His reform of the Prussian administra-

tion of justice, and his *Codex Fridericianus* (Berlin, 1747—1750), are among the greatest benefits his country owes him.

COCCE'JUS, or COCK, JOHANNES, a distinguished theologian, was born at Bremen, August 9, 1603. After preparatory studies in his native place, he, in 1625, went to Hamburg, where he studied Hebrew. From thence he went to Franeker in 1629. Returning to Bremen in 1630, C. was appointed professor of Hebrew at the Athenæum of his native place; called to Franeker for the same office in 1636, and in 1643 appointed professor of theology also. In 1650 he became professor of theology at Leyden, where he died in 1669. C.'s chief work is the *Lexicon et Commentarius Sermonis Hebraici et Chaldaici Veteris Testamenti* (Leyden, 1669) the first tolerably complete dictionary of the Hebrew language. The irrelevant and inaccurate matter which it originally contained, has been weeded out in the course of time by more skilful editors. In spite of his great learning, C. held very peculiar hermeneutical principles, which enabled him to discover the whole New Testament in the Old. The result, of course, was that he virtually transferred the language of the Old Testament to the New. The representation abundantly employed in the former of a covenant between God and man, usurped the place of the New Testament doctrine of the Fatherhood and Sonship; and his theology is simply a modern renewal of the old attempt to Judaise Christianity, which Paul denounced and condemned. C. carried the covenant theology, as it is called, to an absurd extreme. The most complete exposition of his views is in his *Summa Doctrinæ de Fœdere et Testamento Dei* (1648). C.'s principal antagonists were Voetius and Desmarets.

COCCINE'LLA. See LADY-BIRD.

CO'CCO, CO'COA ROOT, or E'DDOES, plants of the genus *Colocasia*, and of the nearly allied genus *Caladium*, of the natural order *Araceæ*, very generally cultivated in tropical and sub-tropical countries for their roots, or flat underground corms, which abound in starch, and are used as articles of food, being deprived by roasting or boiling of the characteristic acridity of the order, which, indeed, some of them possess in a comparatively small degree. They are sometimes included under the name *Yam*, but are totally different from the true yams. The names Cocco, Cocoa Root, and Eddoes, perhaps more strictly belong to *Colocasia antiquorum*, a stemless plant with ovate leaves, and flowers enclosed in a cylindrical erect spathe. The taste of its roots is like that of potatoes. *Colocasia esculenta* is a similar plant, a native of tropical America, and is much cultivated. *Colocasia macrorhiza* is the Tara (q. v.) of the South Sea Islands. In the Himalaya, *C. Himalensis* forms the principal food of many of the inhabitants. The root in its recent state is stimulant, diaphoretic, and expectorant.

COCCOLOBA. See SEASIDE GRAPE.

COCCOMI'LIA, or COCUMIGLIA, (*Prunus coccomiltia*), a species of plum, a native of Calabria, and of which the bark—particularly of the root—is much used in that country for the cure of intermittent fevers. Its valuable qualities have been strongly attested by Neapolitan physicians, and it is employed both in private practice and in military hospitals, but it has not come into use in other countries. The C. has obovate leaves, short double flower-stalks, and an austere tawny-yellow fruit.

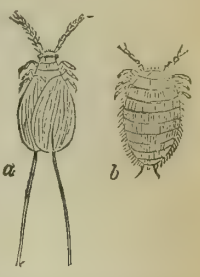
Coccosteus.

COCCO'STEUS, a genus of fossil fishes, peculiar to the Devonian measures. It was nearly related to Cephalaspis (q. v.), but differed in having, in addition to the bony helmet of that genus, a cuirass covering both the dorsal and ventral aspects of the body as far down as the origin of the dorsal fin, from which to the tail—comprising more than one-half the entire length of the animal—all seems to have been exposed without the protection even of a scale. In a well-preserved specimen in the British Museum, the remains of the endo-skeleton can be detected. Seven species have been described from the bituminous schists of the Old Red Sandstone of the north of Scotland.

COCCOTHRAU'STÉS. See HAWFINCH.

CO'CCULUS I'NDICUS, the name given commonly, and in the pharmacopœias, to a very poisonous seed, brought from the East Indies, which is used for various medicinal purposes, and illegally in the preparation of malt liquors. It possesses acrid and intoxicating qualities. It is used in India for stupifying fish, that they may be taken by the hand. An ointment made with it is a very efficacious remedy for ring-worm. It contains a most poisonous principle called *Picrotoxine*, whilst the pericarp contains another called *Menispermine*, equally poisonous. It is the seed of the *Anamirta Cocculus*, a beautiful climbing plant, of the natural order *Menispermaceæ*. It imparts to beer its bitter taste, and at the same time a fulness and apparent richness, but renders it very deleterious in its effects. It has been frequently asserted that C. I. is used to a considerable extent by British brewers, but according to the Report of the Laboratory Department of the Inland Revenue Office issued in 1876, there is little ground for this belief, as in no case were the officers of the department able to discover the drug in any brewer's premises, or in any samples of beer. Of the large quantity imported, almost the whole is again exported, chiefly to Germany.—The genus *Anamirta* is closely allied to the genus *Cocculus* (see CALUMBA), in which it was formerly included. The fruit of several allied species possesses properties analogous to those of the *A. Cocculus*.

CO'CCUS (Gr. *kokkos*, kermes), a genus of insects of the order *Hemiptera*, sub-order *Homoptera*, the type of a family, *Coccidæ*, allied to the *Aphis* (q. v.) family, although in many respects very distinct. The *Coccidæ* are sometimes called *Scale insects*, and by the French *gallinsectes* (Latinized by some entomologists into *Gallinsecta*), but they are not to be confounded with the insects called gall-flies (*Cynipidæ* or *Gallicolæ*), which produce *galls* or nut-galls. The *Coccidæ* are very numerous, and are attached to particular plants, on the juices of which they feed, often producing much mischief by the flow and loss of sap which their punctures occasion, and giving great trouble to gardeners, who find it very difficult to free their plants, particularly in hot-houses, from the *scale*, the *mealy bug*, the *vine-gall*, &c. Various washes, consisting of soap, sulphur, tobacco, &c., are employed for this purpose; but moist heat, or as much exposure to steam as the plant can bear, has been found in many cases the most efficacious remedy. The destructive Coffee-bug belongs to this family. The male *Coccidæ* are winged insects, having only two wings, which shut horizontally upon the body, the abdomen is terminated by two threads. The females are wingless. It is not well known how the males subsist, as they have no apparent organs for sucking juices or eating any sort of food. The females have a beak, which they insert into plants in order to suck their juices. This interesting family of insects contains not only many troublesome species, but some of which are of great value, particularly for the beautiful dyes which they yield. These dyes are obtained from the bodies of the female insects. Among them are Cochineal (q. v.) and Kermes (q. v.). A species of C. (*C. Polonicus*), which lives on the roots of the Knawel (*Scleranthus perennis*), yields the SCARLET GRAINS OF POLAND, a considerable article of commerce before cochineal was introduced into Europe; and a species which feeds on the roots of the burnet (*Poterium Sanguisorba*), was in like manner used by the Moors for dyeing silk and wool of a rose color. Other species produce Lac (q. v.) and Wax. See WAX INSECT.



Cochineal Insect (*Coccus cacti*); *a*, male; *b*, female.

COCCY'ZUS. See CUCKOO.

COCHABA'MBA, a name of various application in Bolivia.—1. A river which forms one of the head-waters of the Amazon.—2. A city on the foregoing river, lying 145 miles to the north-north-west of Chuquisaca, one of the chief cities of the Bolivian republic, and containing about 15,000 inhabitants. It has a temperate and healthy climate, and is engaged in the manufacture of cotton fabrics and glass wares.—3. A department, of which the city just described is the capital, in lat. 17°—19° S., long. 65°—68° W. With an area of 26,000 square miles, it has a population of about 380,000. In addition to the precious metals, it yields cotton, sugar, dyewoods, and timber.

CO'CHIN, a protected state of Hindustan under the presidency of Madras, lat. 9° 48′—10° 50′ N., long. 76° 5′—76° 58′ E. With Malabar on its N.W. and N., and Travancore on its E. and S., it fronts the Arabian Sea on the S.W., and meets Coimbatore towards the N.E. on the water-shed of the Western Ghauts. It contains 1361 sq. m., and (1881) 601,114 inhabitants. Its hydrography is singular. The Western Ghauts, which have here an elevation of fully 4000 feet, intercept the south-west monsoon, and render the coast one of the most humid regions in the world during June, July, August, and September; while even during the remaining eight months, anything like an unremitting drought is unknown. As the space between the mountains and the sea is almost on a level with the tide, the countless streams have each two contrasted sections—the plunging torrent that breaks into comparatively short pieces the magnificent trunks of teak with which it is freighted; and the sluggish brook which, however it may vary, according to the season, in breadth and depth, pretty uniformly results in a brackish estuary. Further, these estuaries, almost continuously breasted by a narrow belt of higher ground, form between them a backwater or lagoon of 120 miles in length, and of every width between a few hundred yards and 10 miles, which communicates at only three points with the ocean. The

cocoa-nut is the most valuable product of the country; besides this tree, however, the forests produce red cedar, anjelly teak, benteak, and many other hard woods, but these are now becoming very scarce. The low country produces rice, pepper, cardamoms, ginger, betel-nut, yams, arrow-root, and sweet potatoes. The population is peculiar in its composition, more especially as compared with that of the more easterly parts of the peninsula. The great mass of the population are Hindus, but there are also Mohammedans, and a large number of Christians and Jews. The Jews are classified into white and black; and the Christians, divided between the Syrian and Romish Churches, trace their origin partly to the Portuguese conquest, and partly to the missionary labors of St. Thomas the Apostle. Both the places of worship and the seminaries of education throw light on the relative numbers of the different parties. The latter, 95 in all, are—English, 5; Malayalam, 69; Tamul, 9; Mahratta, 1; Sanscrit, 7; and Hebrew, 4. The former are—Hindu, 2734; Mohammedan, 31; Jewish, 8; and Christian, 108.

COCHIN, once the capital of the principality above described, but now a seaport of the district of Malabar, in the presidency of Madras, stands in lat. 9° 58′ N., and long. 76° 18′ E., on the south side of the principal channel, between the open ocean and the backwater mentioned in the preceding article. As this lake, so to speak, is, even in its lowest state, always navigable for canoes, its value, as a means of communicating with the interior, can hardly be overrated in a country where roads and bridges are nearly out of the question. The harbor affords a depth of fully 25 feet; but there is a bar in front, which according to the latest survey, has only between 17 and 18 feet of water upon it. On this bar, during the south-west monsoon, the surf breaks so violently, that it is sometimes, but not often, impassable for vessels. Still C. is next to Bombay on this coast with respect to ship-building and maritime commerce. Here the Portuguese erected their first fort in India in 1503. They were supplanted by the Dutch in 1663—the epoch also of the transfer of Bombay to Charles II. In 1796, C. was captured by the British, and about ten years after, its fortifications and public buildings were destroyed, and its private dwellings very much damaged. Notwithstanding this check, the place continued to flourish; many merchant vessels, ranging upwards to 1000 tons, have been built; and, besides ships of war for the local navy, 3 frigates have been launched for the imperial service. The population of the city, numbering (1871) 13,588, is more heterogeneous than even that of the state of the same name, the additional elements being Dutch, Armenian, Arabian, and Persian. Its trade depends almost entirely on the produce of the cocoa-tree—viz., oil and cocoa fibre. Water is brought from a distance of 18 miles. Half a mile south is a town of the same name, in the native state of Cochin.

CO'CHIN CHI'NA, or ANA'M, an empire of Asia, occupying the greater part of the eastern portion of the Indo-Chinese peninsula. It lies in 10°—23° N. lat., and 102°—109° E. long., including Tonquin and Cochin China Proper. It is bounded, N. by China, E. by the Gulf of Tonquin and the China Sea, S. by Lower or French Cochin China, and W. by Laos, Siam, and Cambodia. Area, 200,000 sq. m.

Physical Features.—A mountain range of considerable height runs through the country, parallel with the coast. The northern province of Tonquin is an extensive plain, through which flows the river Song-ca. C. C. Proper extends along the coast between 11° and 18° N. lat. The largest river of Anam, and indeed of the whole Indo-Chinese peninsula, is the Meckhong or Cambodia, which, rising in the mountains of China, flows through Laos and Cambodia, and, after a course of some 1500 miles, separates into several branches, and finally discharges itself into the China Sea. The Song-ca, or Great River, of Tonquin, has an estimated course of 400 miles. The Hué, in C. C. Proper, flows through a fertile valley, and presents some of the finest scenery in Asia.

As to *climate* in Tonquin, the changes of temperature and weather are very sudden. Much rain falls in C. C. during the whole summer, which produces a general inundation about the end of October. September, October, and November are the best months of the year, and most suited to the European constitution.

Amongst the *agricultural productions*, rice, of which two crops are raised in the year, holds the chief place. Potatoes, peas, beans, melons, and other vegetables, maize, tobacco, cotton, indigo, tea, and sugar are also grown. Silk is produced in considerable quantities. Valuable trees, such as the calumba, ki-nam or scented eagle-wood, ebony, rose-wood, iron-wood, sandal-wood, the varnish-tree, and many others, flourish on the mountains. The palm-tribe and the bamboo are common in the low lands. The *mineral* riches of the country are very much neglected; but gold, silver, iron, copper, and coal exist, and are most abundant in Tonquin. The *domestic* animals are the elephant, Indian cow, buffaloes, pigs, goats, dogs, and cats. Fowls of that kind so lately a rage in this country, ducks, geese, and pigeons, abound in every village. The most dreaded of the *wild animals* of C. C. is the tiger. Elephants are very numerous in the forests of Tonquin; and leopards, wolves, bears, wild-boars, the rhinoceros, as well as many kinds of apes and monkeys, infest the mountainous districts. Serpents and other reptiles are to be met with in great numbers. Of *birds*, eagles, peacocks, quails, partridges, paroquets, and wild-ducks are amongst the most important. Fish of very excellent quality swarm in the rivers and canals. Very many are taken on the sea-coast, and carried to every part of the country.

Inhabitants.—The Cochin Chinese, like the other peoples of the Indo-Chinese Peninsula, are characterized by a Mongolian physiognomy and a monosyllabic language. They are rather low in stature, but well proportioned, hardy, and active. The women have a lighter skin, and are altogether better-looking than the men. Their dress is the old national costume of the Chinese prior to the Tartar conquest. The Cochin Chinese are greatly addicted to smoking, and betel-nut is the universal masticatory. The civilization of this people has been derived from China; hence their religion and government, manners and customs, nearly approximate to the creeds, administrative system, and habits of that country. The selection of a place of sepulture is with them a very grave consideration, and the good or bad fortune of a family is supposed to depend upon it. Rice, with a sauce called balachiam, made of macerated salt fish, is the principal food of the Cochin Chinese; but they are very unclean feeders, no flying or creeping thing, whether bat, insect, or reptile, coming amiss. The national drink is tea; but a liquor made from rice is also in use.

The common dwellings, which are raised two or three feet from the ground, are made of bamboo and thatch; but the better classes inhabit brick-houses roofed with tiles. Women in C. C. are allowed full liberty, and frequently engage in commerce and agriculture. They are kind to their children, and proud of a numerous offspring. Infanticide is unknown, but the poor sometimes sell the children they cannot afford to keep. Marriages are regulated by law; and before they can be contracted, the consent of the head of the family is required. Polygamy, or rather a system of concubinage, is allowed, but obtains chiefly among the rich. Divorce is also permitted. The laws against adultery are very severe, yet amongst single women little or no disgrace attends a breach of chastity. The law invests the creditor with the most arbitrary power over the property, wives, and family of his debtor. The population is estimated at 21,000,000.

Government and Administration.—These are after the Chinese model. The emperor is absolute, but he must govern according to the laws. He is assisted by a supreme council of high mandarins, seven of whom are his ministers. The government officials are divided into military and civil or literary mandarins. The former have the precedency; and from them the emperor selects his ambassadors, governor-generals, and viceroys. The learned and official language of the country is Chinese. For *administrative purposes*, the country is divided into provinces, departments, districts, and villages. A military governor or viceroy, and two high civil mandarins, reside at every provincial capital; and the minor divisions have each their regular number of officials, who are appointed by the supreme government. The laws are very arbitrary. The bastinado system is in full force; indeed, the bamboo may be regarded as a political and social institution. The mandarins, as a class, are described as very corrupt. The capital of the whole empire is Hué, or Huah. The foreign *commerce* of C. C. is carried on chiefly with China, the Portuguese settlement of Macao, Bankok, and Singapore. Cochin Chinese junks annually visit that port and the British Straits' Settlements.

History.—Previous to the Mongol invasion of China, Tonquin formed a part of that empire, but at that time it threw off its allegiance. The Anamitic sovereign now, indeed, acknowledges the emperor of China as his superior, yet his vassalage is little more than nominal. The present inhabitants of C. C. Proper are said to be descendants of political refugees from Tonquin. In 1774, a revolution in the former country deprived the reigning monarch, Ghialong, of his throne, but in 1790, assisted by some European adventurers, he not only re-established his power in C. C., but added Tonquin to his dominions. By a treaty in 1874, France guaranteed the independence of C., and obtained the opening of three ports to European commerce.—See Veuillot's *La Cochinchine* (1859); Bouillevaux's *L'Annam* (1875).

COCHIN CHINA, LOWER or FRENCH, a colonial possession of France in the southern extremity of the eastern portion of the Indo-Chinese peninsula. Lat. 9° 5′—10° N.; long. 105°—107° E. This territory was acquired after a war provoked by the continuous persecutions for many years of the Christians in his dominions by the king of Anam, and especially by the murder of several French and Spanish missionaries. After an invasion, the three provinces of Saigon, Bienhoa, and Mytho, together with the island of Pulo Condor, and a few others which lie off the coast, were taken pos-

session of in 1861. In 1867, a new treaty, formed after the repression of formidable hostile aggressions on the part of some of the natives, led to the annexation of other three provinces, thus completing the present colony of *Cochinchine française*. Area, 22,900 square miles (in four provinces, Saïgon, Mytho, Vinh-long, Bassac); population (1880) 1,597,013.

Napoleon III., in urging on the vigorous war policy which led to this acquisition, had in view the tradition that France had earlier claims to be satisfied, and other wrongs to be redressed, than those which induced him and the Spanish government to resolve on putting an end to the oriental monarch's persecuting cruelty. In 1787, Ghialong, king of Anam, in want of assistance to secure his throne, entered into a treaty with Louis XIV., by which he engaged, in return for French aid, to cede the town and harbor of Touran (Kwang-han), with its territory and two adjacent islands. The little active assistance afforded by France was effective; Ghialong was established on the throne, and added Tonquin and Cambodia to his dominions. The promises made to France were not fulfilled, but her missionaries were protected. Of three kings, each excelled his predecessor in persecuting the Christians, whether Europeans or natives, and in murdering the missionaries. The blood of the victims never ceased to flow till the sanguinary struggles which led to the establishment of the colony of Lower C. C. frightened the bloodthirsty potentates into toleration.

Cambodia, a level country to the north-west of French C. C., fertilized by the Mekhong, and formerly a sort of feudal dependency on Siam, was in 1864 declared independent under the protectorate of France. Extensive explorations in the interior of Cambodia have made us acquainted with stupendous monuments of an extinct civilization, rivaling those of Assyria and Egypt, but lost for ages amidst the dense forests. Remains of extensive cities and carved stone figures attest a unique culture, and justify the belief that some 2000 years ago the Cambodian empire was of enormous power and wealth.

Most of the monuments betray Buddhist influences; and the center of the empire lay without the present limit of Cambodia, where now wild tribes dwell on the borders of East Siam and west Anam. Apparently the subjects of the ancient empire were of the same stock as the present Cambodians, who, with European features and polysyllabic speech, are totally distinct from the surrounding Mongoloid populations, and seem to be of Caucasic stock. The national name of the Cambodians proper, as of the wild tribes adjoining, is *Khmer*. Latterly, the French have been making their influence more felt in the extreme north of the peninsula, and in 1882 occupied the capital of Tonquin (Tongking), the northernmost province of the Anamese empire.

Great exertions have been made by France to promote the prosperity of Cochin China, and to use its territorial influence in such a way as to acquire the good-will of the natives. But that the colony pays its own expenses has not been made clear; and the French do acknowledge that their new subjects are neither industrious nor commercial. Although the resources of the country are but imperfectly developed, rice is produced in considerable abundance; cotton, sugar, indigo, and tobacco are also cultivated. The dwarf mulberry grows freely; silkworms are reared with facility; hemp, the betel-nut, and the areca-nut are likewise grown.

CO'CHINEAL, a dyestuff employed in dyeing scarlet and crimson, and in the preparation of Carmine (q. v.) and Lake (q. v.).

C. consists simply of the bodies of the females of a species of *Coccus* (q. v.), called *C. cacti*, because it feeds upon plants of the *Cactus* family, particularly on one, therefore designated the C. plant, but known in Mexico as the NOPAL (*Opuntia cochinillifera*), figured in the article CACTEÆ. This plant is nearly allied to the prickly pear. It assumes a somewhat tree-like form. Its fruit, although eatable, is very inferior to that of the prickly pear. It is a native of Mexico and other warm parts of America, and is assiduously cultivated, in order to what may be called the cultivation of the valuable insect which it supports. This cultivation was carried on by the Mexicans long before the country was known to the Europeans. It is now carried on also in some parts of the West Indies, and in the island of Teneriffe. The C. plant and insect have been introduced into Algeria; but no considerable success has yet attended the attempts to introduce them into the East Indies, although the East India Company once offered a reward of £6000 for their introduction.—Other species of *Opuntia* appear to be as suitable for the C. insect as *O. cochinillifera*, particularly *O. Hernandezii*, which is employed in Mexico, and *O. Tuna*, which is chiefly used in Peru.

Cochineal or Nopal Cactus and Cochineal Insect.

The C. insect is a small creature, a pound of C. being calculated to contain 70,000 in a dried state. The male is of a deep red color, and has white wings. The female, which is wingless, is of a deep brown color, covered with a white powder; flat beneath, convex above. When a plantation of the C. plant has been formed—by cuttings which are ready to receive the insect in eighteen months—the cultivator (*nopalero*) procures branches laden with C. insects; and keeping the branches, of which their succulency admits, till the mother-insects have laid their eggs, he places their bodies, with the eggs which they cover, in little nests formed of some cottony substance upon the C. plants, and the young insects, when hatched, soon spread over them. The gathering of the C. is very tedious, and is accomplished by brushing the branches with the tail of a squirrel or other animal. The insects are killed by boiling water, by heating them in ovens, or by exposure to the heat of the sun. They must be speedily killed, to prevent them from laying their eggs, which diminishes their value. When killed and dried, they may be kept for any length of time without injury. The different appearances presented by C. as brought to market, are ascribed to the different modes of killing the insect. C. is one of the most important exports of Mexico.

CO'CHLEA. See EAR.

COCHLEA'RIA. See SCURVY-GRASS.

COCK, properly, the name of the male of the common domestic fowl (see FOWL), but very generally extended to the males of other kinds of gallinaceous birds, and not unfrequently employed as a distinctive appellation of the males even of some kinds of small birds.

The ancients regarded the domestic C. as the companion of Mars, and in heraldry he is the emblem of strife, of haughtiness, of quarrels, and of victory. Guillim has the following quaint eulogium on the cock: 'As some account the eagle the queen, and the swallow or wagtail the lady, so may I term this the knight among birds, being both of noble courage, and also prepared evermore to the battle, having his comb for a helmet, his sharp and crooked bill for a falchion to slash and wound his enemy; and as a complete soldier armed cap-à-pie, he has his legs armed with spurs, giving example to the valiant soldier to expel danger by fight, and not by flight. The cock croweth when he is victor, and giveth a testimony of his conquest. If he is vanquished, he shunneth the light and society of men!' The C. is said to have been the emblem of the ancient Gauls, who wore it on their helmets for a crest; and though the tradition does not rest on the authority of any medal or other monument, and is supposed to have been a mere play of words between Gallus, a cock, and Gallus, a Gaul, the C. was placed, after the Revolution, on the flags and ensigns of France.

As the emblem of watchfulness, the image of the C. was placed on the summits of church-steeples from a very early period. It is introduced by artists amongst the emblems of our Lord's passion, in allusion to St. Peter's sin, and for the same reason it is St. Peter's own emblem.

COCK DIVINATION, or ALECTROMANCY, is a method of divining in which a young white cock was made the principal actor. The plan pursued was to describe a circle, and divide it into as many equal parts as there are letters in the alphabet. Upon each of the spaces marked by its respective letter, a grain of corn was placed; and the letters from which the fowl picked the grains, when put together, formed the name of the person about whom inquiry was made.

COCKA'DE (Fr. *cocarde*, or *coquarde*). According to Wedgwood, the word signified originally a cocked-hat, or a hat with the broad flap looped up on one side, and was then applied to the knot of ribbon with which the loop was ornamented. Another view is, that it is derived from *coquart*, a beau, one fond of gay trappings. The word is now, however, restricted to signify an appendage to the head-dress worn as a military or naval distinction.

Badges of distinction were early had recourse to in party and civil warfare. A sprig of broom (*planta genista*) was the badge of the House of Plantagenet. In England, during the wars between the Houses of York and Lancaster, the adherents of the former party were distinguished by a white and the latter by a red rose worn in the cap.

The party organized at the court of Charles IX. of France to perpetuate the massacre of St. Bartholomew, recognized one another by a paper cross. The faction of the *Fronde*, opposed to Cardinal Mazarin, wore stalks of corn for the same purpose; and certain military bands were called *Lances vertes*, from decorating their lances with green twigs. The use of cockades, as marks of distinction in campaigns and battles, became very general about the beginning of the 18th century. Eugene and Marlborough gave the Germans, English, and Dutch, composing their army, a tuft of corn or grass as their signal or cockade. The use of the

C. began to be more fixed in the War of Succession. White being the color of France, and red of Spain, the two colors were united in the C. of the combined army. At last, in 1767, an authoritative regulation determined that every French soldier should wear a C. of white stuff; and in 1782, cockades were prohibited to all but soldiers. From this time till the Revolution, the C. was an exclusively military badge; and, both in France and England, 'to mount the cockade' was synonymous with becoming a soldier. But in the enthusiasm of 1789, the citizens of France generally assumed the tricolored ribbon as the badge of nationality and patriotism, which was soon also given to the army. The three colors were blue, white, and red: white had long been the color of France and its kings; the blue is understood to have come from the banner of St. Martin, and the red from the Oriflamme (q. v.).

Long before the Revolution, the three colors were used in combination; they were given by Henry IV. to the Dutch, when they desired him to confer on them the national colors of his country, and have ever since been borne by the Dutch Republic and kingdom of the Netherlands. At the Restoration, the white C. of the monarchy again took its place, but had to give way once more to the tricolor, which continues to be the C. of the French army.

Black, with some distinction, enters into the cockades of the German nations. The Austrian is black and yellow; and the Prussian black and white, abandoned for the black, yellow and white of the German Empire. After the German war of liberation in 1813, a national C. of black, red, and gold came into general use, and was afterwards assumed by the military and by officials. The wearing of these German cockades was prohibited in 1832 by a resolution of the German Diet; but in 1848 they were again introduced not only by patriots as a badge of German union, but into the armies. The national colors of Belgium are black, yellow, and red. Cockades of these colors were worn by almost the whole population of Brussels on occasion of the constitutional festival, July 21, 1860. Cockades of green, white, and red are worn in Italy.

The continental C. is generally in the shape of a flat disk, sometimes of metal, sometimes of silk, or other stuff, with the colors disposed concentrically.

In England, the badge of the Stuarts was a white rose; and after the expulsion of the family, the white C. became the distinctive mark of the adherents of the exiled family, in opposition to the orange of Nassau and the black of Hanover; it is a favorite theme in Jacobite songs. The black C., to be seen on the hats of many gentlemen's servants, was unknown in Britain till the accession of the House of Hanover, and was then introduced by George I. from his German dominions. It seems to be understood that the right to use it belongs to naval and military officers, and the holders of some offices of dignity under the crown, including privy councillors, officers of state, supreme judges, &c. It is difficult to know where the line should be drawn, as the privilege is one of which the law takes no cognizance. It is often maintained that the distinction belongs to deputy-lieutenants, but it can hardly be supposed to extend to officers of volunteers.

COCKATOO' (*Plyctolophus*), a genus of birds of the parrot family, or *Psittacidæ*, distinguished from parrots by the greater height of the bill, and its being curved from the base, and by the lengthened broad, and rounded tail. The head is also large, and in the true cockatoos is surmounted by a crest of long and pointed feathers, with their tips directed forwards, which can be erected and expanded like a fan or depressed at the pleasure of the bird. The true cockatoos are also all of generally whitish plumage, but often finely tinged with red, orange and other colors, or mixed with these colors in more brilliant display.

But the name C. is also commonly extended to nearly allied genera, as *Calyptorhynchus* and *Microglossus*, in both of which the plumage is generally dark, and to which belong the *black cockatoos* of Australia and of the Indian archipelago. The genus *Microglossus*, to which belongs the Great Black C., or Giant C. of New Guinea, is remarkable for the structure of the tongue, which is cylindrical, tubular, capable of being greatly protruded from the mouth, and terminates in a cloven horny tip. All the cockatoos are natives of the regions already named. They abound in Australia. They live not only on fruits and seeds, but partly on insect larvæ. Some of them are frequently to be seen in confinement in Europe, particularly the Lesser Sulphur-crested C. (*Plyctolophus sulphureus*), which, although of comparatively tame plumage, is a general favorite on account of its docility. None of the cockatoos learn to speak many words. Their name is derived from their own proper cry.

CO'CKATRICE, one of the fabulous monsters, a belief in the existence of which prevailed among the ancients and during the middle ages. It was sometimes distinguished from, and sometimes identified with, the basilisk. It was always regarded as possessing similar deadly powers. Its monstrous generation has already been noticed in the article BASILISK. For protection against it, travelers in Africa are said to have carried with them its relative, the cock, the crowing of which caused it instantly to expire. The word C. is sometimes used in the English version of the Old Testament. Perhaps all that can safely be affirmed of the meaning of the original Hebrew, is that it is the name of a venomous serpent. In heraldry, the C. is an imaginary monster, with the wings of a fowl and the tail of a serpent.

CO'CKBURN, HENRY, a Scottish advocate and judge, was born at Edinburgh on October 26, 1779. At the age of eight, C. began attendance at the High School of Edinburgh, but exhibited no indications of extraordinary abilities. Sent to the university of Edinburgh at the age of fourteen, his powers began to develop themselves; and though never distinguished as a student, he became the companion of men like Brougham, Horner, and Jeffrey, from whom he imbibed liberal opinions, greatly to the annoyance of the hereditary Toryism of his family. He was called to the Scottish Bar in 1800, and after seven years spent in becoming patience, according to the manner of his profession, he was appointed, by his relative Lord Melville, one of the advocates whose duty it is to assist the Lord Advocate in the prosecution of criminal offenders.

Though the appointment was conventionally a political one, and though the party to whom C. was opposed was then in power, he was persuaded to hold the office, as it had in itself really nothing of a political character, upon the understanding that his own views were not to be compromised. It was expected, however, that he would give up his liberalism; and when this expectation was disappointed, advantage was taken, about four years after, of some trivial excuse to dismiss Cockburn. Not till the introduction of jury trial in civil causes into Scotland in 1816, did C. find opportunity for remunerative professional employment. His powers were better adapted for success with a popular, than with a professional tribunal. Extremely simple, clear, and impressive, at times humorous, at times pathetic, always unaffected, and, when he pleased, eloquent, he urged his side of the question with so much earnestness and candor, that the effect was almost irresistible. Under the Grey ministry of 1830, he was appointed Solicitor-general for Scotland; and four years later, he was made one of the judges of the Scottish supreme civil and criminal courts, and took, according to the Scottish custom, the title of Lord Cockburn. He died 26th April 1854, at his residence of Bonaly, in the neighborhood of Edinburgh.

The efforts of C. as an author were not numerous. He contributed to the *Edinburgh Review* a few articles, having, it would seem, chiefly a temporary interest. Those upon Scottish law reform are known to have had considerable influence in producing the changes desired. Late in life, he undertook, at the request of Jeffrey's executors, the life of his beloved friend. This work was published in 1852. C. will be best remembered by the *Memorials of his Time*, which appeared posthumously in 1856. It is a kind of autobiography, into which have been interwoven numerous anecdotes illustrating old Scottish life, and numerous sketches of the men who composed the brilliant circle of Edinburgh society at the beginning of the present century. A portion of the MS. kept back until a date further removed from the times of which it treats, appeared in 1874, entitled *Journal of Henry Cockburn*.

CO'CKCHAFER (*Melolontha vulgaris*), a beetle of the family *Lamellicornes* (q. v.), and section *Phyllophagi* (leaf-eaters), very common in England and most parts of Europe, comparatively rare

Cockchafer (*Melolontha vulgaris*):
a, full-grown larva; *b*, pupa; *c*, perfect insect.

in Scotland, famous for the ravages which it commits, both in the grub state and in that of a perfect insect—the winged beetle feeding on the leaves of fruit-trees, and of many forest-trees, as the sycamore, lime, beech, and willow; the grub devouring the roots of plants, particularly of pasture-grasses and corn.

The C. is fully an inch in length, of a pitchy black color, with

a whitish down, giving a sort of powdered appearance; the sides of the abdomen marked by a range of triangular spots; the abdomen terminating in a point; the antennæ short, terminating in a club formed of six or seven leaflets: the grub is about an inch and a half long, thick, whitish, with a red head and six legs. The C. does not live long after it has passed into its perfect state, but it lives nearly four years in the grub or larva state. The female C. deposits her eggs in the earth. The ravages of cockchafers were so great in some of the provinces of France in 1785, that the government offered a premium for the best mode of destroying them. The whole grass of a field has often been destroyed in a short time by their grubs, and the beetles themselves strip off the foliage of trees like locusts. They have sometimes appeared in prodigious numbers in some places in England: the river Severn is said to have been so filled with their bodies in 1574, that the water-wheels of the mills were clogged; and in 1688, they so abounded in the county of Galway, in Ireland; that they hung in clusters on the trees and hedges like bees swarming; the noise of their countless jaws at work was heard by every traveler, and was compared to that of the sawing of timber. Rooks and other birds render great service by preventing the excessive multiplication of cockchafers. In Scotland they are called *clocks*.

Cocker.

CO'CKER, a small kind of spaniel, very similar to the Blenheim dog, often black. The habits and disposition are similar to those of the spaniel. The small size of the C. fits it for ranging in low and thick coverts, and it is accordingly much employed by sportsmen in pheasant and woodcock shooting; but it must not be allowed to range to any considerable distance, as it cannot be trained to wait for the sportsman, but starts the game.

CO'CKER, EDWARD, widely celebrated on account of his *Arithmetic*, which has served as the model of almost all school-treatises subsequent to its publication, was born, it is supposed, in London about the year 1631 or 1632; and died between the years 1671 and 1675. The first edition of his famous *Arithmetic* (which was the first to confine itself to commercial questions only) was published, after his death, 1677, by John Hawkins, who came into possession of C.'s MSS. C. was author of some other works, but his fame rests entirely on the one mentioned. The expression, 'according to Cocker,' became common through its frequent use on the title-pages of arithmetical treatises following his method.

CO'CKERMOUTH, a parliamentary borough in the west of Cumberland, at the confluence of the Cocker and Derwent, 25 miles south-west of Carlisle. It is delightfully situated in an agricultural district, and has a promenade a mile long along the Derwent. The ruins of a castle, founded in the end of the 11th c., stand on a bold height on the left bank of the Cocker, near its junction with the Derwent. The castle was besieged for a month by the royalists in 1648, and afterwards reduced to ruins by the parliamentarians. Near C. is a tumulus, with a Roman camp and ditch 750 feet in circuit. Many ancient relics have been found near Cockermouth. There are manufactures of linens, woollens, cottons, hats, hoisery, and paper, and in the vicinity, extensive coal-mines. Wordsworth the poet was born here. Pop. (1881) 7189. C. returns one member to parliament.

CO'CK-FIGHTING is said to have originated with the Athenians. In the earlier part of our history, since the Conquest, we find little mention of it; but it is evident that it existed in the days of Thomas-à-Becket, and until the time of the Commonwealth it flourished, the pit at Whitehall having been erected and patronized by royalty. It was prohibited in 1654; and although there have been other acts passed with the view of putting it down, it still exists under prohibition.

The greatest point considered in choosing cocks, is the breed. Formerly, there were established favorites, and very large sums were given for their chicks. Much art is said to be displayed in the training of cocks, and in trimming and preparing the cock for the combat; the fastening on of the spurs is a matter of considerable experience. Young cocks are called stags; two years is the best age.

In fighting a match, a certain number of cocks to be shown on either side is agreed upon, and the day before the match, the cocks are shown, weighed to the greatest nicety, and matched according to their weights. Their marks are all also carefully set down, to prevent trickery. The cocks within an ounce of each other in weight are said to '*fall in*,' and are matched. Those which do not fall in, are matched to fight what are called '*byes*.' Those which do fall in, come into the *main*. The main is fought for a stake upon each battle, and so much for the main, or the winner of the most battles in the main; while the byes have nothing to do with the main, and are usually fought for smaller sums. Should the numbers be equal, so that the main cannot be decided, it is usual to separate two or more cocks which are matched to fight, and are of equal or a dead weight, and to give or take an ounce either way with one of each of the birds which would fall into the byes, so as to make an uneven number.

A middling size is considered the best, and from 3 lbs. 6 oz. to 4 lbs. 8 oz. is the medium. Cocks sometimes fight in silver spurs, but more often in steel. The laws of fighting are very precise and particular.

To lend to brutes the means of destroying each other, and of rendering their conflicts more deadly than nature ever intended them to be, cannot be considered a spectacle calculated either to refine or improve humanity; while the indulging in it as a sport, as it is practised even in its lightest and least objectionable form, is simply cruelty. But the practices of placing a bird, that has perhaps been crippled in combat, down, without even his natural weapons, before a young stag armed, in order that the stag may be taught the art of killing, and the Welsh main, where the cocks fight until only one is left alive, are too disgustingly cruel to be thought of without indignation.

C. is prohibited by 12 and 13 Vict. c. 92. A penalty of £5 may be levied on any person keeping fighting-cocks, letting a cock-pit, or otherwise connecting himself with C., for every day that he shall so act.

COCK LANE GHOST. In the year 1762, London was thrown into a state of extraordinary excitement by the reported existence of a ghost in the house of a Mr. Parsons, in Cock Lane, Smithfield. Strange and unaccountable noises were heard in the house, and a luminous lady, bearing a strong resemblance to one who, under the name of Mrs. Kemt, had once resided in the house, but who had died two years before, was said to have been seen. Dark suspicions as to Mr. Kemt having poisoned the lady were immediately aroused, and were confirmed by the ghost, who, on being interrogated, answered, after the fashion of the spirits of our own day, by knocking.

Crowds, including Dr. Johnson, were attracted to the house to hear the ghost, and the great majority became believers. At length a plan was formed by a few sceptics to ascertain the real origin of the noises. The girl, from whom the sounds were supposed to proceed, was taken to another house by herself, and threatened with the imprisonment of her father in Newgate if she did not renew the rappings that evening, the noises having for some time been discontinued. She was observed to take a board with her into bed, and when the noises took place, no doubt was entertained that they had all along been produced by similar methods. A prosecution was then raised by Mr Kemt, and Parsons was condemned to stand thrice on the pillory for imposture and defamation.

COCK OF THE PLAINS (*Tetrao* or *Centrocercus urophasianus*), the largest of the North American species of grouse. It is about one-third smaller than the European Capercailzie (q. v.), or Cock of the Woods. Its plumage is dense and soft, the prevalent color yellowish-brown, but beautifully mottled and varied with darker

Cock of the Plains.

tints; the under parts white, with dark streaks and patches. On each side of the neck is a large bare space, capable, when the bird struts, of being inflated into a hemispherical sac. The female is smaller, and of less showy plumage than the male, and is destitute of the neck-sacs. This bird is an inhabitant of the desolate plains on the upper parts of the Columbia, and in the interior of California, living in flocks, and often feeding so much on species of *Artemisia* that its flesh is almost too bitter to be eaten.

COCK OF THE WOODS. See CAPERCAILZIE.

CO'CKLE (*Agrostemma*), a genus of plants of the natural order *Caryophylleæ*, in which the flower has ten stamens and five styles; the five teeth of the leathery naked calyx are much longer than the tube of the corolla, and the capsule is perfectly 1-celled. The common C., or Corn C. (*A. Githago*), is a frequent weed amongst crops of grain, a native of Europe or the west of Asia, but now to be found in almost all parts of the world. It is an annual plant, clothed with very long hair; with large, solitary, terminal lilac flowers. The root, stem, leaves, and seed were formerly used in medicine; the seed is still sometimes sold in Germany under the name of Black Cumin (Schwartzkümmel). The corn C. is a very troublesome weed in some parts of Britain, and is rare and almost unknown in others.

Corn Cockle.

COCKLE (*Cardium*, a genus of Lamellibranchiate mollusks, having a shell of two equal ventricose valves, more or less of a heart-shaped appearance. The animal has two *adductor* muscles for drawing the valves closely together; its foot is remarkably large, and bent in the middle, and is capable of being suddenly straightened, so that the animal may move by a jump. More commonly, however, the foot is employed for excavating a hole in the sand or mud, in which the C. burrows; and when used for this purpose, it is distended by being filled with water. Cockles are usually gregarious, and vast numbers are found on sandy and muddy banks. The common C. (*C. edule*) is very abundant on the sandy parts of the British shores, and is one of our most valuable shell-fish, affording much palatable and nutritious human food. The number of known species is about 200; they are most numerous within the tropics, and particularly in the Indian Ocean.—The genus *Cardium* is made the type of a family *Cardiadæ*, and of an order *Cardiaceæ*, which includes *Veneridæ*, *Mactridæ*, *Tellinidæ*, and other families.

Cockle with Valves open, showing the Foot.

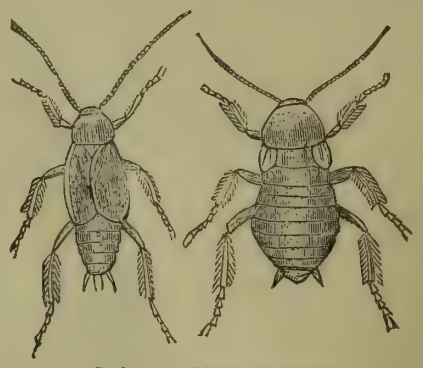
CO'CKNEY. This word is connected with *cocker* (Dutch, *kokeln*, to pamper; Fr. *coqueliner*, to dandle), which, according to Wedgwood, means primarily to rock the cradle, and hence to cherish, pamper.

C. thus meant originally a child delicately nurtured, and was hence applied to the citizens of luxurious towns, as opposed to the hardier inhabitants of the country. The French *Pays de Cocagne*, and similar expressions among other nations, denote a Utopia—an imaginary land of luxurious abundance without labor. London has been famed for its luxury from the earliest times—a veritable Cocagne; and its inhabitants have now appropriated the name of Cockneys.

CO'CKPIT, in a ship of war, is a room near the after-hatchway, under the lower gun-deck; it adjoins the surgeon's cabin and the surgery. It contains the medicine-chests for the entire crew, and is the place where wounded men are attended to during an action.

CO'CKROACH (*Blatta*), a genus of Orthopterous (q. v.) insects, having an oval or orbicular flattened body, the head hidden beneath the large plate of the prothorax, long thread-like antennæ, and wings folded only longitudinally. The elytra are parchment-like, and the wings are sometimes very imperfectly developed, particularly in the females, as in the case of the common cockroach. The eggs of these insects are collected in a sort of shell fixed to the abdomen of the mother, which at last she deposits in a suitable situation, attaching it by a glutinous secretion. The larvæ, when hatched, discharge a fluid which softens the cement that holds together the toothed edges of a longitudinal slit in this remarkable shell, and emerging through it, at once enter upon active life. They are very similar in form to the perfect insects, and, like them, very voracious. Cockroaches are most numerous in warm countries, and even the common C. (*B. Orientalis*)—now so well known in Britain, a pest in many houses, particularly in towns, and, although not a coleopterous insect, often called the Black Beetle—is said to have been imported from abroad, but its native country is uncertain.

It is a nocturnal insect, concealing itself in holes during the day, and fleeing on the approach of a candle. It devours both animal and vegetable substances; and a dark-colored fluid, which it emits from its mouth, gives a disgusting smell to everything that it passes over. A tame hedgehog is of great use for reducing the numbers of cockroaches in kitchens and other places where they abound. Another excellent method of getting rid of cockroaches, is to place a washing-basin on the floor, with some treacle



Cockroach—Male and Female.

in the bottom. A piece of wood resting between the floor and the edge of the basin, conducts the C. to the fatal trap, from which the slipperiness of the sides of the basin prevents their exit. In this way thousands of 'black beetles' may be caught in a single night. The common C. is only about an inch long, but some of the tropical ones are much larger, and are more troublesome because of their frequent use of their wings. The Kakerlac, or American C. (*B. Americana*), a native of the warm parts of America, has found its way into Europe, and infests some seaport towns. A small species (*B Lapponica*) is very common in Lapland, sometimes doing great injury by devouring the winter stores of salted fish.

CO'CKSCOMB (*Celosia cristata*), an annual plant of the natural order *Amarantaceæ*, a native of the East Indies, one of the most familiar inmates of our hothouses and conservatories, often also planted out in warm borders, especially in the southern parts of Britain. It grows with an upright stem, which becomes flattened upwards, divides, expands, and forms a sort of wavy crest, covered with pointed bracts, and bearing on its surface many very small flowers, so crowded as often to present a rich velvety appearance. The colors are various, and often very brilliant.

COCK'S-FOOT GRASS (*Dactylis*), a genus of Grasses, having the panicle of flowers much on one side of the stem, its secondary branches so short that the spikelets are much crowded into clusters; the glumes unequal, the larger one keeled; each spikelet containing 2—7 florets, each of which has two lanceolate scarcely awned paleæ. This genus is closely allied to Fescue (*Festuca*), but differs in habit. The Common or Rough C. G. (*D. Glomerata*), is a native of Europe, Asia, North America, and the north of Africa. It is very abundant in Britain, growing in tufts by waysides, in meadows, woods, &c., from the level of the sea to high altitudes on the mountains. It forms an important part of almost all the best natural pastures, is much relished by cattle, and grows with great rapidity after it has been cut, yielding a large quantity of herbage, and succeeding well on most kinds of soil, and in situations too shady for many other grasses. It is therefore generally sown along with other grasses. An improved variety, of greater size than the ordinary one, has been introduced into cultivation. In America, this grass is called Orchard Grass, and is extensively cultivated. To this genus belongs also the Tussac Grass (q. v.).

COCK'S-SPUR THORN. See Cratægus.

CO'CKSWAIN, or COXSWAIN (pronounced *Cosn*), on board ship, is the steersman of a boat, and commander of the boat's crew. He is expected to have his men always ready for service at short notice, and is furnished with a whistle to summon them.

CO'COA, CACA'O, or CO'CO. The different kinds of C. either consist of, or are prepared from, the seeds of trees of the genus *Theobroma*.

The genus *Theobroma* (Gr. food of the gods) belongs to the natural order *Byttneriaceæ*, and contains a number of species, trees of moderate size, with large undivided leaves and clustered flowers, all natives of the tropical parts of America. It is distinguished by a 5-leaved calyx; five petals, concave at the base, and extended into a strap at the apex; the stamens united at the base into a cup, which is divided upwards into ten segments, five tips being without anthers, and the other five, alternate with them, bearing two anthers each; a threadlike style, terminating in a 5-partite stigma; the fruit a 5-angled capsule, of a substance

between leathery and woody, not splitting when ripe, 5-celled, and containing many seeds in a pap-like or butter-like pulp. The seeds of several species yield more or less of the C. of commerce. By far the most important species of this genus is *T. Cacao*, to which the name C.-tree is often exclusively appropriated. It is extensively cultivated in tropical America and the West Indies, and its cultivation has been introduced into some parts of Asia and Africa. It generally rises with a bare stem to the height of only 6 or 7 feet, dividing into many branches, and attaining a height of only 16 or 20 feet altogether, although it is sometimes twice that height. The fruit is somewhat like a cucumber in shape, and is 6 or 8 inches long, yellow, and red on the side next the sun; the rind is thick and warty, the pulp sweetish, and not unpleasant; the seeds numerous, compressed, and not unlike almonds, with a thin, pale, reddish-brown, fragile skin or shell, covering a dark-brown, oily, aromatic, bitter kernel, which consists mostly of the wrinkled cotyledons. These seeds are the *C. beans* of commerce; when bruised so as to be reduced to small pieces, after being shelled or decorticated, they become *C. nibs*. The C.-tree produces larger seeds in cultivation than in a wild state. The tree attains its full vigor and productiveness in seven or eight years, and generally yields two principal crops in the year. When gathered, the fruit is subjected to five days' fermentation in earthen vessels or in heaps on the ground, and then opened by the hand, and the seeds dried by the sun or by fire; or it is buried for a while in the earth, till the pulp becomes rotten. The latter method is said to produce the best cocoa (*earthed C.*, or *Cacao terré*).

C. is very nutritious. The principal constituent of C. beans is the soft, solid oil called *C. butter*, which forms more than 50 per cent. of the whole shelled bean, about 22 per cent. being starch, gum, mucilage, &c., and 17 per cent. being gluten and albumen. They contain also a crystallizable principle called *Theobromine*, analogous to Caffeine (q.v.), but more nitrogenous.

For dietetic use, C. is prepared in several ways. It is made into Chocolate (q. v.); it is crushed into *C. Nibs*, the purest state in

Theobroma Cacao.

which C. can be purchased in shops; or the unshelled bean is powdered in a hot mortar, or between hot rollers, which yields a paste capable of being mixed with sugar, honey, starch, &c., sold in shops under the name of Soluble C., Rock C., and Common Cocoa.

C. is eaten in the solid state in the form of cakes and bonbons, or is scraped down, and treated with boiling water or milk. When C. nibs are infused with water like coffee, they yield a highly palatable beverage, which is much lighter than any other infusion of cocoa. The large quantity of oily matter present in the bean tends to make the various infusions thick and heavy, so that they do not agree with some delicate stomachs. The annual consumption of C. is upwards of 100 millions of pounds.

An infusion of the broken and roasted shells of C. beans is sometimes used in the same way as tea or coffee. The pulp of the fruit is eaten in the countries in which the tree grows, and a kind of spirit is obtained from it by fermentation and distillation.

CO'COA-NUT, or CO'CO-NUT, the well-known fruit of a species of palm, *Cocos nucifera*, perhaps originally a native only of the Indian coasts and South Sea Islands, but now diffused over all tropical regions. The C. palm belongs to a genus having pinnate leaves, and male and female flowers on the same tree, the female flowers at the base of each spadix. The genus is further distinguished by a simple 3-celled ovary, which is succeeded by a coarse, fibrous, 1-celled drupe, two of the cells becoming abortive. There are about eighteen known species, all natives of South America, except the most important, the C. palm itself. The American species prefer dry and somewhat elevated districts. The C. palm, on the contrary, is seldom found at any considerable distance from the sea-coast, except where it has been introduced by man, and generally succeeds best in sandy soils near the sea. It is always one of the first of the larger plants to establish itself in the low islands of the Pacific Ocean, so soon as there is soil enough.

It has a cylindrical stem, about 2 feet in diameter, and from 60 to 100 feet high, with many rings marking the places of former

Crown of Cocoa-nut Palm, with Fruit.

leaves, and bearing at its summit a crown of from sixteen to twenty leaves, which generally curve downwards, and are from 12 to 20 feet in length. The flowers proceed from within a large pointed spathe; the fruit grows in short racemes, which bear, in favorable situations, from five to fifteen nuts; and ten or twelve of these racemes, in different stages, may be seen at once on a tree, about eighty or one hundred nuts being its ordinary annual produce. The tree bears fruit in from seven to eight years from the time of planting, and continues productive for seventy or eighty years. Of the three round black scars at one end of the shell, the one which alone can be easily pierced with a pin, and through which an opening is commonly made to get out the *milk*, is the destined outlet of the germinating embryo, which is situated there, the kernel consisting generally of the albumen (q. v.) destined for its nourishment. The thick husk is remarkably adapted to the preservation of the seed, whilst the nut is tossed about by the waves, until it reaches some shore far distant from that on which it grew.

The C. affords to the inhabitants of many tropical coasts and islands great part of their food; it is not only eaten as it comes from the tree, both ripe and unripe, being filled in a young state with a pleasant milky fluid, but is also prepared in a variety of ways, as in curries, &c.

The kernel of C. contains more than 70 per cent. of a fixed oil, called C. Oil, or C. Butter. The oil is itself an important article of commerce, being much employed in Europe, particularly for the manufacture of *Stearine candles;* and also of a *marine soap*, which forms a lather with sea-water. In tropical countries, and particularly in the East, it is much used as a lamp oil, and as an unguent. It is also employed as an article of food, so long as it remains free from rancidity, to which, however, it is very liable. It is obtained by pressure of the bruised kernel, or by boiling over a slow fire, and skimming off the oil as it floats on the surface. A quart, it is said, may be obtained from seven or eight cocoa-nuts. It is liquid in the ordinary temperatures of tropical countries, but in colder climates, becomes a white, solid, butter-like oil. It becomes liquid about 74° Fahr. It can be separated by compression in the cold into a more liquid portion called *olein*, and a more solid part termed *cocostearin*, or *cocosin*, which is of complex constitution, and contains at least six fatty acids. C. oil is not a good lamp oil, as it chars on the wick, and burns with smoky flame. This remark applies also to the *olein* obtained from it, which, however, is used mixed with sperm oil, but it lowers the value of the sperm oil. C. oil and resin melted together yield a substance capable of being used with success in filling up the seams of boats and ships, and in tropical countries, for covering the corks of bottles, as a protection from the depredations of the white ants.

The root of the C. palm possesses narcotic properties, and is sometimes chewed instead of the areca-nut.—When the stem is young, its central part is sweet and eatable; but when old, this is a mass of hard fibre.—The terminal bud (*Palm Cabbage*) is esteemed a delicacy, and trees are often cut down for the sake of it.—The saccharine sap (*toddy*) of the C., as of some other palms, is an esteemed beverage in tropical countries, either in the state in which it is obtained from the tree, or after fermentation, which takes place in a few hours; and from the fermentedsap (*palm wine*), a spirituous liquor (*arrack*) is obtained by distillation. The juice is often also in the East Indies boiled down to yield sugar (*jaggery*).

The dried leaves of the C. palm are much used for thatch, and for many other purposes, as the making of mats, screens, baskets, &c., by plaiting the leaflets. The midribs of the leaves supply the natives of tropical coasts with oars.—The wood of the lower part of the stem is very hard, takes a beautiful polish, is employed for a great variety of purposes, and is imported into Britain for ornamental joinery, under the name of PORCUPINE WOOD.—The fibrous center of old stems is made into cordage.—By far the most important fibrous product of the C.-tree is COIR (q. v.), the fibre of the husk of the imperfectly ripened nut. The husk of the ripe nut is used for fuel, and also, when cut across, for polishing furniture, scrubbing floors, &c.

The shell of the C. is made into cups, goblets, ladles, &c., and is often finely polished and elaborately ornamented by carving.—Within the nut there is occasionally found a small stony substance, of a bluish-white color, 'a sort of vegetable bezoar,' called in India *Calappa*, which is eagerly purchased by the Chinese, who ascribe great virtues to it as a sort of amulet to preserve them from diseases.

Cocos butyracea, one of the South American species of this genus, is a very large tree, and its nut abounds in an oil and butter of similar quality to that obtained from the cocoa-nut.—The DOUBLE C. of the Seychelles Islands is the fruit of a palm of a different genus.

COCOA-NUT BEETLE (*Batocera rubus*), a large beetle of the family *Longicornes* (q. v.), tribe *Lamiariæ*, the larvæ of which are very destructive in cocoa-nut plantations, eating their way in all directions in the stems of the younger trees. They are destitute of feet, large and pulpy, and of repulsive aspect; but are esteemed a luxury by the coolies of the East. They resemble the *grugru worms* of South America.

COCOO'N, a silken envelope which the larvæ of many insects spin for themselves immediately before their transformation into the pupa state, and which serves for the protection of the inactive and helpless pupa. The name is sometimes extended to coverings formed of other materials, by agglutination or otherwise. Many insects mix foreign materials of various kinds with their silken cocoons; some caterpillars, as those popularly called *woolly bears*, working into them the hairs with which their own bodies were previously covered; and others fastening together the sides of a leaf or of several adjacent leaves. Some of the moths, which attach their silk to leaves, so that the leaf itself forms part of the protective covering of the pupa, proceed with a mathematical nicety as to the position and direction of their threads, more wonderful, if possible, than even that exhibited by bees in the building of their comb. The silken substance of which cocoons are made, is produced much more abundantly by some kinds of larvæ than by others; the cocoons of some being only an open network, whilst others form a compact ball. The C. of the common silk-worm exhibits externally a loose gauze-like covering, within which is a close and compact oval ball; yet all is of one continuous thread, which may be unwound from it 1000 feet long. Different parts of this thread are of different qualities, but the stronger part of it may be unwound as easily as a ball of cotton. The insect works from the outside inwards, and the outer parts of the C. are produced first. The spinnerets by which the C. of the silk-worm and those of other moths are produced, are situated at the mouth of the caterpillar; but the larvæ of a few insects—not lepidopterous—have them at the opposite extremity of the body. The time occupied in spinning the C. is very various in different insects; in the silk-worm, it extends to several days.

CO'CUM OIL, a solid oil or vegetable butter, obtained from the seeds of *Garcinia purpurea*, an Indian tree of the same genus with the mangosteen. It is white or pale greenish yellow, brittle or friable, with a faint and not unpleasant odor. It melts at 95° F., but when cooled after being melted, remains liquid to 75° F. It is used for mixing with ghee (butter), and is exported to Britain for mixing with bear's greese in the manufacture of pomatum.

COCY'TUS, the name given by the ancients to a river of Epirus, fed by the snows of Pindus, and which, after a long underground course, was regarded as falling into the Acherusian Lake.—Cocytus was also the name of a river of the infernal regions, a branch of the Styx.

COD (*Gadus Morrhua*, or *Morrhua vulgaris*), a fish of the family *Gadidæ* (q. v.), almost rivaling the herring in its importance to mankind. The genus to which it belongs is distinguished by having three dorsal fins, two anal fins, and a barbule beneath the chin. The C. sometimes attains a weight of 100 lbs.; but even from a small size, it is in request for the market and the table. The roe of the female has been estimated to contain from four to nine millions of eggs, a reproductive power which seems beneficently intended to provide supply for far more extensive fisheries than are yet carried on. The C. is found in all the northern parts of the Atlantic Ocean, and in the arctic seas; it is not known in the Mediterranean. It occurs both on rocky coasts and on sand-banks, where the largest are usually caught in depths from 25 to 50 fathoms.

The productiveness of the great banks of Newfoundland excels that of all others, but the cod-fisheries near the coast of Sweden, Iceland, and the north of Scotland are also important. The Dutch were engaged in the cod-fishery as early as the middle of the 14th c., and the English resorted for this purpose to the coasts of Iceland about the same period. More than 6000 European vessels are said to be employed in it, besides boats along the shores. The fishery is always carried on by means of lines and hooks, partly by *long-lines* and partly by *hand-lines*. One man has been known to catch from 400 to 550 fish, on the banks of Newfoundland, in ten or eleven hours; and eight men to take eighty-score in a day on the Dogger Bank. The C. is very voracious. Small fishes, shell-fish, &c., are used for bait. The C. is used as food, either fresh, salted, or dried. Great quantities of dried C. are carried from Newfoundland to the West Indies, and are consumed also in the Roman Catholic countries of the south of Europe. *Cod Sounds* are esteemed a delicacy, and are often salted, and so sent to market. They are also used in a dried state as isinglass. The recent discovery of the medicinal value of Cod-liver Oil (q. v.) has added to the economical importance of this fish.

ROCK C. and RED C. are names given to the common C. when its color is somewhat affected by living among weedy rocks.—BALTIC C. is a name of the Dorse (q. v.).

CO'DA, in Music, is the ending or winding-up of a composition by an extra-melodic phrase, for more completely establishing the final cadence. It may be compared to the peroration of an oratorical discourse.

CODE (Lat. *codex* and *caudex*), the primary meaning of the Latin word was the trunk or stem of a tree; latterly, it came to signify more especially wooden tablets bound together, and covered with a coating of wax, which were used for writing on. After parchment and paper were substituted for wood, the name C. was still retained. Cicero applies it to a bill; but it was not till still later, in the times of the emperors, that it was used to express a collection of laws and constitutions.

Codes, Roman.—1. *Codex Gregorianus and Hermogenianus.*—The term *codex* never was applied to the laws of the twelve tables, and the earliest collections so called were those of Gregorianus or Gregorius, and Hermogenianus. Of these, whether two separate collections, or two parts of one collection—a disputed point—we have only fragments. They never received the imperial authority, but they were quoted as authoritative compilations in the courts, and they supplied the models on which the subsequent works of Theodosius and Justinian were executed.

2. *Codex Theodosianus.*—This compilation was executed by a commission of eight persons appointed by Theodosius the Younger in the year 429, and afterwards increased to sixteen. The work was completed and published, or rather promulgated, as law throughout the Eastern Empire in 438, and declared to be a substitute for all the constitutions made since the time of Constantine. In the Western Empire also, having been laid before the senate, it was confirmed as law in the same year by Valentinian III., the son-in-law of Theodosius. Nine years later, the new constitutions (*novellæ constitutiones*), which had been made since the promulgation of the C., were likewise promulgated in the Western Empire. The name of novels (*novellæ*) continued to be given to all the constitutions issued subsequent to the date of the Theodosian C. up to the overthrow of the Western Empire. The C. of Theodosius has been, in a great measure, preserved. It consists of sixteen books, which are subdivided into titles and sections. The best edition is that of J. Gothofredus (6 vols. fol., Lugd. 1665), which was re-edited by Ritter (Leip. 1736—1745). This edition contains the Theodosian C. entire, except in the first five, and part of the sixth book, for the reproduction of which the Breviary or abridgment prepared by the orders of Alaric II., king of the Visigoths—which itself may be regarded as another C.—formed the only guide. Some recent discoveries of MS. and palimpsests have added considerably, not only to our critical knowledge of the contents of this C., but have enabled us to restore several of the genuine constitutions of the first five books. Of the 262 laws and fragments of laws, which were omitted in the Breviary, 62 have been thus restored (see *Jus Civile Antejustin*, Berol. 1815).

3. *Codex Justinianeus.*—In 528, the Emperor Justinian appointed a commission of ten persons, one of whom was the celebrated Tribonian (q. v.), to compile a C., incorporating in it the previous codes of Gregorianus, Hermogenianus, and Theodosius, and also the Constitutions (q. v.), Rescripts (q. v.), and Edicts (q. v.), subsequently issued. The work was performed in fourteen months, and it was then declared that the new C. should supersede the older compilations. A second edition of this work, revised, and having subsequent constitutions, &c., incorporated (*Codex Repetitæ Prælectionis*), is what we now know as the C. of Justinian. It consists of twelve books, divided into titles.

Gothic C.—The laws of the barbarians were all collected into

a single C., which bore the title of *Codex Legum Barbarorum*. Of these various systems, the first was that of Alaric, king of the Visigoths, mentioned above, augmented by the legislative labors of his successors. To this C. was given the title of the Gothic law, *par excellence*, and it was the best and fullest of all the barbarian codes. The second C. comprised in the collection was that of the Burgundians; the third, the Salic law (q. v.), composed when the Franks issued from their German forests; the fourth, the law of the Frisians, which dates from the times of their conquerors Pepin and Charles Martel. These, and all the other codes by which the tribes of the north which overthrew the Empire were governed, merged at last in the feudal system, and a mass of local customs speedily arose which introduced the greatest uncertainty into jurisprudence.

French Codes.—Charles VII. was the first of the kings of France who attempted, by a series of general *ordonnances*, to introduce something like uniformity into the legislation of France; and several of his successors, in particular, Louis XI. and Henry III., entertained the idea of establishing a single C. for the whole kingdom. A C., having this object in view, was subsequently prepared by Michel de Marillac, and published in 1629. It consisted of 471 articles, and is spoken of by French jurisconsults in terms of the highest praise. Its reception, however, was very partial, confined indeed to the jurisdiction of the parliament of Dijon. Louis XIV., who, amongst his other ambitions, affected that of becoming the French Justinian, published a series of very important ordonnances embracing most of the leading departments of the law. The work was executed by a commission composed of the most distinguished magistrates and advocates of the kingdom, and before the various ordonnances received the royal assent, the king caused them to be discussed with the principal officers of parliament. Minutes of these discussions have been preserved, and they constitute one of the most precious monuments of the history of French jurisprudence. Many important chapters were subsequently added to this C., before it assumed the form in which, as the C. of Louis XV., it represents the condition of French jurisprudence previous to the Revolution.

Such, with the addition of sundry attempts at legislation during the period of anarchy which succeeded, was the position of affairs when Napoleon assembled that brilliant band of jurisconsults—Tronchet, Portalis, Merlin, Bigot-Préameneu, Treilhard, Pensey, &c.—by whose labors, aided in no insignificant degree by that marvelous insight into human affairs which he himself possessed, the modern legislation of France, and of no small portion of the rest of Europe, was called into existence. Such was the energy which he contrived to bring to bear on the work, that the vast edifice of the C. Napoleon, or C. Civil, was reared in a single year, the first title having been promulgated on the 5th March 1803, and the last on 30th March 1804. The C. de Procédure Civile followed in 1806, the C. de Commerce in 1807, the C. d'Instruction Criminelle in 1808, and two years afterwards, the C. Pénal. The period of the Restoration produced several codes of less importance—forest-laws, fishing-laws, &c. The C. Napoleon received the force of law in the countries which were successfully subjugated by France; in Italy, in the kingdom of Holland, in the Hanseatic departments, in the grand duchy of Berg. In the Rhenish provinces and in Belgium, it still forms the basis of legislation.

Since 1867, but especially since 1871, great progress has been made in the codification of German law.

CODEX (pl. CODICES: for derivation see preceding article), the name applied to ancient manuscript copies of the Scriptures. See BIBLE.

CO'DICIL, a supplement to a will, whereby anything omitted is added, or any change demanded by the altered circumstances of the testator or the beneficiaries, is effected. A C. is authenticated in the same manner as a will, and possesses the same privileges when holograph, or written by the hand of the testator himself. See TESTAMENT, WILL.

CODIFICA'TION, the act of forming a Code (q. v.), or systematic collection of laws. Though a code, in the wider sense, comprehends frequently the whole legislation of a country, there is a narrow sense in which the term is applied to a particular branch of legislation, such as commercial law, criminal law, marine, &c. In this latter sense, some of our general acts of consolidation, such as the Merchant Shipping Act of 1854 (17 and 18 Vict. c. 104), may almost lay claim to the character of codes. All attempts at C. in the wider sense in England have failed, notwithstanding the earnest advocacy of Lord Brougham. The department in which it seems to be most hopeful is the law-merchant in which, being necessarily cosmopolitan beyond the other departments of the law, great benefit may be derived from the labors of our continental neighbors. See CODE.

CO'DLIN, the name given to a number of varieties of apple, chiefly used for culinary purposes. Some of them are in high repute in Britain, both on account of the quality of the fruit and the productiveness of the tree. The fruit cannot easily, however, be kept long. In most of the varieties which bear this name, it is large and somewhat conical. The trees are often propagated by layers or suckers, or even by slips, plants thus obtained becoming fruitful much sooner than grafted trees.

CODLIN MOTH (*Pyralis pomona*), a small moth which is very injurious in apple-orchards in some parts of Britain, laying its eggs in the eyes of the newly formed fruit, within which the larva feeds, so that the growth of the fruit is arrested, and it falls prematurely off. This moth is one of the *Tortricidæ*, agreeably colored, with rather short and broad wings. The caterpillar has sixteen feet.

COD-LIVER OIL is generally obtained from the livers of the common cod (q. v.), but likewise from allied species, as ling, dorse, coal-fish, torsk, &c. In these fish, the adipose tissue (q.v.), containing oil, is almost entirely confined to the liver, in which they agree with the shark tribe, whilst in other fish, as in the herring and salmon, the oil is diffused over the entire structure of the animal. C. O. is prepared largely in Britain, Norway, and Newfoundland. There are three varieties of the oil sold in commerce—*pale C. O.*, *pale-brown C. O.*, and *dark-brown Cod-liver Oil*.

In the preparation of the oil, the livers are placed in a tub with a layer of spruce boughs at the bottom, and subjected to pressure, when the light-colored or pale oil exudes, and is run off by an opening at the lower part of the tub. As the livers partially putrefy, more oil escapes, which is darker than that procured from the fresh livers, and constitutes the pale-brown oil; whilst the residual livers being boiled with water, part with the remaining oil they contain, and yield the dark-brown oil. The pale oil thus approaches more nearly the condition in which the oil is present in the livers, while the other varieties are more or less impregnated with the products of the putrefaction of the livers. The purer oil has a peculiar fishy odor and taste, which is not disagreeable, although it remains for a little time, and in some cases requires a little practice to get accustomed to it. The darker varieties have more or less of a disagreeable empyreumatic odor and taste, and leave in the throat an unpleasant nauseous sensation, more difficult to overcome.

The oil mainly consists of oleic and margaric acids, in combination with glycerine, and holding in solution the constituents of the bile, acetic acid, a phosphorized oil, as also iodine and bromine. These ingredients are most largely present in the light-colored oil. C. O. is occasionally adulterated with more or less train-oil, to which a little iodine has been added. In the purer varieties of C. O., the presence of any such admixture can be at once observed from the disgusting odor, although in the darker varieties of C. O. the test of odor cannot be relied on.

As a remedy, C. O. has a great reputation as efficacious in the treatment of scrofulous and tubercular diseases, and especially in Consumption (q. v.); it has also been used extensively in chronic rheumatism, in rickety affections, and in other diseases of the bones and joints. The virtues of C. O. have been ascribed to iodine, bromine, and other specific ingredients; but, on the whole, the most probable view of its action is that it is simply a fattening agent—a fatty food—and that it acts by nourishing the system in cases attended with emaciation, just as new milk, cream, and butter, or fat bacon, will sometimes act in similar cases. C. O. is often found to be more easily digested than, from its somewhat disagreeable odor and taste, might have been expected. Children, in particular, often take it readily; and in emaciated old people, it is sometimes of great service in conjunction with remedies suited to the peculiar character of the case. In true tubercular consumption, it has for some years enjoyed a great reputation; but it is very far from having anything like a specific remedial action in that disease. C. O. is commonly taken in doses of from a dessert-spoonful to a table-spoonful three times a day; but a pint, or even more, is said to have been consumed daily in some instances with good effect, or at least without injury.

CODO'GNO, a town of Lombardy, Northern Italy, situated in a rich district between the Adda and the Po, about 15 miles to the south-east of Lodi. It is well built, and has manufactures of silk and linen, and a great trade in cheese. Pop. 9632.

CO'DRINGTON, SIR EDWARD, G.C.B., &c., a distinguished British admiral, third son of Edward Codrington, Esq., was born in 1770, and entered the navy in 1783. In 1794 he was lieutenant of the *Queen Charlotte*, Lord Howe's flag-ship, in the actions of the 28th and 29th May and 1st June. At the battle of Trafalgar in 1805, he was captain of the *Orion*, 74. He afterwards served in the Mediterranean, and in North America, and rose to the rank of vice-admiral in 1821. In November 1, 1826, he was appointed commander-in-chief of the Mediterranean squadron, and in that capacity took the leading part in the battle of Navarino (q. v.). In reward for this victory, he received the Grand Cross of the Bath, with Russian and French orders; but the battle being considered an 'untoward event,' C. was recalled. He attained the full rank of admiral of the red in 1837, and in 1839 was appointed commander-in-chief at Portsmouth. He was M.P. for Davenport from

1832 to 1839. He died April 28, 1851.—His son, GENERAL SIR WILLIAM JOHN CODRINGTON, G.C.B., was commander-in-chief in the Crimea, 1855—1856; and was promoted to the rank of general in 1863. The brother of the last mentioned, ADMIRAL SIR HENRY JOHN CODRINGTON, K.C.B., took part in the destruction of St. Jean d'Acre, and became an admiral in 1867.

CO'DRUS, the last king of Athens, was the son of Melanthus, and, according to Grecian legend, sacrificed his life for his country about the year 1068 B.C. A war raging between the Athenians and Dorians, the oracle declared that the victory should belong to those whose king was slain by the enemy; whereupon, C., attiring himself as a peasant, entered the Dorian camp, and having picked a quarrel with some of the soldiers, contrived to have himself slain. His son, Medon, was made Archon (q. v.) for life, on the pretence that no one was worthy to succeed such a man as king. The accounts, however, which have come down to us, indicate that the sons of C. had quarrelled about the succession after their father's death, and it is more probable that the aristocratic families (the Eupatrids) took advantage of the opportunity presented to them, of diminishing the regal authority by abolishing the name.

COEFFI'CIENT (Lat. together-making) is the name given in Algebra to the known or constant factor of an unknown or variable quantity. Thus, in the expressions $4x$ (4 times x), bz (b times z), 4 and b are coefficients of x and z, b being supposed known as well as 4, and x and z unknown or variable. Strictly speaking, in a product, such as 3×5, $4 \times x$, or $b \times z$ ($= bz$), either of the two factors is a C., since they 'together make' the product; but in practice, the meaning is restricted as above explained.

COEHOORN, or COHORN, MENNO, BARON VAN, called the Dutch Vauban, was born at Lettingastate, near Leeuwarden, in 1641, and studied fortification and mathematics under his uncle Bernardus Fullenius, then professor of these sciences at Franeker. Prince Henry Casimir, Stadtholder of Friesland, apprised of the youth's great abilities, appointed him, in his 16th year, captain of a company of infantry; and in 1674 C. greatly distinguished himself at the siege of Maestricht, and in various battles. At the siege of Grave, in 1674, he demonstrated that small portable mortars might be advantageously employed (see next art.); and also that the combined effect of a certain mass of projectiles is much greater than the effect produced by a successive discharge of the separate projectiles composing the mass. The application of this principle distinguishes the operations of Coehoorn. C. covered himself with honor before Kaiserswerth (June) and Bonn (October 1689), and the Elector of Brandenburg wanted to make him major-general, a promotion he refused. He also distinguished himself in the battle of Fleurus (July 1, 1690). He was now for some time in disgrace, but was soon sought again by William III. He fortified Namur, and defended his own intrenchment 'William' against Vauban in 1692; besieged that fortress in 1695, and retook it; was appointed lieutenant-general and director-in-chief of the Dutch fortifications, and fortified several towns, of which Bergen-op-Zoom may be considered his master-piece. In 1702 he annihilated the French lines near St. Donat. He died at the Hague, March 17, 1704. His principal works are, *The New System of Fortification* (Leeuwarden, 1685) and *The Pentagon.*

COE'HORNS—named from the military engineer who invented or introduced them—are small howitzers or mortars, generally $4\frac{2}{5}$ inches calibre. These implements of war, being easily moved and adjusted, and taking little powder, are found very useful in sieges, if grouped in great number. A battery of 30 or 40 C., by pouring their small shells or grenades into the outworks of a fortress, may prevent the garrison from effecting a strong occupation, or making a demonstration.

CŒ'LELMI'NTHA (Gr. hollow worms), the name given by Owen to one of the two orders of Entozoa (q. v.), or Intestinal Worms, having a distinct abdominal cavity and intestinal canal, the *Vers intestinaux cavitaires* of Cuvier. Examples of this order are *Ascaris*, *Strongylus*, and *Filaria.*

CŒLENTERATA. See SUB-KINGDOMS, ANIMAL.

CŒ'LE-SY'RIA (Hollow Syria), now called by the natives El-Bŭkâ'a, 'the deep plain,' a valley of Syria, extending between the ranges of the Lebanon and Anti-Lebanon. Near Bar Elias, it is 2854 feet above the sea. Its length is about 100 miles, and its average breadth 10. In this valley stand the ruins of Baalbek and the village of Zahleh.

CŒ'LIAC A'XIS. See AORTA.

CŒ'NOBITES (Gr. *koinos*, common, and *bios*, life), or SYNODITES, the name given to those monks who live together, in contradistinction to the Anchorites (q. v.), or hermits, who withdraw from all society, and live in a solitary fashion. The first *Cœnobium*, or monastery, was founded by Pachomius, a disciple of St. Antony, about the year 340 A.D., at Tabennæ, an island in the Nile. In a short time, it reckoned 1300 monks, and stimulated the establishment of numerous other monasteries in Egypt, Syria, and Palestine.

CŒNU'RUS. See CESTOID WORMS.

CO'FFEE. This well-known beverage is an infusion of the roasted albumen of the seeds of the C. tree (*Coffœa Arabica*), a native of Abyssinia and Arabia, but now naturalized in many of the tropical countries colonized by Europeans. There are a number of species of *Coffœa*, but this one only is known to possess valuable properties; the seeds of *C. Mauritiana* prepared in the same way, are bitter and slightly emetic. The genus belong to the natural order *Cinchonaceæ*. It has a tubular 4—5-cleft corolla, and a succulent fruit containing two cells lined with a cartilaginous membrane, and each containing one seed.

In a wild state, the C. tree is a slender tree of 15—25 feet high, with few branches; in cultivation, it is seldom allowed to become more than 6—10 feet high, and is made to assume a sort of pyramidal form, with horizontal branches almost from the ground. The leaves are evergreen, opposite, very shining, oblong, and leathery; the flowers are small, clustered in the axils of the leaves, and snow-white; the whole appearance of the tree is very pleasing; and the smell of the flowers is delicious. The fruit, when ripe, is of a dark-scarlet color, and the seeds are semi-elliptic, and of a horny hardness. The seeds are commonly termed *C. Beans*, but this name is not derived from a resemblance to beans, which they have not, but from the Arabic word *bunn*. They are sometimes, but very incorrectly, designated *C. berries.*

The C. tree succeeeds only in countries where the average temperature of the year is about 64—70° F. In Peru and Quito, it is acclimatized at an elevation of 6000 feet, where, however, frost never occurs; but as it delights in a moist atmosphere, it nowhere thrives better than in tropical islands. The fruit ripens in the hothouses of Britain, where the C. tree frequently flowers. C. plantations are laid out pretty much in the same way everywhere. In quadrangles, bordered by fruit-trees, the C. trees stand in rows; they are pruned to the same height, and the ground between them is carefully kept clear of weeds. Where the climate is dry, abundant irrigation is necessary, but the supply of water is cut off as the fruit begins to ripen, in order to the improvement of its quality. The tree yields its first crop in the third year; the crop from a full-grown tree may amount to a pound of C. beans. As the C. tree continues flowering for eight months, its fruits are at any time of very unequal ripeness; in the West Indies and Brazil, three gatherings are therefore made annually. The beans are placed on mats or large floors specially adapted for the purpose, where they are dried by the sun's rays, being meanwhile frequently turned. They are passed between rollers to remove the dried pulp of the bean, and the membrane which encloses the seeds themselves, and the C. is afterwards freed from impurities by winnowing, and conveyed in bags to the seaports. As equal care is not, however, bestowed upon the preparation of it in all places where it is cultivated, there are great differences in quality and price.—The earlier history of the C. tree is not very clear. It was not known to the Greeks or Romans; but in Abyssinia and Ethiopia it has been used from time immemorial; and in Arabia it was certainly in use in the 15th c., and over the rest of the East in the 16th century. Towards the end of the 17th c., it was carried from Mocha to Batavia by Wieser, a burgomaster of Amsterdam, where it was soon extensively planted, and at last young plants were sent to the botanical garden at Amsterdam, from which the Paris garden obtained a tree. A layer of this was carried out to Martinique in 1720, where it succeeded so well, that in a few years all the West Indies could be supplied with young trees.

Coffee:
a, a branchlet with leaves, flowers, and fruit; *b*, section of fruit.

The following sorts are particularly distinguished from each other in commerce. *Mocha C.*, which comes from Arabia, and is known by its small gray beans inclining to greenish; *Java* or *East Indian C.*, which has large yellow beans; *Jamaica C.*, with beans somewhat smaller and greenish; *Surinam C.*, which has the

largest beans; *Bourbon C.*, with beans pale yellow and almost whitish.

The employment of C. as a beverage was introduced from Arabia, in the 16th c., into Egypt and Constantinople. Leonhard Rauwolf, a German physician, was probably the first to make C. known in Europe, by the account of his travels printed in 1573. Soon after the first introduction of C., COFFEE-HOUSES arose almost everywhere. The first in Europe was established in Constantinople in 1551. In London, the first coffee-house was opened in Newman's Court, Cornhill, in 1652, by a Greek named Pasquet. This Greek was the servant of an English merchant named Edwards, who brought some C. with him from Smyrna, and whose house, when the fact became known, was so thronged with friends and visitors to taste the new beverage, that to relieve himself from annoyance, Edwards established his servant in a coffee-house. The first coffee-house in France was opened at Marseille in 1671, and in 1672 there was one opened in Paris, which soon had several competitors.

In Arabia and the East, C. is not usually prepared as a beverage in the same way as in Europe, except by Europeans. A decoction of the unroasted seeds is there generally drunk; and for the 'Sultan's Coffee,' the pericarp with the dried pulp roasted, is employed.

The great demand for C. has led to the employment of a number of cheaper substitutes, of which *Chicory* (q. v.) root is the best known in this country. Of others, dandelion root, carrot, and the seeds of the common yellow iris may be mentioned. They are prepared by roasting like coffee. The seeds of *Astragalus Bœticus*, already mentioned in the article ASTRAGALUS, are known on the continent of Europe as *Swedish C.*, and are said to be the best substitute for C. yet discovered. But all these substitutes want the most important constituent of true C., *caffeine;* and are therefore very different from it in their qualities. C. is subject to great adulteration, most of the articles specified as substitutes being employed for this purpose. The chief substance of mixture, however, is chicory, the use of which for this purpose was legalized by a Treasury minute in 1840. This adulteration was prohibited by a Treasury minute of 1852; but it being found impossible to make the prohibition effectual, a minute was passed in the succeeding year, permitting the mixture and sale of C. and chicory, on condition that the parcels containing it were labelled in conspicuous letters *Mixture of Coffee and Chicory.*

The leaves of the C. tree are used in the western part of Sumatra instead of the seeds. They are prepared by quick drying in a manner similar to that in which tea-leaves are prepared; and in this state contain even a larger proportion of caffeine than the C. beans of our shops. It seems not improbable that the use of the C. leaf may yet extend very much.

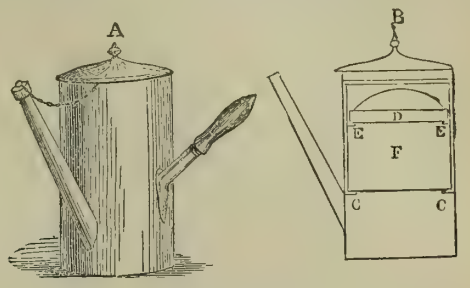
C. owes its exhilarating and refreshing properties to the presence of three substances: 1. *Caffeine* (q. v.)., which occurs in the roasted bean to the extent of ½ to 1 per cent.; 2. A *Volatile oil*, which is not present in the raw bean, but is developed during the process of roasting to the extent of only one part in about 50,000 of the roasted C.; and 3. Astringent acids, resembling tannic acid, but called Caffeo-tannic and Caffeic acids. The average composition of unroasted C. is as follows:

Caffeine	0·8
Legumin (vegetable caseine), (q. v.)	13·0
Gum and sugar	15·5
Caffeo-tannic and Caffeic acids	5·0
Fat and volatile oil	13·0
Woody fibre	34·0
Ash	6·7
Water	12·0
	100·0

When the beans are roasted till they assume a reddish-brown color, they lose 15 per cent. by weight, and gain 30 per cent. in bulk; when further roasted till they become chestnut-brown, they have lost 20 per cent. by weight, and increased 50 per cent. in bulk; whilst if the roasting is continued till the beans become dark-brown, they lose 25 per cent. in weight, and acquire 50 per cent. in bulk. The beans should never be darker than a light-brown color, which is quite sufficient to bring out the excellent aroma and other qualities of the C.; and when the roasting is carried further, more or less charring is the result, and a disagreeable burned smell is produced, which tends to overcome the natural pleasant aroma.

C. does not retard the action of the bowels, as strong infusions of tea tend to do, partly because there is less of the astringent principle, and also owing to the presence of the aromatic oil which tends to move the bowels. The important offices which C. fulfils are, to allay the sensation of hunger; to produce an exhilarating and refreshing effect; and, most important of all, to diminish the amount of wear and tear, or waste of the animal frame, which proceeds more or less at every moment. See NUTRITION. The grounds of C. are very nutritious, from containing so much legumin; and some of the eastern nations take advantage of this, and use the grounds as well as the infusion. In other respects, C. possesses similar properties to Tea (q. v.).

An endless variety of apparatus have been contrived—some of them of great complexity—for preparing C. for the table. The chief object aimed at is, to obtain the liquor free from all sediment. One of the simplest and cheapest of these contrivances is the percolating C. pot, represented in the figure. The easiest way of making C.—requiring no special apparatus, and as satisfactory in the result perhaps as any—is to put two ounces of (fresh-roasted and fresh-ground) C. into a small saucepan or common C.-pot; pour over it a pint of boiling water, and allow it to stand, closely covered up, by the side of the fire (but *not* to boil) for five minutes. The liquor may then be simply poured off the grounds, or it may be strained through a cloth, and then returned to the saucepan or C.-pot (previously rinsed out), and warmed again. Soyer recommends, that before the boiling water is poured in, the saucepan should be set dry on the fire, and the powder stirred till it is quite hot, but not in the least burned. In France,



Percolating Coffee-pot:

A is the coffee-pot with the nozzle fixed; B is a section of the same with the perculator, F, inserted, which easily slips into the coffee-pot, and rests on plugs at C, C; D is a small upper percolator, with a curved handle, which fits into the top of F, also resting on plugs, E E. When coffee is made in this pot, all the openings in the percolator are covered gently with coffee; the small upper percolator, D, is put in its place, and boiling water is poured through it on the coffee, in such quantity as may be wished. The cover and nozzle are immediately fitted on the pot, which is placed on the fire until steam appears at the spout and cover, when it is instantly withdrawn.

a pint of boiling milk is added to a pint of coffee. The chief effect of adding chicory to C. is to deepen the color.

ESSENCE OF COFFEE is a highly concentrated infusion, mixed to the consistence of treacle with extract of chicory and burned sugar, and kept in well-corked bottles. By pouring boiling water upon a tea-spoonful of the essence, a cup of very tolerable C. may be prepared in a moment.

The trade in C. is of great importance. The following statement is given in *M'Culloch's Commercial Dictionary* as 'a pretty fair estimate' of the comparative exports of C. from the principal places where it is produced, and of the annual consumption in those countries into which it is imported from abroad:

EXPORTS.

	Tons.	
Mocha, Hodeida, and other Arabian ports	8,000	
Java	55,000	
Sumatra and other parts of foreign India	8,000	
Brazil and the Spanish main	160,000	
Hayti	16,000	
Cuba and Porto Rico	7,000	
British West India colonies	2,000	
India and Ceylon	38,000	
Dutch West Indies	2,000	
French West Indies and the Isle de Bourbon	2,500	
		298,500

CONSUMPTION.

	Tons.	
Great Britain	16,000	
Netherlands and Holland	40,000	
Germany, Russia, and countries round the Baltic	60,000	
France, Spain, Italy, Turkey in Europe, the Levant, &c	55,000	
The United States	90,000	
Canada, Australia, &c	30,000	
		291,000

In 1880, the total quantity, imported into the United Kingdom, was 1,546,451 cwts., of which 850,000 cwts. were imported from Ceylon and other British possessions, the computed real value being £6,861,130, or about 10*d.* per lb. The quantity ratained for home consumption during this year was about 360,000 cwts., on which a duty of 14*s.* p. cwt. in the raw state, and 2*d*, per lb. in a kiln-dried, roasted, or ground condition was leviable.

COFFEE BUG (*Lecanium coffeæ*), an insect of the Coccus (q. v.) family, which lives on the coffee-tree, and is often extremely destructive to coffee-plantations. It has of late years devastated some of these in Ceylon. To check its ravages, the experiment was tried of introducing into the plantations the red ant (*Formica smaragdina*), abundant in many of the gardens and jungles of the island, which feeds greedily on the C. B.; but the fierce assaults of the ants on the naked skins of the Malabar coolies, made them threaten to leave the estates.

CO'FFEE-TREE, KENTUCKY. See GYMNOCLADUS.

CO'FFER, in Fortification, is one particular kind of *Caponnière* (q. v.).

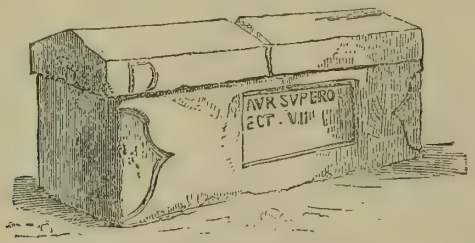
COFFER, a deep panel in a ceiling, also called a cassion.

COFFER, a casket for keeping jewels or other valuables. Caskets and chests were sometimes made of iron, but more frequently of wood.

CO'FFERDAM, a water-tight structure used in engineering for excluding the water from the foundations of bridges, quay-walls, &c., so as to allow of their being built dry. Cofferdams are generally formed of timber piles driven close together (called sheeting) in two or more rows, according to the depth of water and the nature of the bottom; the space between the rows, which may vary from four to ten feet, being spooned out, down to the solid and impervious bottom, and filled up with clay puddle. Sometimes they are made of only one row of piles of the full height, calked above low-water, with a low or dwarf row outside to confine the puddle up to that level, or, where there is no wave or current, with a mere bank of clay thrown against the outside; and occasionally the upper work is formed of horizontal planking, fixed on open main piles, and calked in the joints. When the bottom is rock, so as to prevent piles being driven, and is not much below low-water, cofferdams are occasionally formed of two stone-walls, with a space between filled with clay.

The cofferdams before spoken of are all what are called high-water dams, and exclude the water at all states of the tide. They require to be provided with sluices, to allow of the water, when first to be excluded, getting out during the ebb, and to shut against it during the flood. The remainder of the water, and all leakages, must be got rid of by pumps, generally worked by a steam-engine. For moderately shallow foundation, and more especially where there is a great rise and fall of tide, tidal-dams are often used. These are sometimes made of sheeting piles, but are often boxes formed of planking or of iron, weighted and sunk into the ground by digging inside in the same way that wells are sunk. These dams can only be used for a couple of hours of thereabouts at low-water, and, of course, require to be pumped out every tide. All cofferdams require to be strongly shored within, to prevent their being forced inwards by the pressure of the external water; and the rows of piles require to be strongly bolted together, to overcome the pressure of the clay puddle, which otherwise would burst them.

CO'FFIN (Lat. *cophinus*, Gr. *kofinos*, in both languages signifying a basket, coffer, or chest, but never a coffin.) In the ordinary English sense of the word, a C. is a chest or box in which dead

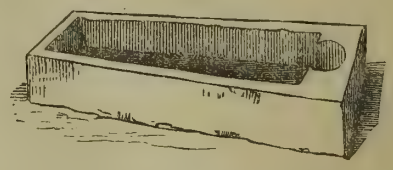


Roman Stone-coffin, found at York,

bodies are buried or deposited in vaults; but the term is also applied to a mould of paste for a pie, and in Printing, to the wooden frame which encloses the stone on which the form is imposed. In farriery, it signifies the hollow part of a horse's hoof. It is in the first of these significations alone that we shall consider it here.

It has been keenly disputed amongst scholars, whether it was more usual with the Greeks to bury their dead, or to burn them (see BURIAL); but both customs unquestionably prevailed, and coffins, in the modern sense, were consequently known in Greece. They were called by various name (*soroi*, *púeloi*, &c.), and composed of various materials, the most common being baked clay, or earthenware. Their forms also varied, sometimes resembling those which we use, sometimes consisting of a narrow triangular box, the undermost side of course being considerably broader than the others. In Rome, the ancient practice was to bury the dead, not to burn them; though under the Empire, and previous to the recognition of Christianity, the latter custom became almost universal. The C. in Rome was called *arca* or *loculus*, and was frequently made of stone, sometimes of a peculiar kind of stone brought from Assos, in Troas, which was said to consume all the body except the teeth in forty days, and which, from this circumstance, was called sarcophagus—an eater of flesh. See SARCOPHAGUS. Many Roman stone-coffins have been found in this country. The simplest of all coffins was that used by the British Celts and other rude nations, consisting of unhewn stones set on their edges, so as to cover the sides and ends of the grave, one or more flat stones being then laid over the body to form a lid. To these succeeded stone-coffins, which were commonly used for persons of the higher classes in Saxon times, and throughout the whole of the middle ages.

From Bede, however, we learn that the Saxons occasionally employed wood; and the common people both then and in the subsequent Norman and English eras, were simply wrapped in cloth, and



Stone-coffin, Temple Church, London.

so put into the ground. The same custom seems to have been followed with monks down to a comparatively recent period. Stone-coffins were generally of a single block, commonly tapering from the upper end. In the hollow for the reception of the body, there was generally a part peculiarly fitted for the head, and a hole in the bottom to allow of the juices of the decaying body to escape.

These coffins, for the most part were not buried very deeply in the earth, and were frequently placed so near the surface that the lids were visible, which, within a church, often formed part of the pavement. Sometimes they were even above the ground altogether, and thus became the originals of altar-tombs. These lids were often covered with elaborate sculpture, representing crosses and other ornaments. Leaden coffins were occasionally used in the middle ages, as those recently brought to light in the Temple Church in London testify, but the slight wooden cases now in common use appear to be of comparatively recent origin. See Strutt's *Manners and Customs*, and Gough's *Sepulchral Monuments*.

CO'GGESHALL, a town in the north-east of Essex, on the left bank of the Blackwater, 44 miles north-east of London. It lies partly on low ground, near the river, and partly on some gentle ascents rising from it. There is an endowed grammar-school, founded by Sir Robert Hitcham. The church is one of the finest in Essex, and has been recently restored at great cost. It has manufactures of silk, velvet, and isinglass. Pop. (1871) 2916. It is supposed to have been the Roman *Canonium*, and the remains of a Roman villa have been found. It has the ruins of a Cistercian abbey, founded by King Stephen in 1142.

COGNAC, a town of France, in the department of Charente, with a pleasant situation on an old castle-crowned hill overlooking the river Charente. C. is celebrated as the place where the best brandy in France is manufactured, to which it gives its name. Not half the quantity of so-called *Cognac* brandy, however, is manufactured here. The cultivation of the vine and distillation of brandy form the chief industry of the inhabitants of the district. Francis I. was born here. Pop. (1876) 13,811.

CO'GNATE. See AGNATE.

COGNI'TION AND SA'SINE, in Scotland, a form of entering an heir in burgage property. See CONVEYANCING.

CO'GNIZANCE, a term used in a loose manner in Heraldry, sometimes to signify a Crest (q. v.), sometimes a Badge (q. v.), or other distinguishing mark.

COGNOSCE'NTI (Ital. from Lat. *cognosco*, to know), persons professing a critical knowledge of works of art, and of a somewhat more pretentious character than amateurs.

COGNO'VIT—viz., *actionem* (he has confessed the action), in the law of England, is the defendant's written confession that the plaintiff's cause against him is just and true. A C. usually proceeds on the condition that defendant shall be allowed a certain time for the payment of the debt or damages and costs; and it impliedly authorizes the plaintiff's attorney to do everything necessary to obtain judgment.

COHABITA'TION, in the law of Scotland, means living at bed and board together, like man and wife, and being reputed to be such. These circumstances, when fully established, are held to afford sufficient proof that the contract of marriage between the parties has actually been constituted by their mutual consent.

CO-HEI'R AND CO-HEI'RESS, one of two or more persons, among whom an inheritance is divided. See HEIR, SUCCESSION.

COHE'SION is the name given to that species of Attraction (q. v.) by which the particles of matter are held together so as to form bodies (see ADHESION), and its measure is the resistance which bodies offer to any mechanical force tending to separate their parts. In gaseous bodies C. is altogether wanting; their atoms even repel one another. In liquids, notwithstanding the ease with which the particles slide on one another, the operation of C. is distinctly seen in the formation of drops. C. is strongest in solids; and degrees of C., in this case, are much the same thing as degrees of solidity. It is the force of C. that constitutes the strength of materials (q. v.). After the particles of a body have been completely separated, it is found that through C. they will reunite, if pressed sufficiently close together. Two clean, smooth, freshly cut pieces of lead placed together, will cohere so as to require a very considerable force to separate them; and it has not unfrequently happened in plate-glass manufactories, that polished plates of glass have cohered so completely that they have been cut and worked as a single piece.

If the particles of matter had no property in relation to one another, except their mutual impenetrability, the universe, it has been said, would be like a mass of sand, without variety of state or form. As it exists, however, it demonstrates the cross action of several universal properties of matter. Among those which most affect its state and form, are heat and cohesion. It may be said that bodies assume the solid, liquid, or aëriform states, just according to the proportion that the C. of their particles bears to those forces which, like heat, tend to separate them. See HEAT. Upon modifications of the cohesive force, and its relations to other molecular forces, would seem to depend such properties as elasticity, brittleness, ductility, &c.

COHESION-FIGURES, a remarkable class of figures produced in liquids by the action of their natural cohesive attraction for the surfaces of other liquids or solids on which they are deposited, or by induced cohesive attraction effected by the means of electricity. They may be described under four heads: (1) The Surface-cohesion Figures of Tomlinson; (2) The Submersion-figures of Tomlinson; (3) The Breath-cohesion Figures of Strethill Wright; (4) The Electric-cohesion Figures of Strethill Wright.

1. *The Surface-cohesion Figures of Tomlinson.*—This class of figures was submitted to the Chemical Section of the British Association by Mr. Charles Tomlinson of King's College, London, in solution or diffuses itself over the surface. He stated that each figure is characteristic of the fluid employed, and that any change in the chemical or molecular state of the fluid is attended with a corresponding change in its 'cohesion-figure.' Hence he recommended that these figures should be applied to the qualitative analysis of various liquids whose ordinary methods of testing were inoperative or inadequate. *Cohesion analysis*, performed as he directs, has been applied with signal success in the verification of oils 1861. He showed that a drop of an 'independent liquid,' such as an oil, alcohol, or ether, when gently placed upon chemically clean water, spreads itself out into a definite figure as it enters into

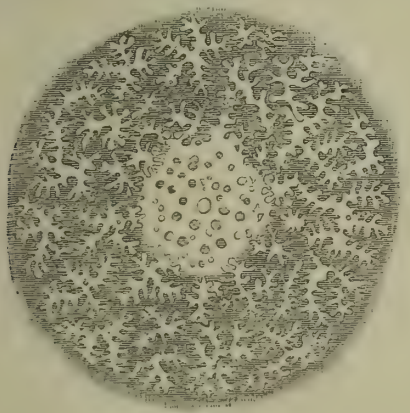


Fig. 1.

and balsams, and as a ready means of indicating the changes which take place in those bodies by age or oxidation. The cohesion-figures of Tomlinson, from their great beauty and variety, combined with the exquisite harmony of coloring displayed by many of them, have been employed, like those of the kaleidoscope of Brewster, to suggest forms for the pattern-designer.

In the production of cohesion-figures, water was the receiving surface generally employed by their discoverer; but in certain cases, he also employed other fluids, such as mercury, acetic acid, cocoa-nut oil, and castor oil in the cold state; and spermaceti, white wax, lard, and sulphur in a state of fusion. On each of these substances, the liquid to be tested formed a different and characteristic figure, and hence additional means of comparison and verification were afforded. Fig. 1 shows the surface-cohesion figure of oil of lavender on water.

2. *The Submersion figures of Tomlinson.*—In the *Philosophical Magazine* for June 1864, this author brought forward a new series of cohesion-figures of liquids, in which the drop, being of great specific gravity, instead of forming a figure on the surface, sank beneath it, and formed a figure as it slowly made its way to the bottom of the vessel. In order to exhibit these phenomena, he employed a column of liquid in a cylindrical vessel. He states that a solution of cochineal dropped into water formed a figure typical of a large class of these figures. A drop laid on the sur-

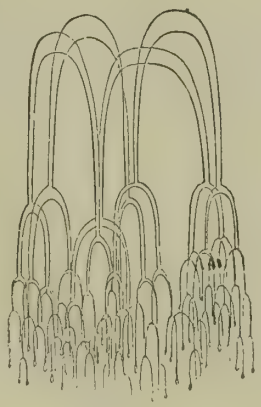


Fig. 2.

Fig. 3.

face sank down, opened into a ring, which became depressed at two opposite points; from these points, lines of fluid descended, which terminated in secondary rings; the secondary rings, in like manner, drooped down into lines carrying tertiary rings, and so on, until the lower part of the vessel became crowded with a complicated system of drooping rings and lines. Oil of lavender in a column of alcohol, fusel oil in paraffine oil, in benzole, in ether, &c., gave various and distinctive figures. He found that similar figures were obtained by the use of oils dropped into columns of hot spermaceti, lard, wax, &c.; and that these figures underwent considerable variation under the influence of change of temperature. Fig. 2 shows the submersion-figure of oil of lavender in alcohol; fig. 3, that of fusel oil in paraffine oil. We have already stated that each of these figures, whether surface-figures or submersion-figures, is characteristic of the fluid which forms it; and Tomlinson considers, with regard to the *surface-figure*, that it is a function of the cohesive force and diffusibility of the liquid, and the adhesion of the surface on which it is deposited: he also considered that it might be a function of the solubility and the diffusibility of the fluid in question, or of the solubility, the density, and the molecular attraction; while with regard to the *submersion-figure*, he thought each figure to be a function of the solubility, the density, and the molecular attraction.

3. *The Breath-cohesion Figures of Strethill Wright.*—These figures were discovered by Dr. Strethill Wright of Edinburgh, and communicated to the Royal Scottish Society of Arts on December 12, 1864. This author, who had long been engaged in observing phenomena connected with the modification of cohesive attraction produced between solids and fluids by heat and electricity, was induced to take up the subject afresh by the publications of Tomlinson, and one of the results was the production of his so-called 'breath-cohesion figures.'

He employed as the recipient surface a freshly-split, and therefore chemically clean, surface of mica; on this he placed a single drop of the fluid to be experimented on. He then breathed upon the surface, and instantly the drop flashed out into a figure characteristic of the fluid of which it was composed. By this means, a variety of substances, such as vegetable extracts, tinctures, and essential oils, and animal fluids, such as serum, vaccine lymph, bile, mucus, and urine in its various pathological conditions, could be examined. By dusting the figures with hair-powder or lycopodium, he was also enabled to render them permanent, and

to exhibit them in his lectures, expanded to a diameter of fourteen feet by the oxyhydrogen microscope. Fig. 4 shows the cohesion-figure of vaccine lymph; fig. 5, that of urine containing a small

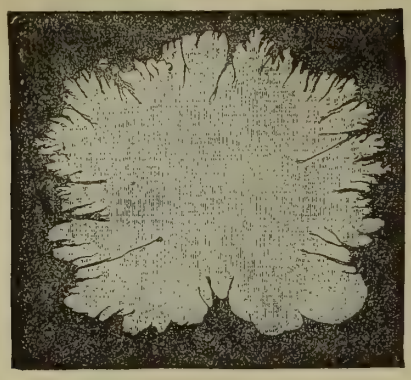


Fig. 4.

proportion of bile; fig. 6, oil of bitter almonds. In general appearance, the breath-cohesion figures bear a strong resemblance to vegetable forms, especially to the fronds of the *Desmidieæ*. In many of them, as in the *Desmidieæ*, a very distinct bilateral symmetry is apparent. Others again, simulate the forms of the larger *Algæ*. A great many are resplendent with the hues of the soap-

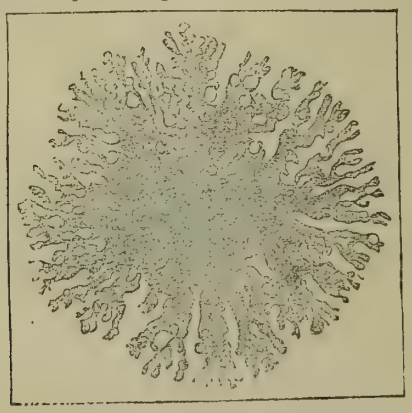


Fig. 5.

bubble, arranged in concentric bands and curves of excessive beauty; while others are veined throughout so as to resemble sections of agate. Dr. Wright considers that the breath-cohesion figure is the product of electric attractive force developed on the freshly-split mica, as a well-known consequence of cleavage.

4. The *Electric-cohesion Figures of Strethill Wright*.—These

Fig. 6.

figures were described by Dr. Wright to the Royal Scottish Society of Arts on April 11, 1864, and are produced by electrifying drops of various fluids placed on a clean plate of glass, vulcanite, mica, or other smooth non-conducting substance. By this method, an endless variety of beautiful dendritic figures are produced, differing not only with the fluid employed, but also with the slightest change in the character of the surface on which it is placed, and with the electricity, whether positive or negative, which is imparted to the drop. The electric-cohesion figures are produced in the following manner: A sheet of plate-glass is laid upon a plate of blackened metal, and in the center of the glass a drop of the fluid to be operated on is deposited with a clean glass rod. The metal plate and the drop are then connected with the opposite

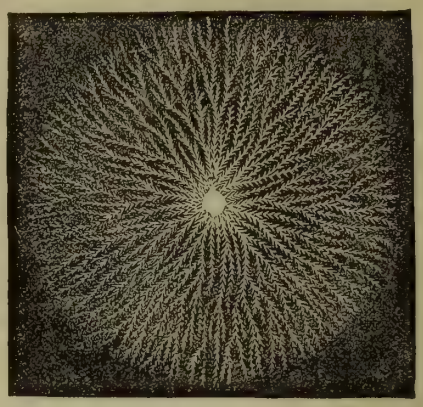


Fig. 7.

poles of an induction coil (capable of giving a spark of about half an inch in length) in full action, and immediately branches protrude from the drop, which slowly creep over the glass until they closely cover a circle of four or five inches. The accompanying figure (fig. 7) shows that produced on a surface of mica by the positive pole from a solution of cyanide of potassium. Sulphuric acid, and solutions of potash, deliquescent salts, and organic fluids, give the best figures; while nitric and muriatic acids and distilled water do not form figures under the electric influence.

COHOES, a city of New York, U.S.A., eight miles north of Albany. It has very extensive manufactures of cotton and hosiery. Pop. (1880) 19,417.

CO'HORT, in the ancient Roman armies, was a portion of a legion, consisting usually of 600 men. Generally, there were ten cohorts to a Legion (q. v.).

COHU'NE OIL, a fixed oil obtained from the kernel of the fruit of *Attalea Cohune*, a palm (see ATTALEA). The oil burns twice as long as the best cocoanut oil. The tree attains a height of about forty feet, but its leaves are thirty feet long.

COIF (Fr. *coiffe*, Ital. *cuffia*, a cap), a covering for the head in general, but more especially for the circular portion on the crown, which the Roman Catholic clergy are in the habit of shaving, and which is thence called the tonsure. The general meaning of the word is preserved in the verb to coif, coiffed, &c., and still more decidedly in the noun *coiffure*, which, so late as Addison's time, was English as well as French. Its special signification is now limited to the caul or cap worn by serjeants-at-law. It is now the only reminiscence of the tonsure amongst lawyers. On attaining the DEGREES OF THE C., or, what is the same thing, becoming a serjeant, a barrister retires from the Inn of Court by which he was called to the bar, and becomes a member of Serjeant's Inn. See SERJEANT-AT-LAW.

COIF, among the armor of the middle ages, was a sort of defensive hood, surmounted by a helmet, sometimes continuous with the hauberk, and sometimes separate.

COIMBATO'RE, a city in the province of Madras, capital of a district of the same name, situated near the left bank of the Noyel, a tributary of the Cauvery from the right, in lat. 11° N., long. 77° 1′ E. It occupies the south declivity of the Neilgherries, 1483 feet above the sea, near the point where those otherwise isolated mountains connect themselves with the Western Ghauts. Almost immediately to the south of the junction of the two chains, the remarkable depression of Palghatcheri traverses the Western Ghauts from east and west, so as to afford a free passage for both the monsoons—the north-east and the south-west—in their respective seasons. C., which contains about 2000 houses, from its proximity to this great gorge, is admirably ventilated during most of the year. This peculiarity, backed by the elevation, tends to promote the salubrity of the place, which, however, is seriously impaired by the brackish character of the wells. In the neighborhood is a very large tank. Pop. (1871) 35,310. C. is on the line of railway from Madras to the west coast.

COIMBATORE, a district in the province of Madras, in lat. 10° 14′—12° 19′ N., and long. 76° 36′—78° 16′ E., containing 7432 square miles and (1871) 1,763,274 inhabitants. Lying to the north-east of the state of Cochin, it is almost entirely beyond the Western Ghauts. Besides the capital above described, there are in the district the towns of Palaghat and Darrampoor

COI'MBRA, a city of Portugal, capital of the province of Beira, situated on the right bank of the river Mondego, here crossed by a stone bridge, 110 miles north-north-east of Lisbon. Built round a conical hill, rising abruptly from the river, and surrounded by olive-gardens and orange-groves, its appearance from a distance is as beautiful as it is picturesque. Interiorly, however, it is not so attractive, its streets being steep, narrow, and dirty. Great historical interest attaches to C., which appears to have been originally built by the Goths. From them it passed to the Moors, from whom it was finally conquered in 1064, by Fernando the Great, aided by the gallant Cid. On the erection of Portugal into a kingdom, in 1139, C. was made the capital, and continued so about two centuries and a half. Of the public buildings, the most noteworthy are the cathedral, the churches of San Francisco and San Salvador, the convents of Santa Cruz and Santa Clara, and a fine aqueduct of 21 arches, dating from the 16th century. The university of C., the only one in Portugal, was originally established in 1290, but permanently transferred here in 1537. It has 46 chairs, and about 1000 students, many of the latter being Brazilians. Attached to the university are museums, an observatory, a botanical garden, and a library of 60,000 volumes. C. has manufactures of linen, woollen, earthenware, and combs. Pop. 13,200.

COI'N, a town of Andalusia, Spain, about 21 miles west of Malaga. It is pleasantly situated on a declivity, with wide clean streets, and environed with fine public walks and gardens. It has manufactures of linen and woollen, soap, paper, &c., and in the vicinity, marble and jaspar are obtained. Pop. 8200.

COIN, COINING. See MINT, NUMISMATICS, MONEY, CURRENCY.

COI'NCIDENCE. If, when two geometrical figures are laid upon one another, the boundaries of the one fall everywhere exactly upon those of the other, the figures are said to *coincide*. Such figures are considered as identical; and this C. is taken by Euclid as the test of equality, or rather, as the definition of equality. It is not necessary, in geometry, actually to lay one figure upon the other; if we know the equality of certain parts, we can infer with certainty that the whole figures *would* coincide, if superimposed, and that the other parts are therefore equal too.

COINING, in Law. The privilege of C. money being an exclusive prerogative of the crown, the crime of counterfeiting the king's money, as it was called, was declared to be treason, both by the common law of England and by many statutes. In Scotland, there continued to be some differences in regard to this crime, even after the Union had extended the treason laws of England to that kingdom.

The whole of the legislation on this subject was at length repealed, and a general act passed for the whole kingdom (2 Will. IV. c. 34). By this statute it is enacted—1. That any one who shall fabricate a coin in imitation of a current *gold* or *silver* coin —or gild silver, or color any counterfeit gold or silver coin—or shall alter silver coin with intent to make it pass for gold coin—or copper coin, to make it pass for gold or silver coin, shall be punishable with transportation for life, or for a term not less than seven years, or with imprisonment for a term not exceeding four years. 2. That any one who shall impair, diminish, or lighten gold or silver coin, shall be punishable with transportation for seven years, or imprisonment for three years. 3. That any one who shall buy, sell, receive, pay, or put off counterfeit gold or silver coin for a lower value than its denomination, or shall import counterfeit gold or silver coin, knowing it to be such, shall be punishable with transportation for life, or seven years, or with imprisonment for not more than four years. 4. The uttering (q. v.) of base coin is punishable with imprisonment for a year. 5. By subsequent clauses, the possession of false money, with intent to utter the same; or of instruments for its fabrication; the conveying such instruments out of the Mint without authority; the fabrication of copper coin, and the altering of current coin so as to make it pass for coin of a higher denomination, are declared to be offences all of which are visited with punishments resembling those above mentioned.

In order to bring these offences within the limits of the statute, it is not necessary that the resemblance of the false to the true coin shall be very perfect; but if it be not such as to deceive a person of ordinary observation, the attempt to bring it into circulation is fraud, and not uttering.

COIR, or CO'COA-NUT FIBRE, the fibre of the husk of the cocoa-nut, much used for making ropes, mats, &c. The husks are steeped in water, in pits, for six months, or even for a year, and then beaten with a stick till the fibre readily separates. C. is now well known as one of the best materials for cables, on account of its lightness, elasticity, and strength. C. ropes are produced in great quantity in the Laccadive Islands. They are entirely made by the hand—chiefly by women—without the aid of machinery of any kind. The manufacture of cocoa-nut mats is now carried on to a considerable extent in Britain, the husks being imported for that purpose. This manufacture is one of the branches of industry in which children are employed in the industrial or ragged schools, and criminals in prisons.

COIX. See JOB'S TEARS.

COJUTEPE'C, a town of San Salvador, Central America. It is situated 15 miles to the east of the city of San Salvador, destroyed by earthquake in 1854, and was the seat of government from that year until 1858. C. has a population of 10,000.—At the distance of a few leagues, a lake of the same name measures 12 miles in length by 5 miles in average breath; and in windy weather it assumes a green hue, often casting on its shores vast quantities of dead fish.

COKE is the fuel generally used in locomotive engines, and is obtained by the heating of coal in ovens, or other arrangements where little air is admitted. Caking coal is most suitable for the manufacture of coke. The process is conducted either (1) in heaps or ridges, or (2) in ovens. The coking in heaps is called the Meiler method, and consists in placing the coal in round stacks, or in long ridges, occasionally to the length of 200 feet. During the building of the coal, wooden stakes are driven in, which are afterwards taken out, and lighted coal introduced at numerous places at the same time. As the coal becomes heated, much smoke and vapor are evolved, which mainly consist of tar, water, and coal-gas. Whenever the smoke ceases to be evolved, the process of coking is regarded as concluded, and the mound or ridge of red-hot cinder, or C., is covered over with fine coal-dust, which, excluding the air, extinguishes the combustion. At places where the operation of coking is conducted regularly on the large scale, it is customary to erect brick chimneys or columns, about the height of the proposed mound, and to build the coal round these, placing the larger masses in the centre, the smaller pieces outside, and ultimately covering the whole with fine coal or dross.

A more economical plan of preparing C. is to introduce the coal into fire-brick ovens. The coal is introduced by the top, and being lighted, a little air is admitted by openings in front. Whenever the coal ceases to evolve smoky vapor, every opening is closed, and the oven is allowed to cool down for 12 to 24 hours. A door in front is then opened, and the C. being raked out whilst still hot, water is thrown upon it, to stop the combustion. Small coal may be used if it belongs to the caking kind; and a little water sprinkled over it, causes the caking operation to proceed more completely. The proportion of C. obtained from coal in Great Britain ranges from 54 to 73 per cent., so that in round numbers the better class of coal for this purpose loses a fourth of its weight. At the same time, the coal increases in volume to the extent of about one-fourth.

C. is a hard, brittle, porous solid, with a color varying from iron-gray to blackish-gray, and more or less of a metallic lustre, and does not soil the fingers. It absorbs moisture from the air, sometimes to the extent of 30 per cent., and contains an amount of ash ranging from ½ up to 15 per cent. It gives off no smoke in burning, is of great value as a fuel, evolving a very large amount of heat, and is used, not only in locomotive and other furnaces, but also in the smelting of metallic ores.

COKE, SIR EDWARD, a distinguished English lawyer and judge, was born at Mileham, in Norfolk, on the 1st of February, 1551—1552. Educated at the free grammar-school of Norwich, and at Trinity College, Cambridge, he passed thence to Clifford's Inn, and subsequently to the Inner Temple, to study law, and was called to the bar in April, 1578. His great ability, legal learning, and the tact he exhibited in the conduct of his cases, secured him an immense practice on the very threshold of his career. In 1586, he was appointed recorder of Norwich; in 1592, recorder of London, a position he resigned the same year for the solicitor-generalship.

In the following year, he was elected member of parliament for the country of Norfolk, and was chosen Speaker of the House of Commons. In 1594, he was made attorney-general, an office he continued to hold until 1606, when he was appointed Chief-justice of the Common Pleas, the duties of which position he discharged in a manner that secured for him a great reputation. Upright and independent, with a high notion of the dignity and importance of his office, he did not, in an age of judicial sycophancy, hesitate to oppose any illegal encroachment by royalty. The court thought to win him over by making him, in 1613, Chief-justice of the King's Bench. But here he proved equally incorrigible, maintaining, among other things, that the king had no power to stay the proceedings in a court of justice, even when his craven-hearted colleagues begged the royal pedant's pardon on their knees for ever having entertained such an opinion. This was too much; C., in a few months (Nov. 1616), was relieved from his chief-justiceship; but in no long time after, the royal favor was in some measure again extended to him. His support of liberal measures in parliament, however, soon brought him into

trouble with the court-party, and in 1621—1622, he suffered seven months' imprisonment in the Tower. In the third parliament of Charles I. (1628), C. took an active part in framing the celebrated Bill of Rights, and it was in a great measure owing to his advocacy that the Lords were induced to agree to it. C. died 3d September 1633. He is now best known for his law treatise, *Coke upon Littleton, or the First Institute*, a work which is still the standard one on all questions of constitutional and municipal law in England. His other works are the *Second*, *Third*, and *Fourth Institutes*, *The Complete Copyholder*, and *Reading on Fines*; while his collection of law reports, which made an epoch in the history of law on their appearance, are still of great value for the profession.

COL (Fr. *neck*), in Geography, is a depression or pass in a mountain-range. In those parts of the Alps where the French language prevails, the passes are usually named cols—as the Col de Balme, the Col du Géant, &c.

COL' A'RCO, in Music, with the bow, in contradistinction to *pizzicato*.

CO'LA NUT, or KOLA NUT, the seed—not properly a nut—of *Cola acuminata* or *Sterculia acuminata*, a tree of the natural order *Sterculiaceæ*, a native of the tropical parts of the western coast of Africa, and cultivated in other tropical countries. There are two varieties of the tree—one with broad, and the other with narrow leaves. The natives of Guinea value the seeds very highly, believing that to take a portion of one of them before their meals, improves the flavor of whatever they may eat or drink. When sucked or chewed, cola nuts are generally asserted to render the flavor even of very putrid water agreeable; but see foot-note under TEA. They are said to possess properties analogous to Peruvian bark. They are of the size of a pigeon's egg, of a brownish color, and bitter taste. They are mentioned by almost all travelers in W. Africa.

CO'LBERG, or KOLBERG, a fortified seaport of Prussia, in the province of Pomerania, on the Persante, near its mouth in the Baltic, in lat. 54° 9′ N., long. 15° 34′ E. It stands on a hill, surrounded with swamps, which can be readily laid under water, and is chiefly remarkable for the protracted sieges which it has undergone. In 1102, Duke Boleslaus of Poland besieged it in vain. It endured long sieges in the Thirty Years' War, and in the Seven Years' War, and again in 1807, when it was most gallantly defended against the French. C. has manufactures of woollen, salt, and spirits; and salmon and lamprey fisheries. Pop. (1880) 16,027.

COLBERT, JEAN BAPTISTE, minister of finance to Louis XIV., was born at Rheims in 1619, and served his apprenticeship in a woollen-draper's shop. He afterwards went to Paris, where his talents introduced him to Mazarin, who soon employed him in most important affairs of state. On his death-bed, Mazarin, warmly recommended C. to the king, who, in 1661, appointed him controller-general of finances. C., who found the finances in a ruinous condition, immediately began his reforms. Fouquet, the superintendent under Mazarin, was found guilty of impoverishing the state by his maladministration, and imprisoned for life. C. next instituted a council of finance and a chamber of justice, to call to account the farmers of the state-revenues, who were forced to yield up all the resources of the crown of which they had fraudulently possessed themselves. The debts of the state C. also reduced by arbitrary composition. So complete and thorough was the change which C. effected, that in twenty years the annual revenue had risen to 116 million livres, of which 23 were spent in collection and administration; whereas, when the management of the finances was intrusted to him, the revenue amounted only to 84 million livres, and 52 millions were absorbed in its collection. C. did not rest satisfied with being a monetary reformer, but in various ways developed the industrial activity of the nation by state support. Commerce was extended, roads and canals—including that of Languedoc—were made. He organized anew the colonies in Canada, Martinique, and St. Domingo, and founded others at Cayenne and Madagascar. Made minister of marine in 1669, he found France with a few old rotten ships; three years later, she had a fleet of 60 ships of the line, and 40 frigates. C. improved the civil code, introduced a marine code of laws, as well as the so-called *Code Noir* for the colonies; and statistical tables of the population were first made out by his orders. While attending to material interests, he did not neglect the arts and sciences; all men of learning and genus found in C. a generous patron. The Academies of Inscriptions, Science, and Architecture were founded by him. In short, C. was the patron of industry, commerce, art, science, and literature—the founder of a new epoch in France. Notwithstanding the ingenuity of C., the unbounded extravagance of his master led him to raise money in ways objectionable to his reason, and to maintain war-taxes in time of peace.

He died 6th September 1683, bitterly disappointed, because his great services were but ill appreciated by the king. The people, enraged at the oppressive taxes, would have torn C.'s dead body in pieces, but for the intervention of the military, and his burial by night. Because he had brains without birth, he was vexed and persecuted, both in private and public life, by those who, having birth, lacked brains.

CO'LCHESTER, a parliamentary and municipal burgh and river port, in the north-east of Essex, on the south bank of the Colne, 12 miles from the sea, and 51 miles north-east of London. It stands on the sides and top of an eminence, and is well built. It has a quay for vessels of 150 tons at the suburb called Hythe. Its former manufactures of baize and silk have both declined. The important oyster fishery has suffered of late. Pop. (1881) 28,395. C. returns two members to parliament. In 1880, 1013 vessels of 55,709 tons entered, and 1025 of 56,504 cleared the port. C. is the British *Camulodunum* and the Roman *Colonia*. The town-walls, castle, and many churches and other buildings, consist of Roman brick. Great quantities of Roman remains have been found here, bushels of coins of many emperors, vases, urns, lamps, rings, bracelets, pavements, pateræ. C. was ravaged by the plague in 1348, 1360, and 1665. The ruins of the castle, built of cement-stone and Roman brick soon after the Conquest, have walls 11 to 30 feet thick. There are the ruins of an abbey, founded by Eudo the 'Dapifer,' and the remains of a priory.

COLCHESTER, CHARLES ABBOT, LORD, a distinguished legal and administrative reformer, was born at Abingdon, Berkshire, October 1757. He was educated at Westminster School, and Christ's Church College, Oxford, and afterwards studied for the bar. Returned to parliament in 1795, he in the very next year succeeded in effecting an improvement in the legislation regarding temporary and expiring laws; and it is due to his exertions that municipal bodies receive a copy of all new acts as as soon as they are printed. The country is mainly indebted to him for the royal record commission, the proceedings of which he for many years superintended. But the greatest service he rendered the country was in obtaining an act for taking the census of the population, the first enumeration under public authority in modern times. It was on his suggestion, too, that the Private Bill Office, which has done much to facilitate parliamentary business, was established. In 1802, he was elected Speaker of the House of Commons, the duties of which high and honorable office he continued to discharge with as much impartiality as distinction, until May 1817, when ill health compelled him to resign. He was then elevated to the peerage as Baron Colchester, with a pension of £4000 a year. He died May 29, 1829.

CO'LCHICUM, a genus of plants of the natural order *Melanthaceæ*. The species which are few in number, are stemless, with flowers half subterranean like the crocus, the limb of the perianth and part of tube only rising above ground. The flowers much resemble crocus-flowers, but are readily distinguished by having six instead of three stamens, and three styles instead of one. The seed-vessel does not remain to ripen under ground, as in the crocus, but after the flowering is over, rises in the form of three little follicles slightly adhering to each other, on a lengthened stalk. The only British species is *C. autumnale*, the MEADOW SAFFRON, sometimes also, but incorrectly named *Autumn Crocus*, which is plentiful in meadows and pastures in some parts of England, and of the continent of Europe. It scarcely occurs as a native plant in Scotland. The flowers are pale purple; they appear in autumn, unaccompanied by any leaves; the leaves, which are large and broadly lanceolate, appear in spring, when the stalk which bears the ripening fruit arises amongst them. The whole plant is very acrid and poisonous, chiefly owing to the presence of an alkaloid called *Colchicine* or *Colchicia*. Cattle are not unfrequently injured by it in pastures where it abounds. It is, however, not difficult to extirpate, the repeated pulling of it by the hand, as it appears above ground, being sufficient for this purpose; the roots soon become exhausted, and die. It is a valuable medicinal plant, and is much administered, in small doses, to allay the pain of gout and rheumatism. Repeated doses produce vomiting, purging, increase of the urinary secretion, and profuse perspiration. C. is generally supposed to have been the basis of the *Eau medicinale*, long a celebrated empiric remedy for gout. The parts chiefly used for medicinal purposes are the corm (popularly called the root) and the seeds. The

Meadow Saffron (*C. autumnale*):
a, capsule.

seeds are round, brown, rather larger than mustard-seed; and fatal accidents have occurred from their poisonous nature.—Other species of C. appear to possess similar properties The *hermodactyls* of the druggists' shops, which for many centuries have enjoyed an extensive celebrity for soothing pains in the joints, and are brought from the Levant, are believed to be the corms either of *C. variegatum* or *C. bulbocodioides;* the former of which is probably the C. of the ancients.—*C. autumnale* is not unfrequent in flower-borders, particularly a variety with double flowers.

CO'LCHIS, a province of ancient Asia, on the east coast of the Pontus Euxinus or Black Sea, situated north of Armenia, and south of the Caucasus. It now forms the Russian province of Imerethia, with the districts of Mingrelia and Guria. It was celebrated in the very earliest times as the native country of Medea (q. v.), and the goal of the Argonauts (q. v.), and was afterwards better known to the Greeks as the seat of some colonies of the Milesians. It was noted for its wine and fruits. The Colchians, according to Herodotus, were of Egyptian descent, being relics of the army of Sesostris, which he attempts to prove by various arguments. In the time of this historian they were subject to Persia; subsequently, they threw off their allegiance, and were ruled by kings of their own; the country then came under the dominion of Mithridates, king of Pontus; afterwards, there were princes of Colchis dependent on the Romans. The principal town was Dioscurias (called under the Romans Sebastopolis), and now Isgaur; the principal river the Phasis.

COLD is the term by which we signify a relative want of sensible heat. There are, therefore, no determinate boundaries between cold and heat, and it is a mere arbitrary distinction to call the degrees of the thermometer below the freezing-point, degrees of cold. When the atmosphere, or any substance which comes in contact with our body, contains less heat than the body, it absorbs heat from the body, and we call it cold. See HEAT.

The physiological action of C. on the animal organism requires a brief notice. All animals (the warm-blooded animals to the greatest extent) have a certain power of maintaining the heat of the body, in defiance of external cold, as has been shown in the article ANIMAL HEAT. This power is mainly due to a process analogous to combustion, in which carbon and hydrogen taken into the system in food, are made to unite with oxygen derived from the air by respiration. If the combustible materials are not duly furnished, or if the supply of oxygen be deficient (as in various deceased conditions), there must be a depression of temperature. Now, if the temperature of a bird or mammal (except in the case of hybernating animals) be lowered about 30° below its normal standard (which in birds ranges from 108° to 112°, and in mammals from 98° to 102°), the death of the animal is the result. The symptoms indicating that an animal or a man is suffering from a depression of the temperature of the body, are, retardation of the circulation of the blood, causing lividity of the skin, which is followed by pallor, in consequence of the blood being almost entirely driven from the surface through the contraction of the vessels; a peculiar torpor of the muscular and nervous systems at the same time manifests itself in an indisposition to make any effort or exertion, and in intense sleepiness. The respiratory movements become slower, for physiological reasons, which will be explained in the article RESPIRATION, and the loss of heat goes on, therefore, with increasing rapidity, till the fatal limit is reached, and death supervenes.

In hybernating animals (the marmot, dormouse, bat, &c.), the power of generating heat within their own bodies is very slight, their temperature following that of the external air, so that it may be brought down nearly to the freezing-point. At this low temperature, the vital actions are scarcely perceptible, but when the temperature is again raised, the vital activity returns. The respirations (in marmots) fall from 500 to 14 in the hour, and are performed without any apparent movement of the walls of the chest; the pulse sinks from 150 to 15 beats in the minute; and the animals can with difficulty be aroused from their torpor.—For additional matter bearing upon this subject, see the articles HIBERNATION, STARVATION, and DORMANT VITALITY.

C. is one of the most powerful depressing agents, and is a fruitful cause of disease, and even of death. Thus, it is observed, that whenever the temperature of the atmosphere is suddenly reduced, and particularly when it is reduced below the freezing-point, a considerable addition takes place to the mortality of the country at large. The effects of C. are, in ordinary circumstances, most apparent among the aged and the very young, and among those suffering from chronic disease; but when a very low temperature is long continued, even the healthy are sure to suffer, when impoverished so as not to have sufficient means of external warmth in their homes. The most direct effects of C. are in the production of what is commonly called frost-bite. The part so affected is deprived of circulation, and does not bleed on being wounded; it is marble-white or livid, and has lost all sensibility; and if the exposure is continued, or reaction is brought about too rapidly, it is apt to pass into gangrene. The extremities, especially the fingers and toes, and the tip of the nose, are the parts most liable to frost-bite. The remedy is exceedingly gradual restoration of the temperature, with gentle friction. In Russia, friction with snow is commonly resorted to, so as to secure against too rapid reaction. The effects of C. upon the general system are described by arctic voyagers, and a medical detail of them may be found in Baron Larrey's interesting account of Napoleon's disastrous campaign in Russia. The circulation is much depressed; diarrhœa and rheumatic pains are frequent; to the end, the general insensibility becomes impaired, and an irresistible tendency to lie down is experienced, with excessive drowsinesss. If this be not resisted, death is certain. The disease commonly termed 'a cold' has been already described under CATARRH.

COLD CREAM is the term applied to a preparation of fatty substances, which is used as a mild and cooling dressing for the skin. It may be prepared by heating gently four parts of olive-oil, and one part of white wax, till a uniform liquid mass is obtained, when a little color and scent may be added; the mixture is then allowed to cool, but must be stirred the whole time, so as to prevent the concretion and consequent separation of the wax. Another variety is prepared with the addition of hogs' lard, but the latter sometimes contains common salt, and is liable to become more or less rancid. C. C. softens the skin, and tends to promote the healing of wounds and of chapped hands.

COLD PIT, or COLD FRAME, in Gardening, is a simple contrivance for the preservation of half-hardy plants throughout the winter, and consists of a pit, seldom more than three feet in depth, and often not so much, walled or unwalled, and covered with a frame, either thatched or glazed.

CO'LDSTREAM, a border town in the south of Berwickshire, on the left bank of the Tweed, 15 miles south-west of Berwick, and on one of the main routes from Scotlond to England. It is irregularly built on a high site. Pop. (1881) 1616. Near C. is the famous ford of the Tweed, where the Scotch and English crossed in former times, before the erection of Berwick Bridge. By this ford Edward I. entered Scotland in 1296, and near it he met the Scottish nobles, to settle the dispute of Bruce and Baliol about the crown of Scotland. By this ford also the Scottish army entered England in 1640. Here General Monk, 1659—1660, raised the regiment still known as the Coldstream Guards (q. v.). Being a border town, C., like Gretna Green, was formerly celebrated for its clandestine marriages.

CO'LDSTREAM GUARDS, a regiment in the Foot Guards (q. v.) or Household Brigade, is the oldest corps in the British army except the 1st Foot. General Monk, in 1660, raised a corps at Coldstream, which was at first called 'Monk's Regiment;' but when parliament consented to give a brigade of guards to Charles II., this corps, under the name of C. G., was included in it.

CO'LEBROOKE, HENRY THOMAS, an eminent Orientalist, was born in 1765. He early went out to India, where, having served in various civil capacities under the East India Company, he was appointed Sanscrit professor in the newly founded college at Fort-William. Afterwards he became a judge at Mirzapore, and subsequently held the appointment of President of the Board of Revenue. During his residence in India, he had gained an extensive knowledge of the literature of the Vedas and their commentators, as well as of the writings of ancient Hindu grammarians, metaphysicians, and mathematicians. A sound critical judgment marks all his writings. He was a director of the Bengal Asiatic Society; and many of the most valuable essays in the *Asiatic Researches* were contributed by him. These, with other papers, were afterwards republished as *Miscellaneous Essays*, in 2 vols., 1837.

He also made translations from the Sanscrit works on Hindu law, algebra, arithmetic, and mensuration, which were important contributions to the history of mathematics. Among his other publications, are a Sanscrit dictionary and grammar, and treatises on the philosophy and sacred Books of the Hindus. He died in London (where he had for some years been president of the Asiatic Society), March 10, 1837.

COLENSO. See NATAL, BISHOP OF.

COLEO'PTERA, or COLEO'PTEROUS INSECTS (Gr. *koleos*, a sheath; and *pteron*, a wing), an order of insects which, with a little change of limits and characters, has been recognized since the days of Aristotle. The number of species enumerated by naturalists, and of which examples are gathered in museums, amounts to many thousands. The C. are sometimes collectively called *beetles*, although that name is generally more limited in its application, and many of them are known by other names, as weevils, lady-bugs, &c. The glowworm and the blistering-fly (*cantharis*) belong to this order.

The C. may be described as four-winged insects, which have the first pair of wings converted into crustaceous wing-cases (*elytra*), and the second pair of wings folded crosswise under these when

not in use. In some of them, the membraneous wings are wanting, or rudimentary in one or in both sexes, for there is often a difference of the sexes in this respect: more rarely, the elytra also are wanting in one sex, as in the female glowworm. The head and antennæ vary extremely in different C., the antennæ often differ considerably in the male and female of the same species. The first segment of the thorax (*prothorax*) is greatly larger than the other two. The abdomen is united to the thorax by its whole width, and not by a stalk. C. have two composite eyes, and no additional simple or stemmatic eyes (*ocelli*). The mouth is fitted for cutting, gnawing, tearing, or chewing, but never at all for suction, and exhibits in the greatest perfection of development the complicated structure which belongs to the mouth of all the *masticating* or *mandibulated* insects. See INSECTS. The annexed cut exhibits the parts of the mouth of a beetle. A, the upper side; B, the under side; C, the parts separated; *a*, *a*, antennæ; *e*, *e*, eyes; *l1*, upper lip (*labrum*); *l2*, under lip (*labium*); *m*, upper jaws (*mandibles*); *mx*, lower jaws (*maxillæ*); *mp*, maxillary palpi; *lp*, labial palpi; *c*, chin (*mentum*). The upper jaws or *mandibles* are hard and horny in most of the C., but comparatively soft in those which feed on vegetable juices, or on putrescent animal matter. The food of the C. is very various: some prey on other insects, worms, &c.; some feed on carrion; some on rotten wood—some on wood in a fresh and growing state—some on the roots of grasses and other plants—some on grain—some on leaves—some on flowers, &c. The food of their larvæ is equally various; but perfect insects and larvæ generally agree in being very voracious. Their digestive organs exhibit great diversities, according to the kinds of their food. The C. are among the insects which undergo complete transformations, and of which the pupa is inactive. The larva (grub) is generally like a short thick worm, with a scaly head and mouth, generally with six legs, of which, however, some species are destitute. Coleopterous insects are distributed over all parts of the world, but are most abundant within the tropics, where also they attain their greatest size and greatest brilliancy of colors.

The splendor of the metallic tints exhibited by many of the tropical species is not excelled in nature. The order, however, contains also many species of dull hue, and sufficiently unattractive appearance. Many of the C. are noted for the mischief which they do to crops, stores of provisions, timber and articles of furniture, trees, &c.; few of them are of any immediate use to man, the principal of these being the blistering-flies or cantharides.

COLERAI'NE, a parliamentary and municipal borough and seaport, in the county of Londonderry, Ireland. It is situated on the right bank of the Bann, four miles from the sea, and 47 miles north-north-west of Belfast, with which it is connected by railway. It consists of a central square and several diverging streets. C. has manufactures of fine linen, leather, paper, and soap, and a large salmon and eel fishery, which produces a rent of nearly £5000. The river Bann has recently been deepened, so that since 1873 larger vessels reach the quay at C. In 1880, 413 vessels, of 54,119 tons burden, entered the port, and 405, of 53,169 tons cleared. The revenue of the borough was in 1875, £2463; its debt, £13,109. The population, in 1871, was 6082, of whom 1329 were Roman Catholics, 2090 Protestant Episcopalians, and 2124 Presbyterians; (1881) 6694. C. returns one member to parliament.

CO'LERIDGE, SAMUEL TAYLOR, was born at Ottery St. Mary, in the county of Devon, of which parish his father was vicar, on the 21st October 1772. He was educated at Christ's Hospital, and numbered Charles Lamb among his school-fellows. His acquirements in Greek were extensive; and before his 15th year he plunged boldly into the sea of metaphysics, and swam therein until the day of his death. His industry, if desultory, was great; he read whole libraries. Full of book-knowledge, and without ambition or any practical bent, he was on the point of apprenticing himself to a shoemaker, when his head-master interfered, and rescued to literature and thought his most distinguished scholar. A copy of Mr. Bowles's sonnets falling into his hands at this time, attracted him towards poetry, in which for a time he found rest.

In 1791, C. entered Jesus College, Cambridge. At the university, he displayed no mathematical aptitude; his whole mind was given to classics, and he obtained a prize for a Greek ode. He did not take a degree. During the second year of his residence at the university, in a fit of despondency, occasioned by an unsuccessful love matter, he quitted Cambridge for London, and enlisted in the 15th Dragoons, under the assumed name of Comberbach. He never advanced beyond the awkward squad, and he enjoyed to the close the reputation of being the worst rider in the corps. One of the officers luckily discovered his classical acquirements, and, becoming acquainted with his real history, communicated with his friends, and C. effected his discharge.

On his release, the poet proceeded to Bristol, and making the acquaintance of certain poetic enthusiasts—Southey was of the number—whose minds were somewhat unsettled by the revolutionary movement in France, he formed a scheme to emigrate to the banks of the Susquehanna, in North America, and there, in pastoral peace and plenty, to bring back the golden age to man. C. found, to his surprise, that before Paradise could be thus regained, money was indispensable; and as of *that* both he and his friends were absolutely devoid, the dream of 'Pantisocracy' had to be given up. About this time, Joseph Cottle, bookseller in Bristol, paid C. 30 guineas for a volume of poems, and after many delays and the advancement of additional sums, the volume was published. In 1795, he married Miss Fricker—his friend Southey on the same day wedding another sister—and removed to Nether Stowey, a village of Somersetshire, in which neighborhood Wordsworth was then staying. It was here, surrounded with beautiful scenery, and in daily communication with the graver and intenser spirit of his friend, that C.'s principal poems were composed. Here he wrote the *Ancient Mariner*, and the first part of *Christabel*, the music of which took captive Scott and Byron, and which was imitated by both with no remarkable success. At this time, C. was in theology a Unitarian, and preached frequently to congregations of that religious sect. In 1798, he visited Germany, and studied at Göttingen. On his return to England, he went to reside at the Lakes, where Wordsworth and Southey then lived; and then it was that the nickname 'Lake poets' was applied by the opposition Reviews to the trio of friends—a nickname which has long sine ceased to be a reproach. In the year in which C. went to live in Cumberland, he published his noble translation of Schiller's *Wallenstein*. Having formed a connection with the *Morning Post*, he contributed to its columns articles on politics and literature. In 1804, he was at Malta, acting as secretary to the governor, Sir Alexander Ball, an appointment he held nearly a year and a half. In 1808, he delivered lectures on Poetry and the Fine Arts at the Royal Institution, London; and the year after, he commenced the publication of *The Friend*, a serial which did not find much commercial success. By this time, C. had written, if he had not published, his finest poems; and imprudent, without resolution, or strong sense of duty, and with a taste for German metaphysics and opium gradually taking possession of him, he left his wife and family with Southey, and went to London where he resided first with Mr. Basil Montague, and afterwards, and up till the period of his death, with Mr. Gillman at Highgate.

Here the rays of his splendid genius shone more and more fitfully through clouds of German metaphysics, and his mental and moral fibre became more and more debilitated by opium. He meditated many theological and philosophical works, which were to 'reduce all knowledge into harmony,' and many epic poems which were to be the glory of literature, and never progressed so far as the first sentence of either. With the subsidence of the writing faculty, the talking faculty developed itself in C. after a fashion unknown to ancient or modern times. At Mr. Gillman's house, he held weekly *conversazioni*, discoursing on every subject human and divine for hours; and thither, from all parts of the country, ardent young men came rushing to listen to the wisdom of the sage, in 'linked sweetness' exceedingly 'long drawn out.' Towards the close of his life, his religious opinions underwent a change and he became a believer in the Trinity. All intellectual pride had ceased, and the most childlike humility had taken its place. He seemed to be conscious that the greatest powers which for generations had been granted to any Englishman had been by him miserably wasted. He died at Highgate on the 25th July 1834, in his 62d year.

As an intellectual power, C. manifested himself in a great variety of ways. Compared with his contemporaries, he did not produce a very large amount of original poetry; and of what he did produce, a considerable portion is prosaic and artificial, but the residue is of the highest order of merit. No poet ever evolved such exquisite fantasies, or wove our language into such webs of spiritual melody. He is also to this day the greatest of philosophical critics. He was the first who gave a definite reason for the 'faith that is in us' regarding Shakspeare. He was the first representative of German literature and philosophy in England, and, till Carlyle came, the most potent. His own philosophical and theological writings, although, from constitutional indolence and irresolution, in some measure incomplete, are full of incidental merits, and have given a new impulse to English thought; yet it is right to mention here, that in his philosophical writings he has been convicted of the most extraordinary plagiarism. Professor Ferrier, in *Blackwood's Magazine*, April 1840, 'tracked the footsteps of this literary reaver through the Hercynian brakes' of Schelling's metaphysics (see also Hamilton Reid's, note), and has shown page after page to be pilfered from the German author.

It has been argued, however, by way of explanation and palliation, that C., who certainly did not lack original and penetrating powers as a metaphysician, was, from the sluggishness and irresolution of his mind, better fitted to conceive in outline, and then adapt from others in detail, than to elaborate for himself a system of thought, or even the fragment of a system; while his notoriously confused and dreamy memory would be apt to mingle and confound what was his own with what *might have been* such. As a thinker, C. exerted greater influence through conversation than through books; and to him we are largely indebted for what the young men who listened to him at Highgate, Sterling, Hare, Maurice, &c., have since produced. A complete edition of his *Poetical and Dramatic Works, with Memoir*, was issued in 1877.

COLERIDGE, HARTLEY, the eldest son of Samuel Taylor Coleridge, was born at Clevedon, near Bristol, on the 19th September 1796. In 1815, C. was entered a scholar of Merton College, Oxford. At the university, he became the slave of intemperate habits, and after obtaining the Oriel Fellowship in 1818, he was judged to have forfeited it by the authorities. He then went to London, wrote for the *London Magazine*, and published therein some sonnets of remarkable beauty. He afterwards repaired to Ambleside, to receive pupils, but the scheme failed. Near this little town, so associated with genius, he resided till his death in 1849. He inherited much of his father's genius, and all his weakness of will. He wrote good verses and better prose. As a writer of verse, he is best known by his sonnets, some of which are surpassed only by those of Milton and Wordsworth. His most important prose works are the *Worthies of Yorkshire and Lancashire*, and the *Life of Massinger*.

COLEROO'N, the largest and most northerly branch from the Cauvery, flows, after a course of 93 miles, into the Bay of Bengal between Trichinopoly on the north and Tanjore on the south, separating these two districts throughout its last 80 miles. This river is remarkable for two specimens of what is called an *anakatt*, being something of the nature of a weir or dam. For many years, the bed of the C. had been observed to be gradually deepening, while that of the Cauvery, below the point of divergence, was proportionally rising, so as to constantly lessen the supplies for the irrigation of Tanjore. In 1836, however, two anakatts, an upper and a lower, were constructed, to prevent the C. from being further deepened, and to throw more water into the Cauvery —works which were soon found to act so powerfully as to require the balance of an anakatt across the Cauvery itself.

CO'LESEED. See RAPE.

COLET, JOHN, Dean of St. Paul's, was born in London in 1466, and was educated at Oxford. He traveled in France and Italy, became acquainted with Erasmus, and the friend of his own famous countrymen Grocyn, Lilly, Linacre, and Latimer. Like them he studied the Greek language with zeal, and was one of the most distinguished of the Englishmen who promoted the 'New Learning.' He did much to awaken that spirit of inquiry which led to the Reformation, especially by lectures and the expounding of Scripture in his own cathedral, and was once denounced as a heretic. He is known as the founder of St. Paul's School (1512), and author of works on grammar, *Daily Devotions*, and the *Monition to a Godly Life*. He died 16th September 1519.

CO'LEWORT, a name given to some of the many cultivated varieties of *Brassica oleracea* (see BRASSICA), and applied, like the names Borecole and Kale, to varieties differing from the CABBAGE (q. v.) in their open heads of leaves, which are used as greens, especially in the winter-months. The same name is also given to cabbages cut for use before their leaves have fully closed into heads; and the common kinds of cabbage are often planted pretty closely together, in order to be used in this way, for a supply of greens in winter and spring. C., or *collet*, is said to have been originally a name of the wild plant from which all the cultivated varieties are derived.

COLIBRI. See HUMMING-BIRD.

CO'LIC (from *colon*—see ALIMENTARY CANAL), a name employed by the later Greek and the Roman physicians to denote diseases attended with severe pain and flatulent distension of the abdomen, without diarrhœa or looseness of the bowels. The disease (commonly called *gripes* or *belly-ache*) is now generally believed to be spasmodic in character, and to be dependent upon irregular contractions of the muscular coat of the intestines: its supposed particular connection with the colon, or large intestine, however, is not usually to be made out from the symptoms. Painful disorders of the bowels are very frequent in persons who are not attentive to the regular evacuations, especially when they are exposed to cold so as to experience chill or coldness of the feet, which will often suffice to bring on an attack of colic. The disease is usually attended with constipation (q. v.), and ceases when the regular action of the bowels is restored, although often in this case the operation of medicine is attended by continued pain for a time. Warm fomentations to the abdomen may be employed with advantage, sometimes medicated with opium, or decoction of poppy-heads; and great relief is commonly experienced from friction with a warm liniment, such as opodeldoc, or the soap and opium liniment. Warmth to the feet, and the recumbent posture, are also to be recommended. In very severe or protracted cases, opium may be taken internally. A good remedy in such cases is a full dose of castor-oil (one ounce or more for an adult), with 30 or 35 drops of laudanum, or of solution of Morphia. (Opiates should not be given to children except under medical advice, and in very reduced doses.) When C. resists such mild and simple remedies as the above—when it is accompanied by tenderness of the belly, or by hard swelling in any part of it—when constipation is obstinate, or vomiting is present—when there is feverishness, or tendency to exhaustion—or when there is reason to believe that it may depend on any other cause than the mere accumulation of the products of digestion in the intestines, no time should be lost in seeking the best medical assistance that can be procured; for C. is closely allied as a symptom to several very severe and dangerous diseases. One of these complicated forms of C. is termed Ileus (Gr. *eileon*, from the idea that its seat was in the small intestine (*ileum*). It is attended with obstruction of the bowels, often from mechanical twisting or involution of one part with another (hence termed *volvulus*). This is, of course, a disease of extreme danger. The only treatment that can be attempted without medical assistance, is the employment of large injections by the lower bowel, and opium in moderate and repeated doses (¼ grain to 1 grain, or 12 to 20 drops of laudanum) by the mouth, carefully watched, and discontinued if there is any sign of narcotism. See OPIUM. C. pains are also present in Peritonitis (q. v.), another most dangerous form of disease; and they form one marked symptom of the slow poisoning by Lead (q. v.), occasionally observed as the consequence of contamination of drinking water by leaden cisterns, &c. In this form, the treatment is different from that of simple C., and will be treated of under lead-poisoning.

COLIGNY, GASPARD DE, a French admiral and general of eminence, was born at Châtillon-sur-Loing, February 16, 1517. Introduced at court, he served under Francis I. in Italy, where he evinced great bravery. Under Henry II. he was made an infantry colonel, and in 1552, admiral of France. On the death of Henry II., C., who had previously adopted the reformed faith, became, with the Prince of Condé, one of the great leaders of the Huguenots. In this capacity he was remarkable alike for his prudence and his bravery. He had the intelligence to plan, as well as the daring to execute, and above all, a heart that was not to be cast down by disasters. At the battles of Dreux and Jarnac, in the former of which Condé was taken prisoner, and in the latter killed, C.'s skill saved the remains of the Protestant army. When peace was concluded in 1570, C. went to court, and was apparently well received by the king (Charles IX.); but the enmity of the Guises, by whom C. was unjustly accused of murdering the Duke of Guise at the siege of Orleans, was stirred up against him, and an attempt was made by one of their menials to assassinate him on the street, August 22, 1572. This attempt at individual murder was but a preliminary to the general massacre of Huguenots which took place two days afterwards, and in which C. was basely slaughtered, his body being afterwards exposed to the vile outrages of the mob.

COLI'MA, a name of various application in Mexico.—1. A volcano of the Cordilleras, with an elevation of about 12,000 feet, in lat. 20° N., and not far from the western coast of the republic. —2. A territory of the Confederation, with (1868) 63,333 inhabitants, extending about 100 miles along the coast; area about 3400 square miles.—3. The capital of the territory, comprising nearly the half of its population, stands in a fertile plain to the south-west side of the volcano.—4. A seaport on the Pacific, about 40 miles to the south-west of the capital.

CO'LIN. See VIRGINIAN QUAIL.

COLL, one of the Western Isles of Scotland, off the west coast of Mull, and forming part of Argyleshire, and 2½ miles north-east of Tiree Isle. It is 14 miles long from north-east to south-west, with an average breadth of 2½ miles. More than a third of it is cultivated, or in pasture. The isle is low and rocky, and is composed of gneiss, approaching to granite and hornblende slate. Pop. (1871) 723; (1881) 643, engaged in agriculture and fishing.

CO'LLAR-BEAM, STRAI'NING-BEAM, &c., the horizontal tie connecting a pair of rafters. Large roofs have two or more collar-beams.

CO'LLARING, the cylindrical part of the capital in the Doric and Tuscan orders. It is often termed the neck.

COLLA'TERAL (Lat. *collarteralis*). See CONSANGUINITY, SUCCESSION.

COLLATERAL SECURITY, is an additional and separate security for the performance of an obligation, or the implement of a bond or covenant.

COLLA'TION, in the Law of England, is where a portion advanced by the father to a son or daughter is brought into *hotch-pot* (q. v.) in order that the beneficiary may have an equal share of his personal estate at his death. C. in this sense corresponds to the C. amongst younger children in Scotland. But in that country there is also the C. between the heir and executor. If the heir accept the heritable (real) estate of the deceased, however small it may be, he has no claim to share in the executry or movable (personal) succession; but should he consider it for his interest, he may claim the share of the movable estate which falls to him as next of kin, on condition of his ceasing to be heir by collating the heritage with the executors. The privilege is not confined to a son, but extends also to brothers and other collaterals.

COLLATION TO A BENEFICE is the act of bestowing a benefice by the bishop or other ordinary, where he has right of patronage. When a bishop *confers*, or collates to a benefice, presentation and institution are both comprised in the act of collation.

CO'LLÉ, a town of Italy, situated on the Elsa, about 22 miles south-south-west of Florence. A steep ridge separates the town into two portions, the lower of which is chiefly occupied by manufactories. C. has a cathedral and castle, and its paper manufacture is extensive. Wine, olive-oil, and silk are produced in the environs. Pop. 5000.

CO'LLECT, a name of uncertain origin, given to certain short prayers in different church-liturgies. It is from the Latin *colligere*, as some ritualists think, because of the comprehensive brevity of such prayers, the matter of the epistle and gospel, e. g., being gathered up, or *collected*, into the C. for the day, as appears in the English Common Prayer Book. Others, with more probability, ascribe to the name an origin from an ancient practice of the chief minister collecting into a single brief prayer at the end of the service the previous devotions of the people; accordingly, one of the service books of the ancient Catholic Church was called *Collectarium*, as containing such prayers. Of the collects used in the liturgy of the Church of England, some are taken from the old Roman Missal, and were probably the composition of St. Jerome; others are of more ancient and primitive times, and a few were composed at the Reformation. They begin with commemorating some attribute of God, or pleading some infirmity or necessity of man, and end with a simple petition based thereupon. Hence it will be seen that the practical teaching of a church may to a great extent be seen in its collects. For every Sunday, there is a proper C., with corresponding epistle and gospel; and this C. stands for every day in the following week, except in the case of festivals and their eves or vigils, which have collects of their own.

COLLECTIONS AT CHURCHES. The collections which are still made at all churches in Scotland—either at the church-doors before the service, or in the church after it—were, till a comparatively recent period, the principal fund for the support of the poor. By a proclamation of the Privy Council of 29th August 1693, it was ordered that one-half of the sums so collected, and of dues received by the kirk-sessions, be paid over to the general fund for the support of the poor. The other half has generally been applied for the relief of sudden or temporary distress. By the Poor-law Act (8 and 9 Vict. c. 83), it is enacted (s. 54) that in all parishes in which it has been agreed that an assessment shall be levied for the relief of the poor, all moneys arising from the ordinary church collections shall in future belong to, and be at the disposal of, the kirk-session; provided, however, that they shall be applied to no purposes other than those to which they were, in whole or in part, legally applicable before the date of the act. A power is reserved to the heritors to examine the accounts of the kirk-session, and to inquire into the manner in which the collections are applied; and the session-clerk is enjoined to report annually as to the application of the moneys, to the Board of Supervision.

The collections made at dissenting meeting-houses, under which denomination Episcopal chapels are included, are entirely at the disposal of the congregations.

In England, there are no regular C. at churches as in Scotland. The alms collected in chapels, as well as in parish-churches, during the reading of the offertory, are declared by the rubic to be at the disposal of the incumbent and churchwardens of the parish, and not of the minister or proprietor of the chapel. If the minister and churchwardens disagree as to the distribution of the alms, they shall be disposed of as the ordinary shall appoint. See OFFERTORY.

CO'LLEGE (Lat. *collegium*, a collection or assemblage). In its Roman signification, a C. signified any association of persons for a specific purpose. In many respects it was synonymous with *corpus*, a body or collection of members, a corporation—with *universitas*, a whole as contrasted with its parts—and with *societas*, a company or partnership, as opposed to all the members of which it was composed. A Roman C. had a common chest, and it could sue and be sued in the name of its manager (actor or syndicus), just like an incorporation with us. It required also to be incorporated by some sort of public authority, springing either from the senate or the emperor. A C. could not consist of fewer than three persons, according to the well-known maxim, 'three make a college' (Dig. 50, tit. 16, l. 85). Some of these colleges were for purely mercantile purposes, but there were others which had religious objects in view, such as the *Collegia Pontificum, Augurum*, &c., and which thus made a sort of approach to a C. in the modern sense. With us, a C. is an incorporation, company, or society of persons, joined together generally for literary or scientific purposes, and frequently possessing peculiar or exclusive privileges. See PHYSICIANS, COLLEGE OF; SURGEONS, COLLEGE OF. Very often in England a C. is an endowed institution connected with a university, having for its object the promotion of learning.

In this relation, a C. is a subcorporation, i. e. a member of the body known as the University. The constitution of a C. in this, its most general and proper sense, depends wholly on the will of the founder, and on the regulations which may be imposed by the visitor (q. v.) whom he has appointed. For a more detailed account of C. in this sense, see UNIVERSITY, OXFORD, CAMBRIDGE, PARIS, EDINBURGH, &c. In Scotland and in America, the distinction between the C. as the member, and the university as the body, has been lost sight of; and we consequently hear of the one and the other indiscriminately granting degrees, a function which in the English and in the original European view of the matter belonged exclusively to the university. Where there is but one C. in a university, as is the case in all universities of Scotland, the two bodies are of course identical, though the functions which they perform are different. In Germany, there are no colleges in the English sense; and though the universities in that country perform precisely the same functions as in Scotland, the verbal confusion between the C. and the university is avoided by the latter performing the functions of both in its own name, as two separate parts of its proper duties. In France, C. has a meaning totally different from that which we attach to it: it is a school, corresponding, however, more to the gymnasium (q. v) of Germany than to the grammar-school of this country. All the colleges are placed under the university of France, to which the centralizing tendencies of that country have given a meaning which also differs widely from that which the term University bears in England. See UNIVERSITY OF FRANCE.

COLLEGE DE FRANCE, originally a *Collége de Trois Langues* merely, founded by Francis I. in 1530, is now a very important educational institution giving instruction over a very wide field of literature, history and science. It is independent of the University of France (q. v.), is directly under the Minister of Public Instruction, and is supported by the government. As in the Sorbonne (q. v.), the lectures are gratuitous; and for the most part are designed to attract authors older than ordinary university students. The college comprises two faculties, one literary, one scientific; and each has about 20 professors. Amongst the professors are some of the most distinguished scholars and scientists in France, such as M. Renan, M. Laboulaye, M. Gaston de Paris, in the literary department; and M. Broun-Séquard in the science division. Amongst the subjects discussed are political economy, Assyrian and Egyptian archæology, Arabic, Slavonic literature, French literature; physiology, anatomy, and embryology.

COLLEGE OF ARMS. See HERALDS' COLLEGE.

COLLEGE OF JUSTICE, in Scotland, which was formed on the model of the Parliament of Paris (q. v.), consists of the supreme civil court (see COURT OF SESSION), with all its members and officers. The title occurs in the statute 1537, c. 36; and in 1540, c. 93, the judges are styled senators. The present members of the C. of J. are, in addition to the judges, advocates (Anglicè, barristers), clerks of session, clerks of the bills, &c.; writers to the signet, solicitors before the supreme courts (not solicitors at law), deputy-clerks and their substitutes, &c.; clerks of Exchequer, directors of Chancery, and their depute and clerks, the writer to the privy seal and his depute, clerks to the general registers of sasines and hornings, macers of the Court of Session, the keeper of the minute-book, the keeper of the rolls of the Inner and Outer House, one clerk to each judge, one clerk to each advocate, the extractors in the Register House, and the keeper of the Advocates' Library. In addition to the above, the keeper of the judicial records, the assistants to the principal clerks of session the auditor of the Court of Session, and the collector of the fee fund, are members *ex officio* by 1 and 2 Geo. IV.

COLLEGIGATE CHURCHES—so called from having a college or chapter, consisting of a dean and canons, attached to them—differ from cathedrals in that the see of the bishop is at the latter. The service is or should be the same in both. They are under the jurisdiction of the bishop of the diocese in which they are situated, and he exercises visitorial powers over them. Those remaining in England are Westminster, Windsor, Wolverhampton, Heytesbury, Southwell, Middleham; also Brecon in Wales, and Galway

in Ireland. Ripon and Manchester have been constituted the cathedrals of the new dioceses. Some churches called collegiate (as Beverley) have no chapters.

CO'LLIER, JEREMY, a celebrated nonjuring clergyman, was born in Cambridgeshire on the 23d September 1650. He went to Cambridge in 1669, and took his degree of M.A. in 1676. At the revolution of 1688, he first plunged into the stormy waters of controversy, his foeman being Burnet, afterwards Bishop of Salisbury. For a publication of his at this time, entitled *The Desertion Discussed*, which gave offence to the government of William, he was sent to Newgate, where he remained several months. On his release he rushed anew into the wars of party, and distinguished himself therein by the publication of several controversial works. Suspected of being a partizan of the Stuarts, he was again arrested in 1692, and imprisoned for a short time in the King's Bench. From this period, his life was a scene of perpetual literary strife, government being the principal object of his attack. He died in London, 26th April 1726. C. wrote many books, including the *Ecclesiastical History of Great Britain;* but the work by which he is best known, is his *Short View of the Immorality and Profaneness of the English Stage*, published in 1698. Congreve and Farquhar came to the rescue of their craft, to the great delight of C., who was never happier than when wielding the satirical whip, and who had no objection to encounter a couple of opponents at a time.

The combat lasted for ten years, and at the close, C. remained master of the field. His strictures on the stage were needed at the time, and his writings materially aided its subsequent purification.

COLLIER, J. PAYNE, a well-known Shakspearian critic and commentator, was born in London in 1789. He became a parliamentary reporter on the staff of the *Morning Chronicle*, and afterwards edited the *Evening Chronicle*. It was in the pages of the former that his first essays in the field of Elizabethan literature appeared. In 1820, he published *The Poetical Decameron;* from 1825 to 1827, a new edition of Dodsley's *Old Plays;* and in 1831, his best work, a *History of English Dramatic Poetry to the Time of Shakspeare, and Annals of the Stage to the Restoration.* This opened up to him two influential sources of information, the libraries of Lord Francis Egerton and the Duke of Devonshire, the latter appointing him his librarian. His next work was a *Bibliographical and Critical Catalogue.* From 1835 to 1839, he published *New Facts regarding the Life and Works of Shakspeare;* followed by an edition of Shakspeare. His next work was the famous volume, *Notes and Emendations to the Text of Shakspeare's Plays, from early manuscript Corrections in a Copy of the Folio of* 1632, *in the Possession of J. P. Collier.* This publication excited great commotion in the literary world; opinion was divided, and the *Emendations* were furiously applauded or furiously assailed. It was in time generally admitted that many of them were just corrections of typographical errors; that many, in cases where the author's meaning was doubtful, displayed very remarkable ingenuity; but that others darkened texts which, save to a commentator, were transparent enough. Later, it was even alleged by some that C. had himself written the marginal emendations in a feigned hand. In 1865 appeared his *Bibliographical Account of Rare Books.* In 1866 he commenced a series of reprints of our early poets and phampleteers. His later works include his *Book of Roxburghe Ballads, Shakspeare's Library, Extracts from the Registers of the Stationers Company, Memoirs of Actors of Plays of Shakspeare*, and *Autobiographical Recollections.* He died at Maidenhead, September 17, 1883.

COLLI'N, or KOLI'N, a town of Bohemia, on the left bank of the Elbe, about 39 miles east-south-east of Prague. It has manufactures of sugar, manure, and oil. Pop. 11,332. In the vicinity was fought, in 1757, the famous battle in which Frederick the Great was defeated by the allied Austrian and Saxon armies under Marshal Daun.

CO'LLINE is a term applied to common gelatine, or Glue (q. v.).

CO'LLINGWOOD, CUTHBERT, ADMIRAL LORD, was born at Newcastle-upon-Tyne, 26th September 1750. Sent to sea as a midshipman at the age of eleven, his life thenceforth, with the exception of some half-dozen years, was spent wholly on board ship. He was an intimate friend of Nelson, whom he followed up the ladder of promotion step by step, until Nelson's death left the topmast round vacant for himself. Among the great naval victories in which C. bore a prominent part, were those of Lord Howe off Brest in June 1794; of Lord Jervis off Cape St. Vincent in 1797; and of Trafalgar in 1805, where he held the second command. In the last-named engagement, his ship was the first to break through the line of the combined French and Spanish fleets; and after Nelson had received his death-wound, he assumed the chief direction, and completed gloriously the triumph which had been so daringly commenced. A peerage was his reward for his gallant conduct in this battle. After several years' able service in the Mediterranean, C. died at sea, March 7, 1810. He was a thorough seaman, unsurpassed by any officer in the navy, at once brave and cool, firm and mild in command.

COLLINGWOOD, a town of Ontario, Canada, on the south shore of the branch of Lake Huron, called Georgian Bay. C. is an important railway terminus, connecting the railways with the lake steamers. Pop. (1871) 2829; (1881) about 5000.

COLLINS, ANTHONY, an able free-thinking writer on religious questions, was born in 1676, at Heston, near Hounslow, in Middlesex. He studied at Eton, and afterwards at King's College, Cambridge. In 1707, he published his *Essay concerning the Use of Human Reason;* and in 1709, his *Priestcraft in Perfection*, &c., which fluttered the churchmen of that time exceedingly. The controversy excited by this last work induced C. to write his *Historical and Critical Essay on the Thirty-nine Articles.* His next work was a *Vindication of the Divine Attributes*, in reply to the Archbishop of Dublin, who asserted the compatibility of Divine Predestination and Human Freedom. C. was a philosophical Necessitarian, and afterwards advocated his opinions more fully in his *Philosophical Inquiry concerning Liberty and Necessity* (1715). In 1711, he went to Holland, where he made the friendship of LeClerc and other eminent *literati.* On his return to England, he published his *Discourse on Free-thinking*, the best known, and the most important of all his works. In 1718, he was made treasurer for the county of Essex; and in 1724 appeared his *Grounds and Reasons of the Christian Religion*, which gave occasion to no less than thirty-five replies. Two years later, he defended himself in his *Scheme of Literal Prophecy;* and in 1727, published his last work, a reply to Dr. Rogers's *Eight Sermons on the Necessity of Revelation and the Truth of Christianity.* C. died December 1729. He was a friend and correspondent of Locke, who declared that 'C. had as much love of the truth for the truth's sake, as ever he had met with in anybody.' His character for integrity and benevolence stood very high.

COLLINS, WILLIAM, a poet of considerable merit and reputation, was born December 25, 1721, at Chichester, where his father was a hatter. He received his education at Winchester College and Oxford. In 1742, he published a small volume containing the *Oriental Eclogues*, and the *Epistle to Sir Thomas Hanmer.* These are not so characteristic of his genius as his later writings. Although the publication was not attended with success, he resolved upon a literary career, and with this object went to London in 1744. Here, from time to time, he published other poems, chiefly consisting of odes; but misfortunes, occasioned chiefly by his own indolence and irresolution, finally rendered him a prey to melancholy, which at times deepened into insanity. This has imparted an interest to his memory which his works alone might not have been able to excite. He died at Chichester in 1756. The poems which he has left are comparatively few; but they entitle him to no mean rank among the poets of the 18th century. He was essentially a lyrical poet; and it is upon his odes that his reputation is principally founded. All his best qualities are exhibited in the well-known ode on *The Passions*—a poem which, at the time it was written, was undoubtedly one of the finest odes in the language. The personification of the passions is true and striking, and the variation of the measure is well adapted to the various emotions to be expressed. Among his other pieces may be mentioned the odes *To Liberty, To Mercy, To Evening, Ode written in* 1746, and the first part of the ode *To Fear.*

COLLINS, WILLIAM, R.A., a distinguished English artist, was born in Great Tichfield Street, London, September 18, 1787. C. early displayed a decided taste for art. In 1807 he entered the Royal Academy as a student, and in the same year he exhibited two pictures at the Academy's exhibition. At first, necessity obliged him to devote himself to portraits, but money coming in rapidly, he was soon able to give his genius its bent; and his children swinging on gates, his children gazing in delighted wonderment on the newly discovered nest, his coast-scenes, his groups of prawn-fishers, his shrimpers on the ebbed sea-beach, drew admiring eyes as they hung on the Academy walls, and brought remunerative prices. C. was elected R.A. in 1820. In 1836 he visited Italy, and remained there nearly two years, studying the great masters, and sketching monks and peasants, and groups of bronzed children. In 1839 he sent to the Academy several Italian pictures, which were greatly admired. His attempts in another direction 'Our Saviour with the Doctors in the Temple' (exhibited in 1840), and 'The Two Disciples at Emmaus' (1841)—were not particularly successful, and he wisely fell back on his green fields, his sea-beaches, his rustics, and his children at their games. His death took place in London on the 17th February 1847.

COLLINS, WILLIAM WILKIE, son of the preceding, was born in 1825, and was educated for the bar. He is widely known as a novelist and miscellaneous writer. He is a great master of mystery, and can so hide a secret in a wrappage of circumstance, that, before it is discovered, the whole tissue must be unrolled. Sev-

eral of his works are models of construction; and in working out his plots, he diverges neither to left nor right, indulging neither in irrelevant pathos nor description. His principal works are *Antonina, Basil, Hide and Seek, After Dark, The Dead Secret*, and *The Woman in White* (1860), *No Name, My Miscellanies, Armadale, The Moonstone, Man and Wife* (1870), *The New Magdalen* (1873), *The Law and the Lady* (1875), *A Rogue's Life* (1879), *Jezebel's Daughter* (1880), and *Black Robe* (1881).

COLLISIONS OF VESSELS. To prevent vessels running against one another in passing, there is a 'Rule of the road' (q. v.) at sea as well as on land. The Trinity House lays down regulations which, though not having the force of law, are recognized by the Admiralty, and govern the decisions in cases of collision. It is at night that the danger of collision is greatest; and hence the necessity for a well-arranged system of lights and other precautions. Of 3575 casualties of all kinds on and near the coasts of the United Kingdom in 1880—1881, 713 were due to collisions; of these, 69 resulted in total loss. The average of the results of collisons for the 10 years 1865—1875 gives: total loss, $81\frac{2}{5}$; partial damage, $345\frac{3}{10}$.

COLLO'DION (Gr. *kollao*, to stick). This substance, on its first introduction, employed in surgery as a preservative of wounds, &c., from contact of air, by means of the tenacious and transparent film which it leaves on evaporation—and now, also, in a slightly modified form, remarkable as the basis of a highly sensitive process for taking pictures by the agency of light—may be defined as a solution of *Pyroxyline* in a mixture of alcohol and ether, to which is added for photographic operations, a small quantity of some souble iodide, bromide, or chloride.

The first step in making C. is the preparation of pyroxyline: Take 10 fluid ounces of sulphuric acid, specific gravity 1·84, in a dish; add 12 fluid drachms of water, and 10 fluid ounces of nitric acid, specific gravity 1·45; and raise the temperature to 140° by immersing the dish in boiling water. One ounce of pure linen or paper should now be immersed in small pieces at a time, keeping the mixture in motion until the liquid is nearly absorbed by the linen or paper.

The action having continued for about ten minutes, the contents of the dish should be plunged into a vessel containing a large quantity of water, which should be speedily poured off and repeatedly changed, until the linen or paper is so thoroughly washed as not to give the slighest indication of acid to the most delicate test-paper, after which it should be slowly dried at a low temperature, and preserved in a glass bottle for use..

One hundred and four grains of the pyroxyline thus prepared are dissolved in a mixture of 16 oz. of pure sulphuric ether, and 2 oz. alcohol, specific gravity ·840; and to this mixture are added 48 grains iodide of cadmium, 30 grains iodide of potassium, and 25 grains bromide of cadmium, dissolved in 4 oz. of alcohol, of specific gravity ·840 C. thus prepared should, after becoming clear by subsidation, yield a rich creamy film of iodide and bromide of silver on immersion in the nitrate bath.

The foregoing formula yields a C. very suitable for taking what are termed *negative* impressions in the camera; but when it is desired to take *positive* pictures, cotton wool should be substituted for linen or paper in the preparation of the pyroxyline, and the iodizing solution should contain iodide of ammonium instead of iodide of potassium. It is important also that the alcohol employed should be free from organic impurities in the shape of fusel and grain oils, small traces of which mar the purity of the high lights in a positive, though their presence is comparatively harmless in a negative photograph. For surgical purposes a *flexible* C. is used, composed of C., combined with certain proportions of Canada balsam and castor-oil. See also CELLULOID and GUN COTTON.

COLLODIONIZED PAPER PROCESS. Paper being substituted for glass in this process, as a basis upon which to support the film, a great increase in portability is arrived at, as the sensitive sheets may be carried in a portfolio, and employed in the same manner as dry collodion plates. There are difficulties, however, in the way of its successful practice, which have prevented it from becoming as popular as it deserves to be. The following is a brief summary of the manipulations. Mr. Corbin, the inventor of the process, ascertained that a peculiar collodion was requisite, the formula of which is as follows: ether, 650 parts; alcohol, 350 parts; pyroxyline, 15 parts; iodine, 1¼ part. The collodion so prepared is poured on the glass in the usual way, and sensitized in a bath containing only one per cent. of nitrate silver, and a half per cent. of nitric acid. The plate having remained in this bath about two minutes, is withdrawn, and freely washed with water; it is then immersed in a solution of one per cent. of iodide of potassium, to insure the complete decomposition of the whole of the free nitrate of silver not removed by the washing. A piece of negative paper is now coated with a solution of gelatine, containing 6 parts of gelatine to 100 parts water; the dimensions of the paper should be rather less than the glass, and the gelatinized side is brought into contact with the collodion film in a dish of water, any intervening water being expelled by passing a glass rod lightly over it. The edges of the collodion film which project beyond the paper are folded back on it, and the film and paper removed together.

The now collodionized paper is laid, film uppermost, on a glass plate, coated with a preservative solution, composed of equal parts of albumen and honey, diluted sufficiently to enable it to flow freely over the paper. The film is lastly sensitized in a solution of nitrate of silver, 5 parts; glacial acetic acid, 5 parts; water, 100 parts; it is then freely washed as before in water, and hung up to dry. As it is apt to wrinkle in drying, it should be attached by all four corners to two lines, running one under the other.

COLLOID is a name applied by Graham to a yellowish, transparent, viscid matter of gelatinous appearance. Starch, gum, albumen, and gelatine are examples of colloids; and the name is used in contradistinction to *crystalloids*.

COLLOT D'HERBOIS, JEAN MARIE, one of those men who gained an infamous notoriety in connection with the first French Revolution, was born in Paris in 1750. Originally a provincial actor, the revolutionary movement attracted him to Paris, where his impudence, his loud voice, and his *Almanach du Père Gérard*, which obtained the prize of the Jacobin Club, secured for him public recognition, and he was elected to the National Convention as one of the deputies for Paris. His general ferocity marked him out as a fit person for the presidency of the Convention, to which he was appointed June 13, 1793, and as a member of the murderous Committee of Public Safety. Sent by Robespierre to Lyon in November 1793, C. took bloody revenge on the inhabitants for having once hissed him off the stage in the theater. Not less than 1600 persons were destroyed by the guillotine and by discharges of grape-shot. An attempt made to assassinate C. (May 23, 1794) served only to increase his popularity, and thus excited the envy of Robespierre, who determined to destroy so formidable a rival. C. therefore took a prominent part in the overthrow of Robespierre and his party in July 1794, but the reaction following this event proved fatal to himself. C. was expelled from the Convention, and in March 1795 was sentenced to deportation to Cayenne, where he caught a fever, and died in great agony, January 8, 1796. Besides revolutionary pamphlets, C. wrote a great number of dramas, now utterly forgotten.

COLLU'SION, an agreement between two or more persons to defraud. The law abhors C., and consequently it has the effect of voiding every transaction which is founded upon it. Arrangements between bankrupts and creditors whom they wish to favor, on the eve of bankruptcy, are amongst the most frequent instances of C., and one of the leading objects of all systems of bankrupt law has been to defeat them. In England, C. is spoken of as 'a deceitful agreement or contract between two or more persons, for the one to bring an action against the other, to some evil purpose, as to defraud a third person of his right.'—*Tomlin's Dictionary*. But there is no limit to the circumstances in which the occurrence of C. is conceivable in any country.

CO'LMAN, GEORGE, commonly called 'the Elder,' a dramatic author and theatrical manager of last century, was born at Florence about 1733. In 1760, his first dramatic piece, entitled *Polly Honeycomb*, was produced at Drury Lane with great success. Next year, he gave to the world his comedy of *The Jealous Wife*, and in conjunction with Mr. Garrick, he in 1766 wrote *The Clandestine Marriage*. In 1761, he became one of the purchasers of Covent Garden Theater, and held the office of acting manager for seven years, after which period he sold his share. In 1777, he purchased the theater in the Haymarket from Mr. Foote. In 1785, he was attacked by palsy, and never recovered; he died August 14, 1794. C. was an industrious author; besides poetry and translations, he wrote and adapted upwards of thirty dramatic pieces.

COLMAN, GEORGE, 'the Younger,' son of the preceding, was born October 21, 1762. His bent lay in the same direction as his father's, during whose illness he acted as manager of the Haymarket Theater; and on the death of the elder Colman, George III. transferred the patent to his son. C. held, for a considerable time, the office of examiner of plays. In industry, he rivalled his father, and he received large sums for his dramatic writings, some of which continue in possession of the stage. He was twice married, and died on the 26th October 1826. His last literary work was *Memoirs*, published in two volumes.

COLMAR, a city ceded to France in 1697, and repossessed by Germany since 1870, the capital of Upper Alsace, stands on a plain near the Voges, 41 miles N.N.E. of Strasburg. A stream of water from the Lauch and Fecht, at the confluence of which the town stands, flows through and keeps the streets clean. Among the principal buildings of C. are the cathedral, the Dominican church, the college, court-house, and town-house. C. is a busy place—one of the chief seats of the cotton manufacture in Alsace. Water, being abundant, is the principal motive-power in driving

the machinery, but steam is also employed to a considerable extent. Other manufactures are paper, leather, ribbons, and hosiery. C. is an old place, having been raised to the rank of a city in 1220. About the end of that century, it was made a free town, and rapidly became one of the most prosperous in Upper Alsace. Fortified in 1552, its fortifications were razed in 1673 by Louis XIV. Pleasant boulevards now occupy their place. Pop. (1875) 23,778.

COLNE, a town in the east of Lancashire, on a high ridge near the source of the Calder, a western branch of the Ribble, 32 miles north-east of Manchester, at the junction of the Lancashire and Yorkshire and Midland Railways. It has manufactures of cotton calicoes, and mousselines-de-laine. Coal, slate, and lime abound in the vicinity. Pop. (1871) 7335. C. is an ancient place, by some supposed to be the *Colunio* of the Romans Many Roman coins have been found here. As early as the beginning of the 14th c., it was the seat of woollen manufactures.

CO'LOCYNTH (Gr. *kolokynthis*), a well-known medicine, much used as a purgative, is the dried and powdered pulp of the *Colocynth Gourd, Coloquintida, Bitter Apple,* or *Bitter Cucumber,* a globose fruit about the size of an orange, of a uniform yellow color, with a smooth, thin, solid rind. The plant which produces it, *Cucumis* (or *Citrullus*) *Colocynthis*, is nearly allied to the Cucumber (q. v.). It is common in Asia, Africa, and Spain, which last country supplies no small part of the C. of commerce. The fruit is gathered when it begins to turn yellow, peeled, and dried quickly either in a stove or in the sun. It is chiefly in the form of a dried extract that it is used in medicine. It owes its properties to a bitter principle called *Colocynthine,* which is more or less abundantly present in the fruits of many of the gourd-family. It is a curious fact, but to which there are many analogous, that the seeds of the C. plant produced in the midst of its medicinal pulp, are perfectly bland, and they even form an important article of food in the north of Africa.—The name False C. is sometimes given to the Orange Gourd (*Cucurbita aurantia*), sometimes cultivated as an ornamental plant in our gardens, on account of its globose, deep-orange fruit. The pulp of the fruit possesses the properties of C., but in a milder degree.

C. is generally administered in the form of pills, in which the extract is associated with aloes, scanmony, and in some cases with calomel or with extract of hyoscyamus. In small doses, the C. acts as a safe and useful purgative; and when accompanied by hyoscyamus, the latter prevents much of the pain and griping which are attendant on the use of C. by itself. In large doses, C. is a poison.

COLO'CZA, or KALOCSA, a town of Hungary, situated on the left bank of the Danube, 68 miles south of Pesth. It has an archiepiscopal palace or castle, and a cathedral. Pop. (1880) 15,789, who are chiefly engaged in the fisheries on the Danube, and in the breeding of cattle. There is a steam packet station at Colocza.

COLO'GNE (Ger. *Köln;* the *Colonia Agrippina* of the Romans), a city and free port on the left bank of the Rhine, in lat. 50° 56′ N., long. 6° 58′ E. Formerly an independent city of the German empire, it is now the capital of Rhenish Prussia. C. is a fortress of the first rank, forming a semi-circle, with the Rhine as its chord, and the town of Deutz on the opposite bank as a tête-du-pont. It is connected with this suburb by a bridge of boats, and a a fine iron bridge 1362 feet in length, for railway and carriage traffic. Pop. (1871) 129,233, only 16,746 of whom were Protestants; (1880) 144,751. The streets are mostly narrow and crooked. The public buildings are numerous, including a number of educational and of charitable institutions. The church of St. Ursula is noted as the place where are preserved the bones of 11,000 virgins companions of St. Ursula (q. v.), who, according to the legend, were slaughtered at C. by the Huns, because they refused to break their vows of chastity. In the 'golden chamber' are the coffin of the saint, and the skulls of a few of her most favored maidens encased in silver. The church of St. Gereon, the first portion of which was founded in 1066, boasts of the possession of the bones of St. Gereon, and of the 6000 Theban martyrs slain during Diocletian's persecution. The church of St. Peter is celebrated for the altar-piece of the crucifixion of St. Peter by Rubens, and that of the Minorites for containing the tomb of the famous scholastic, Duns Scotus. The chief object of interest in the city, however, as well as its greatest ornament, is the cathedral, one of the noblest specimens of Gothic architecture in Europe.

This cathedral is said to have had its origin in an erection by Archbishop Hildebold, during the reign of Charlemagne in 814. Frederic the Red-bearded bestowed upon it, in 1162, the bones of the three holy kings, which he took from Milan, and this gift contributed greatly to the increase of its importance. The bones are retained as precious relics to this day; but the old structure was burned in 1248; according to some accounts, the present cathedral was begun in the same year, but others fix the date of its commencement in 1270—1275. To whom the design of this noble building is to be ascribed, is uncertain. The choir, the first part completed, was consecrated in 1322. The work was carried on, sometimes more actively, sometimes more slowly, till the era of the Reformation, when it was suspended; and during the subsequent centuries, not only was nothing done to advance it, but what had been already executed, was not properly kept in repair. In the beginning of the present century, however, attention was directed to its unrivalled beauties, and it has since become the subject of an enthusiasm extending over all Germany, and which has given birth to a multitude of associations for the supply of the necessary funds to repair and complete it according to the original design. Funds have also been forthcoming from other parts of Europe. On September 4, 1842, the king of Prussia, who had contributed largely to the funds, laid the foundation-stone of the transept, since which time great progress has been made. The naves, aisles, and transepts were opened in 1848. The magnificent south portal was completed in 1859, and the north has also been finished; and in 1860, the iron central spire was added. With the exception of the towers, the church was completed in 1863; and the towers, the crown of the edifice, were finished in August 1880. The body of the church measures 500 feet in length, and 230 feet in breadth; the towers are above 500 feet high. Since 1823, £900,000 has been expended on the building; the total cost of the whole is estimated at £2,000,000. The situation of the city is extremely favorable for commerce. Various branches of manufacture are carried on, of which the chief are the making of beet-sugar, tobacco, glue, carpets, soap, leather, furniture, pianos, chemicals, and spirits of wine, besides the characteristic manufacture of Eau-de-Cologne (q. v.). In 1876, 6670 vessels and boats traded at the quays of C. C. has extensive and important railway connections.—The city was founded by the Ubii, about 37 B.C., and was at first called *Ubiorum oppidum;* but a colony being planted here in 50 A.D. by Agrippina, the wife of the Emperor Claudius, it received the name of *Colonia Agrippina.* At the partition of the Frank monarchy in 511, it was included in Austrasia; and by a treaty in 870, was united to the German Empire. It entered the league of the Hanse towns in the beginning of the 13th c., and contended with Lübeck for the first rank. It was at a very early period the seat of a bishopric, which was elevated, in the end of the 8th c., into an archbishopric, and the archbishops acquired considerable territories, some of them distinguishing themselves as politicians and warriors.

They took their place amongst the princes and electors of the empire, but were involved in a protracted contest with the citizens of C., who asserted against them the independence of the city, and the archiepiscopal residence and therefore removed to Bonn. The archbishopric was secularized in 1801, when the city also lost its independence, and the congress of Vienna did not attempt to restore to it its former character, but assigned the whole territories to Prussia. The archbishop, therefore, has not now the political rights and power that belonged to his predecessors.

COLOGNE YELLOW is a pigment composed of 2 parts of yellow chromate of lead, 1 of sulphate of lead, and 7 of sulphate of lime or gypsum.

COLOMBA'NO, SAN, a town of North Italy, in the province of Milan, on the right bank of the Lambro, about 10 miles south of Lodi. It is situated in the midst of hills, in which are found porphyry, feldspar, and fine red granite, and also limestone containing numerous fossils. Pop. 6000.

COLO'MBIA, immediately after the war of independence, was a term which embraced all that now belongs to the three republics of Venezuela, United States of Colombia, and Ecuador, being the entire north of South America, and the extreme south of what is geographically distinguished as Central America. Independently of the singular difficulties of communication, and of the resulting absence of anything like natural unity, this unwieldy state contained, from the beginning, the cause of its own dissolution in the national character of its inhabitants. So long as union was necessary to meet external dangers, C. maintained an imposing attitude in the eyes of the world; but, gradually, sectional interests and political jealousies did their work, and, at last, about 1830, the ill-assorted elements of the confederation were separated for ever.

COLOMBIA, UNITED STATES OF, the official title, since 1861, of what was formerly called NEW GRANADA (q. v.).

COLO'MBO, the capital of Ceylon, an episcopal city and seat of government, is situated on the western side of the island 6° 59′ N. lat., and 80° 4′ E. long., near a rocky headland, the *Jovis Extremum* of Ptolemy, by which the mariners of antiquity steered for the port of Galle. The modern fortifications of C. which were constructed by the Dutch, include, on the land-side, four bastions with counterscarps and ravelins, and, towards the sea, seven batteries. Except the military officers, few Europeans resided within the fort. Colpetty, a beautiful suburb, shaded by groves of the cocoa-nut palm, is a favorite retreat. Here, the houses are chiefly of one

story, with broad verandahs. The large and lofty rooms are furnished with punkahs, floored with tiles, and for the sake of air, have windows opening to the ground, at which, however, snakes, lizards, scorpions, and the teeming insects, of a tropical country, make free to enter. The humble mud-constructed dwellings of the Dutch, Portuguese, Eurasians, Singhalese, Tamils, Moors, and Malays are outside the city walls. The *pettah* or Black Town, the only ancient quarter, extends to the river Kalany-ganga. Pop. (1871) 100,238. C. is connected with Kandy by railway.

The mean annual average of temperature at C. is 80°, or thereabout, and has reached to 86° in extraordinary years. The annual fall of rain is 72·4 inches, of which the greatest quantity is measured at the change of the monsoon, when it pours down in a perfect deluge. Out of 72·4 inches, 20·7 fall in April and May, and 21·9 in October and November.

The early name of C., Kalan-totta, the 'Kalany Ferry,' so called from its proximity to the river, the Moors corrupted into Kalambu, and by this designation it was described about 1340 A.D. as the finest city of Serenbid. At the arrival of the Portuguese, who fortified it 1517 A.D., Kalambu had merged into Kolamba or Columbu, which they henceforth wrote Colombo, in honor of Christopher Columbus. The Dutch succeeded to the Portuguese (see CEYLON), and C. was taken by the British, 16th February 1796.—Sir James Emerson Tennent's *Ceylon*.

CO'LON. See PUNCTUATION.

COLON, that portion of the large intestine which extends from the Cæcum (q. v.) to the rectum, which is the terminal portion of the intestinal canal. Whether it is derived from *koilon*, 'hollow,' or *kolao*, 'I arrest' (because the fæces are retained for a considerable time in it), is uncertain. It is divided into the ascending, the transverse, and the descending C., and the sigmoid flexure. See ALIMENTARY CANAL.

The whole length of the C., from its commencement in the cæcum, to its termination in the rectum, is rather more than four feet. It is retained in its position by the serous membrane, which envelops, more or less, all the intestinal viscera, and is termed the Peritoneum (q. v.). Its structure is essentially the same as that of the rest of the intestinal canal, which is described in the article DIGESTION, ORGANS AND PROCESS OF; but in consequence of a peculiar arrangement of the longitudinal muscular fibres, the interior of the C. is divided into sacculi, which serve to retain its contents for a longer period than if it were a uniform tube, and thus by extracting water from them, to reduce them to a more solid consistence, such as is possessed by normal excrement. In some animals, as in the horse and sheep, the shape of the fæces is completely moulded in these cells.

CO'LONEL (from the Italian *colonello*, the leader of a column) is the highest officer of a regiment; any grade above this converts him into a general-officer belonging to the army collectively, rather than to any one regiment. Before the reign of Elizabeth the chief officer of an English regiment was captain, but in 1588 the title of C. had become familiar. In the British army at the present day, except in the Artillery and Engineers, the office of regimental C. is a sinecure, the real active commander of the battalion being the lieutenant-colonel. The C. receives higher pay and dignity. The colonels are generals, who have had what is called a regiment 'given to them,' as a reward for long service, and virtually as a retirement. The pay, except in the Guards (where it is higher) is £1000 a year.

The Army Estimates provide for about 150 regimental (otherwise called 'honorary') colonels of cavalry and infantry, and for about a sixth of that number colonels commandant in connection with the Artillery and Engineers. There is a frequent outcry against these appointments when viewed as sinecures, but looked upon as retirements for deserving old officers there is little that is objectionable in them. The rank of C. was above those which were purchasable. See COMMISSIONS, ARMY. Apart from regimental rank there is the army or brevet rank of colonel, through which all officers must pass on the way to general-officer. It is attained by specified service in certain positions as lieutenant-colonel. In the Austrian, Prussian, and Russian armies, where the regiments are very large, the colonelcies are mostly honorary posts, held by emperors, kings, princes, and other distinguished persons.

COLO'NIA DO SANTI'SSIMO SACRAME'NTO, a port of Uruguay or Banda Oriental, stands on the north or left bank of the Plata, nearly opposite to Buenos Ayres, and about 100 miles above Monte Video, the capital of the state. The place is pretty regularly fortified. As its acquisition would tend to secure to Buenos Ayres the entire command of the interior navigation, the town was seized by Rosas, the dictator of that state; but, in the interest of the freedom of commerce, it was, in 1845, taken from him by the French and English squadrons.

COLO'NIAL CORPS were certain regiments forming part of the regular army of the British Empire, and paid for out of the imperial revenues. They were never very fixed in number, varying with the circumstances of the colonies in which they were located. The following were the names of the corps, the numbers provided for in the Army Estimates for 1860—1861, when these regiments were at their largest recent establishment, and the composition of each corps, whether British or native:

Three West India Regiments (afterwards raised to five	3420	Negro.
Newfoundland Veterans	229	British.
Ceylon Rifles	1585	Native.
" Invalids	163	Native.
Cape Mounted Rifles	1084	Boers and natives.
Malta Fencibles	638	Native.
Canadian Rifles	1106	British.
St. Helena Regiment	433	"
Gold Coast Artillery	351	Native.
Falkland Islands Company	37	British.
African Artillerymen	64	Native.
Hong-Kong Gun Lascars	88	"

These corps, comprising about 95 companies, had somewhat over 1000 officers, commissioned and non-commissioned, and about the same number of horses. All the corps were officered by British, except the Malta Fencibles. The Cape Mounted Rifles was a mounted infantry corps.

As the colonies obtained self-government, and the military theory of employing troops only in large bodies gained ground, it was considered as against imperial polity to maintain, out of imperial revenue, corps which were tied to one colony, and not available for the general defence of the Empire. Accordingly the colonial corps have been gradually disbanded, and there survive only two West India Regiments and the Malta Fencibles.

COLO'NNA, a village in Central Italy, is noticed because it gives its name to the most celebrated and powerful of all the Roman aristocratic families—the Colonna—from which have sprung a pope, several cardinals, generals, statesmen, and noted scholars.

The C. palace, situated at the base of the Quirinal (Rome), is celebrated for its splendid gallery and treasures of art.

COLONNA, CAPE (ancient *Sunium Promontorium*), a headland of Greece, forming the southmost point of Attica, in lat. 37° 38′ N., long. 24° 1′ E. Crowned by the ruins of a temple of Minerva, its summit rising about 270 feet above the water, Cape C. is a conspicuous and remarkable object from the sea. Sixteen white marble columns, from which the cape derives its modern name, are still standing.

COLONNA, VITTORIA, the most celebrated poetess of Italy, a member of the above-named family, was the daughter of Fabrizio Colonna, High Constable of Naples, at whose estate of Marino she was born in the year 1490. When four years old, she was betrothed to a boy of the same age, Fernando d'Avalos, son of the Marchese de Pescara. At 17, they were married. After her husband's death in the battle of Pavia (1525), Vittoria C. found her chief consolation in solitude and the cultivation of her poetical genius. During seven years of her widowhood, she resided alternately at Naples and Ischia, and then removed to the convent of Orvieto, afterwards to that of Viterbo. In her later years she left the convent, and resided in Rome, where she died in February 1547. Her poems were chiefly devoted to the memory of her husband. Among them, the *Rime Spirituali* (Venice, 1548) are remarkable for truth of sentiment and enlightened piety. The most perfect edition of the poems of Vittoria C. was published by Ercole Visconti (Rom. 1840).

COLONNA'DE is the name given to a series of columns placed at certain intervals from each other, and arranged in various ways according to the rules of art and the order employed.

CO'LONSAY, one of the Western Isles of Scotland, off the south-west part of the mainland of Argyleshire, in the wide entrance of the Firth of Lorn, between the isles of Islay and Mull, with the small isle of Oronsay at the south end, separated by a narrow sound, which is dry at low water. C. and Oronsay are together 12 miles long from north-east to south-west, and one to three miles broad.

The surface is irregular, and composed of mica-slate, passing into chlorite-slate and clay-slate, and mixed with quartz-rock and limestone. Half the surface is cultivated. Pop. (1881) 387. Next to Iona, C. contains the most extensive remains of religious edifices in the Western Isles. On Oronsay stand a large stone cross and the ruins of a monastery founded by the Lords of the Isles in the middle of the 14th c.

CO'LONY (Lat. *colonia*, from *colonus*, a husbandman; the first inhabitants of a C. being generally people of agricultural pursuits). The term is loosely used to embrace various classes of distant territories subordinate to or dependent on a parent state. A C., however, properly means a body of people formed by migration to a distant region, where they support themselves by in-

dustry and the produce of the soil, and are under the protection and attached to the supreme government of the mother-country. Our colonies in Australia and North America, where the natives have either ceased to exist, or do not compete with the colonists for the ownership of the soil, are practical instances of the C. in this its proper sense; but there are many other dependencies of of the British crown which deviate more or less from the true characteristics of a colony. Gibraltar and Malta, for instance, are mere fortresses, not affording a profitable emigration-field for a portion of our population, but, on the contrary, requiring that such inhabitants of the United Kingdom as reside there shall be specially remunerated for doing so. The support of these dependencies is justified by the warlike, not the economic policy of the country. On the other hand, territories have afforded profitable residence to our people without being colonies; the most conspicuous of this class is the British Empire in Hindustan, where our people scarcely hold any land, or concern themselves in the occupation of agriculture, from which the term colonist is taken; but reside as the rulers and defenders of the native races. The ancient migrations of nations, by which our own islands, for instance, became peopled, apparently in the first place by Celts, and next by Goths or Teutons, were not colonization in the fullest sense of the term, since the parent-country kept no control over the settlers, and afforded them no protection. The Greeks were a spreading people, carrying with them their genius and their language. They established communities in Asia Minor, on the coast of Africa, in Italy, and in France; for instance, Marseille was a Greek town, founded by the inhabitants of Phocæa about six centuries before the Christian era. A close connection was maintained between these emigrant communities and the states from which they had removed. Still, however, none of these districts were colonies, according to the definition given above; and it was one of the many triumphs of the organizing genius of the Romans, to form the 'C.' according to its most perfect modern acceptation. The principle of responsibility to a central government was brought to its greatest perfection in the policy of Rome, and it was part of this policy that not only every conquered territory, but every district where Roman citizens settled, should be an integral part of the empire.

The *colonia* was one of the municipal institutions of the empire, having its own governing corporation dependent on Rome. There were various grades of colonies—some where there was the high privilege of Roman citizenship, and others, where the citizenship was of a humbler grade. Corresponding with the consuls in Rome, there were municipal officers in the colonies, representing, after the Empire was formed, the old republican institutions—these were called sometimes *duumviri*, and sometimes *quatuorviri*—terms, the special application of which has been matter of considerable discussion. The Romans appointed men of very high rank to the government of their provinces or colonies—men who had held such offices as the consulship or prætorship at home, and were called proconsuls or proprætors. It was a feature of the sagacious jealousy of the Roman system, to limit their period of government, lest they should become independent of the empire, and establish separate states; and this idea is followed in the colonial system of the British empire at the present day.

After the fall of Rome, centuries passed before colonization recommenced; for the various tribes who devastated the empire were not connected with any parent state, and the Normans, who spread themselves over Europe at a later period, were utterly unconnected in the countries where they settled, with the government of the northern states whence they migrated. It is curious that not a trace of the genealogy of the Normans of England or France can be found anterior to their settlement in the latter country, so little connection did they preserve with the country of their ancestors. The Spanish and Portuguese were the first among modern European states to establish colonies. Their sovereign aimed not only at the restoration of the Roman empire in Europe, but at the creation of a new empire in America, which was looked on as the exclusive property of the Spanish crown. In carrying out this view, it was not so much that the people of the peninsula went to America, and had the necessary staff of civil and military officers sent to them by the parent state, as that great officers, with high rank and enormous salaries, were sent over to the new empire, and brought followers after them. The other governments of Europe—Britain, France, Holland, and the minor states—subsequently colonized in America and Africa, Denmark occupying the inhospitable shore of Greenland.

The earlier British colonies arose in the reverse order to those of Spain—the colonists went first, the dignitaries followed. Both Raleigh and Drake attempted to form settlements in America, but unsuccessfully. The British race there dates from the reign of James I. of England. The settlers were privileged companies, with royal letters-patent, but, in reality, they were independent; and as they were dissenters seeking a place of refuge from what they considered the grievances of the established church and the government, they took care not to convey the grievance with them, as they would have done had they been actually incorporated with the British empire.

The northern colonists, indeed, acted as if they were a sort of private corporation, occupying their own territorry according to their own taste, and considered themselves entitled to prohibit any person differing from their religious and political opinions from entering their boundary. In later times, the example of Rome was more closely followed, and it became the policy of Britain, that any land acquired by her subjects by conquest or occupation, should be deemed to be held by them for the crown. This was strongly exemplified in New Zealand, where a body of energetic and spirited adventurers had projected something like a new empire, of which they were to be masters. Some of them had purchased large territories for a musket, a barrel of powder, or a piece of red cloth, and thought it hard that they should not be entitled to retain the fruit of their fortunate bargains. The crown, however, stepped in, asserted a supreme authority over the colony, and readjusted all its territorial rights, with a view to doing practical justice both to the natives and the settlers. There are many evils incident to any attempts at independent colonization, among which, the chief is the cruelty and rapacity which it is the nature of such private adventurers to exercise against aboriginal tribes, and even against any other communities weaker than themselves who happen to fall in their way. The British colonists of the American continent and islands in the 17th c. were robbers and pirates on a large scale, and became memorable in history by the name Bucaneers. Colonists themselves, when they rightly appreciate their own interest, must see their advantage in the supremacy of the crown—or rather in that of the British parliament—for the crown is only properly supreme over a territory which has been taken by conquest from another civilized power. The supremacy implies a right to protection, much needed by small collections of men in distant regions; and it may be safely predicted, that had an independent body of British settlers established themselves in New Zealand, their C., when it rose to importance, would have been seized by France, or some other foreign power. After the example set by the United States, it is not likely that the supremacy will be continued after it ceases to be advantageous to both parties.

Many fallacies regarding colonies have been dispersed by the progress of political economy. It used to be thought, that the support of colonies at any price was an advantage to our trade, since it is more profitable to trade with our colonies than with foreign countries, because, among other reasons, they can be compelled, by restrictions and monopolies, to take our goods while we take theirs; but other nations cannot, and may continue to sell to us without buying from us. We now know that the best trade for the country, is that which the individual dealers in it find to be the best for themselves; and they will go where they can trade with most profit, whether to a C. or a foreign country.

It was when the United States were rich and enterprising—not when they were our colonies—that we have driven the greatest trade with them. No doubt, there must always be two parties in trade; and let a nation be as energetic and enlightened as it may, it will have no foreign trade unless there be some other that can afford and is inclined to deal with it. If the population of the United States were displaced by Red Indians, there would be a sudden collapse in the trade of Britain. For such a reason it is that we have an interest in seeing our own race—the most enterprising in the world—spread over its face. Every new British C. may be calculated on as a new market for our goods; and as a pecuniary speculation, it may be worth supporting a governor and a staff of officers to take charge of it.

CO'LOPHON, an Ionian city of Asia, about nine miles north of Ephesus, and near the sea-coast. The river Ales, noted for the coolness of its water, flowed past it. It is not often mentioned in history, although the birthplace of several poets, Mimnermus, the elegist, among others, and even claiming to be the native city of Homer. The Greek proverb, 'to put the colophon to it,' meaning to terminate an affair, is said to have originated in the boast of the famous Colophonian cavalry, that their *charge* was usually the finishing-stroke in battle. Hence, in old printed books, the conclusion, in which were stated the name of the author, and the place and year of printing, was called a colophon.

COLO'PHONY. See Rosin.

COLOQUI'NTIDA. See Colocynth.

COLORA'DO (Sp. red), the name of a state and also of two rivers of the United States. The state is bounded on the N. by Wyoming and Nebraska, E. by Kansas, S. by New Mexico, and W. by Utah. Its area is 104,500 sq. m., and the pop. in 1870 was 39,864; in 1880, it had risen to 194,649. The Rocky Mountains intersect the state from N. to S., but it has large and fertile valleys. That of San Luis, in the south, is an immense well-wooded amphitheater, surrounded by mountains, with an area of 18,000 square miles. The mineral resources of C. are very great, and include gold, silver, copper, gypsum, coal, salt, iron, and limestone. Value of gold and silver produce (1878), 8,800,000

dollars; (1880) 19,250,000. At that date, C. was foremost of the states for silver production, and fourth for gold. Denver (the capital), Leadville, and Central City, are the principal towns. C. was formed into a territory in 1861, and admitted into the Union as a state in 1876.—Of the rivers named C., one is confined to the state of Texas, is 800 miles long, and falls into the Gulf of Mexico. The other rises in the Rocky Mountains, and enters the Gulf of California, about lat. 32° 10′ N., and long. 114° 20′ W., after a course of 1200 miles.

COLORADO (*Rio C.* or *Colorado River of the West*) is formed at about 38° N. lat. and 110° W. long. by the junction of the Green and Grand rivers. The Green River rises in the Rocky Mountains in the W. of Wyoming Territory, receiving in its S.W. course the waters of the Bear, the White, Uintah, and San Rafael. From Flaming Gorge, a point in the N.W. of Colorado, where the Uintah Mountains rise, the Green River cleaves its way rapidly through 'cañons,' the walls of which tower up to a height of nearly 1500 feet. (Cañon, Spanish for tube, is now commonly used in the United States for deep ravines worn by running waters). The Grand River rises in the Rocky Mountains to the W. of Denver, Colorado; receiving in its S.W. course the South Fork or Gunnison, the San Miguel, and Dolores. After the junction, the C. flows S.W. through Utah, joined on the E. by the San Juan, on the W. by the Dirty Devil and Escalante; S.W. through the N. of Arizona, till its waters are increased by the Colorado Chiquito or Little C. of Arizona. From the mouth of the Little C., the river bends W., and for the first 200 miles shoots through the remarkable 'Grand Cañon.' The walls of this water-worn trench are often vertical, or nearly so, for a distance of thousands of feet at a time; sometimes they slope steeply, or constitute magnificent terraces. The cliffs or rock-walls attain a height of from 4000 to 7000 feet above the stream, which runs with a varying descent of from 5 to 200 feet to the mile, and whose channel now contracts to 30 feet in breadth, and now widens to 300 feet. In many parts there is no talus of fallen rocks, still less banks of gravel or earth; but the stream fills the channel from wall to wall. Elsewhere masses of fallen rock from 30 to 300 feet high line the sides of the rock. Below the cañons there is, in the valley, much fertile bottom-land on one or both sides of the river. Numerous tributaries pierce the high plateau on either side, the whole presenting a strangely intersected topography. Escaping from the Grand Cañon, the river flows S.W. to the borders of Nevada, receiving from the W. the Paria, Tapeat's River and the Kanat of Arizona, and the Virgen of Nevada. Above Callville, Nevada, the C., as also its tributaries, again bores its way through deep cañons, the sides of which in some places present walls of solid rock nearly 7000 feet high; the plateaus at the top of these rock-masses, generally treeless, are again surmounted by terraces of 1000 feet or more in height. These lower and higher terraces are both piled with massive ruins, once the walled towns and cities of the Toltecs, as is supposed, a race said to be represented by the present Moqui Indians in the N.E. of Arizona. Below Callville the river is again shut in by the last of the cañons, the Black Cañon, 25 miles long, and from 1000 to 1500 feet high. Shortly after receiving the Virgen, the C. takes a southern course, severing Arizona and Sonora on the E. from Nevada, California, and Lower California on the W., and receiving on the E. Bill Williams's Fork and the Gila.

After absorbing the Gila, the river sweeps round in a westerly direction for 7 or 8 miles, and soon expands to a width of 1200 feet. Thence it pursues a tortuous course of 180 miles, the last portion being through Mexican territory, to its mouth in the Gulf of California. From the sources of the Green River, the C. measures a total length of about 2000 miles. It is navigable for steamers as far as Callville, 612 miles from its mouth; and can be made navigable, it is thought, to the foot of the Grand Cañon, 57 miles higher. At low water (winter), vessels drawing 9 feet can reach only to Arnold's Point, 35 miles up. From the rapid rise of the tide, and the shifting of the channel, navigation is difficult to the head of tide-water, 40 miles from the mouth. The cañons of C. were descended in 1867 by James White, the sole survivor of a party prospecting for mines; and in 1869, by Major J. W. Powell, at the head of an exploring party sent by the U.S. Government. See Powell's *Exploration of the Colorado* (Washington, 1875).—Another Colorado, 900 miles long, flows S.E. through Texas into the Gulf of Mexico; a third, 600 miles long, flows from the Andes across the Argentine Republic.

COLORA'DO POTA'TO BEE'TLE (*Doryphora decemlineata*), a small beetle, which, since 1861, has done great harm to the potato crops of the United States. It is of a yellowish cream-color, with ten black lines running down the wing covers. The *larvæ*, which do the principal mischief, are at first reddish brown, and get paler with increasing age.

COLO'SSÆ, a populous city of ancient Phrygia, on the river Lycos. Its inhabitants were noted for their skill in dyeing wool. C. was almost entirely destroyed by an earthquake, 65 A.D. To the Christians of C., Paul addressed one of his epistles.

COLOSSE'UM. See AMPHITHEATER.

COLO'SSUS, a Greek word of unknown origin, used to denote a statue very greatly beyond the size of life. In English, the adjective colossal is used in a somewhat wider sense, to denote all statues which exceed the size of life, in however small a degree. Most statues are thus colossal, though of colossi, very few have been erected in modern times. The 'Bavaria' (q. v.) at Munich is perhaps the only very celebrated example. The colossal was the peculiar characteristic of Egyptian art, and innumerable colossi were raised in Egypt, mostly of the hardest stone, many of them from 50 to 60 feet in height. The most celebrated is the vocal statue of Memnon (q. v.), in the plain of Thebes, described by Strabo and Pausanias, and supposed to be identical with the more northerly of the two existing colossi on the west bank of the Nile.

But it was in the artistic world of Greece that the most famous colossi appeared: e. g., the bronze statue of Pallas Athene, on the Acropolis of Athens, the plume of whose helmet and the point of whose spear were landmarks to sailors between Sunium and Athens; another statue of the same goddess, of gold and ivory—the so-called Palladium in the Parthenon at Athens; and the Olympian Jupiter, of the same materials, the master-piece of Phidias, who was also the author of the two statues just mentioned. Amongst the seven wonders of the Old World, was reckoned the gigantic C. of Rhodes, representing Phœbus, the national deity of the Rhodians. It is said to have been commenced by Chares, of Lindus, a famous pupil of Lysippus, and terminated by Laches. They formed it of metal, which was cast in separate pieces, a process which lasted for twelve years, and was completed 280 B.C. Its height is doubtful—some making it 90 feet; others 90, and even 105 cubits. It cost 300 talents. Sixty years after its erection it was thrown down by an earthquake. The Romans imitated the Greeks in the erection of these gigantic structures. The statue of Jupiter upon the Capitol, made from the armor of the Samnites, was so large that it could be seen from the Alban Hills. Then there was the bronze statue of Apollo, of which what is supposed to be the head is now in the Capitol; a bronze statue of Augustus, in the Forum; a C. of Nero, executed in marble, of the enormous height of 110 or 120 feet, from which the contiguous amphitheater is believed to have derived the name of 'Colosseum;' an equestrian statue of Domitian, in the center of the Forum; and many others.

COLO'STRUM is the term applied to the first milk yielded after delivery. It differs very materially from ordinary milk, and generally appears as a turbid, yellowish, viscid fluid, similar to soap and water. When examined under the microscope, it is found to contain, in addition to the ordinary milk corpuscles (see MILK), peculiar conglomerations of very minute fat granules, which are hence known as colostrum corpuscles. The chief chemical difference between C. and milk is, that the former contains nearly three times more salts than the latter. It is probably this excess of salts that usually causes it to exert a purgative effect upon the new-born infant, and thus to remove the Meconium (q. v.) which had accumulated in the fœtal intestine.

CO'LOR, in Optics. See LIGHT, CHROMATICS, SPECTRUM.

COLOR, in Art, means either the pigment employed to produce a certain effect to the eye, or the effect thus produced, i. e., the tint of a picture. In the former sense, it is treated of in this work under the names of the colors themselves. See CARMINE, CHROME, &c. In the latter sense, C. must be regarded by the artist not so much as the result of the application of one or more pigments separately, as of their use in the innumerable combinations of which they admit.

Recent investigation tends to regard as simple or primary colors *red*, *green*, and *violet*. It is found impossible to resolve red, green, and violet (or blue) light into any other colors; whereas a yellow ray may be resolved into red and green, or compounded by mingling red and green light. But in popular acceptation, as in the scientific works of Brewster and others, the primaries are *red*, *blue*, and *yellow*. See CHROMATICS, SPECTRUM, LIGHT, &c. Compounded in various proportions, pigments of the three last-mentioned colors produce every tint that is physically posssible, and in this respect may still be called primary. First, when combined in twos, they produce the three colors usually termed *secondary*—that is to say, blue and red make purple or violet; yellow and red, orange; blue and yellow, green. The grays and browns, again, are compounds of all three of the primary colors.

COMPLEMENTARY COLORS are the colors or color which, with any color or colors mentioned, make up the three primary colors, which constitute white light. Thus, if the given C. be a primitive, its complementary C. is composed of the other two primitive colors; e. g., the complementary color of blue is orange = red and yellow. Again, if the given C. be a secondary, its complement-

ary C. is the remaining primitive color. Thus, the complementary C. of green—blue and yellow—is red.

CONTRAST OF C. is either simple or compound. Each of the primitive colors forms a simple contrast to the other two. Thus, blue forms a simple contrast to red and to yellow. But if red and yellow be mixed together, the complementary C. to blue will be produced—viz., orange, which is the most powerful contrast that can be made to blue.

HARMONY OF C. consists in the preservation of the same character in a picture throughout, in so far as coloring is concerned. It is said to result from an equal distribution of the three primary colors, either pure or in composition; but such a rule, even if correct, is correct with so wide a latitude as scarcely to admit of practical application. The only method of attaining to a knowledge of harmony of C., is to train the eye by the observation of it as exhibited in nature. A southern sky will be found to harmonize with a southern landscape, and consequently, the colors of which the one is composed with those which compose the other. The experiment may be made by painting an Italian sky over an English landscape, when the want of harmony in the coloring will be at once apparent. The art of preserving harmony without sacrificing variety, resembles that of preserving light in shadow, and combining clearness with depth, which we have explained under CHIAR-OSCURO.

WARM AND COLD COLORS are terms derived from the corresponding sensations which they are supposed to produce. Blue is said to be a cold C., and orange a warm one, whereas red is neither warm nor cold. Without supposing color-blindness, however, it seems very possible to imagine that in this respect the same C. may, from association and other causes, produce different sensations on different persons.

A COLORIST is an artist in whose works success in color is the prominent excellence. The greatest colorists are Titian, Correggio, Paul Veronese, Rubens, and perhaps his pupil Vandyck. To say that these artists surpass Raphael, or even Leonardo da Vinci, in this respect, would probably be to say too much. But that they equal these greater artists in this, and in this respect alone, is a sufficient reason for their being known as colorists *par excellence*. The art of coloring admits of being transmitted to pupils to a greater extent than the highest branch of all.

COLOR, a rhetorical term, which was adopted into the technical language of English pleading. Previous to the passing of the Common Law Procedure Act of 1852 (15 and 16 Vict. c. 76), it was a rule that pleadings in confession and avoidance, as opposed to pleadings by way of traverse, should confess the matter adversely alleged, to the extent at least of admitting some apparent right in the opposite party requiring to be encountered and avoided by the allegation of new matter. This was called giving C. to the plaintiff's claim. All this curious subtilty, to which English lawyers till recently were in the habit of attaching so much value, was very properly set aside by the statute above referred to. The section which applies to *C.* is the 64th.

COLOR, in Heraldry. The colors used are generally red, blue, black, green, and purple; which are called Gules, Azure, Sable, Vert or Sinople, and Purpure. Tenne or tawny, and Sanguine or blood-color, sometimes occur, but they are not common. Yellow and white, again, are not colors in the heraldic sense, but metals; they are called Or and Argent, and are always represented by gold and silver. It is a fundamental and invariable rule in blazon, not to put C. upon C., or metal upon metal; thus, if the field be of a metal, the bearing must be of a C., and *vice versâ*. The only exception is said to be the arms of Jerusalem, which were given to Godfrey of Bouillon, which are *argent, a cross potence or, between four crosslets of the same.* Apparent exceptions to this rule in common blazon are—1. Abatements or marks of cadency or difference, labels, crescents, batons, and the like; and 2. Extremities or adjuncts to animals, or other objects, such as tongues, claws, horns, &c.; but neither of these are regarded as independent bearings. Colors and metals, when engraved, are generally indicated by dots and lines: *or*, gold, by dots; *argent*, silver, is left plain; *gules*, red, is indicated by perpendicular lines from top to bottom; *azure*, blue, by horizontal lines from side to side; *sable*, black, by horizontal and perpendicular lines crossing each other; *vert*, by diagonal lines from right to left; *purpure*, by diagonal lines from left to right; *tenne*, by diagonal lines from left to right, crossed by horizontal lines; and *sanguine*, by lines crossing diagonally from left to right, and from right to left.

CO'LOR-BLI'NDNESS, a term introduced by Sir David Brewster to denominate a defect of vision, owing to which certain persons are either unable to discern a single color, such as red, or to distinguish between two colors, such as green and red, so that they may be said to be blind to red, or to be blind to one of two colors presented simultaneously to the eye. This defect has been called *chromato-pseudopsis*—i. e., false vision of colors; Daltonism, after Dalton the chemist, who suffered under it; and various other learned names, have been applied to it; but C. seems to be as apt and expressive a name as any. It occurs in eyes whose power of vision, as to form and distance, is otherwise perfect. The late Dr. George Wilson, whose work on this subject should be consulted by the reader (*Researches on Color-blindness*, Edin. 1855), thus classifies the varieties of the defect: 1. Inability to discern any color properly so called, so that black and white—i. e. light and shade—are the only variations of tint perceived. 2. Inability to discriminate between the nicer shades of the more composite colors, such as browns, grays, and neutral tints. 3. Inability to distinguish between the primary colors, red, blue, and yellow, or between these and the secondary and tertiary colors, such as green, purple, orange, and brown. The first sort would appear to be very rare, but well-marked cases of it are on record, and show that insensibility to colors is not only compatible with distinct vision in other respects, but is frequently attended by a greater power than is usual of perceiving objects very faintly illuminated. None of these recorded cases, however, have been examined with such care as to warrant the conclusion, that the C. was absolute. It would appear that where the C. is nearly absolute, degrees of luminosity supply the place of shades of color in giving variety to the aspects of objects. The second variety of C., where the nicer shades of the more composite colors are mistaken, would appear to be very common—the rule rather than the exception in the majority of persons, at least of the male sex, in this country; but it is a matter of doubt how far it may not be referable to imperfect cultivation of the sense of color. In many cases of this kind, however, it can be shown that the defect differs in degree only from that of the third form. The third form is the most important variety of the affection. In extreme cases, although colors are occasionally quite correctly named, there is no certainty as to any color: in less severe cases, two colors, at least, as red and green, and generally four, as red, green, olive, and brown, are not distinguished from each other. Yellow would appear the color which gives least difficulty to those not absolutely unconscious of color; while blue, if pure and well illuminated, is readily recognized by the color-blind, a few of whom, indeed, describe it as the color which they see best. Red appears to be the color the want of the sense of which may be said to characterize all the color-blind. Indeed, Dr. Wilson thinks C. might properly enough be called *Anerythric* (No-red) vision. He says that while the normal eye analyzes white light into three colored elements, one of which is *red*, the color-blind eye, on the other hand, analyzes white light into two elements, neither of which is red.

The eyes of persons having this defect of vision have been carefully examined after death without the discovery of any peculiarity. C. therefore has its seat in the sensorium, not in the visual apparatus.

C. would appear to be very prevalent. Of 1154 persons of various professions, examined in 1852 and 1853 at Edinburgh by Dr. George Wilson, 65, or 1 in 17·7, were color-blind; 21 confounded red with green; 19 confounded brown with green; and 25 confounded blue with green. In consequence of this prevalence of the defect, the investigations into its nature are of the greatest practical importance. Railway officials, for instance, should always be tested for it, lest, being color-blind, they should mistake the various signals in use on lines of rail, and thus cause accidents.

Sir David Brewster, Sir John Herschel, Professor Maxwell, and many others, have written on the subject of color-blindness. Perhaps the most ingenious investigator of C., and the phenomena of vision generally, is Professor Maxwell, whose writings thereon in the Transactions of the Royal Societies of London and Edinburgh, will well repay perusal.

COLORING, as a musical term, is applied to those passages and harmonic progressions in bravura airs affording the singer an opportunity of display. It is also applied to all grand harmonic combinations in orchestral compositions.

CO'LOR-PRI'NTING. See POLYCHROME PRINTING.

COLORS, THE DIATONIC SCALE OF. Sir Isaac Newton, when investigating the properties of light, discovered that the lengths of the spaces occupied in the Spectrum (q. v.) by the seven so-called primary C., exactly correspond to the lengths of chords that sound the seven notes in the diatonic scale of music. Hence the phrase, *the diatonic scale of colors.*

COLORS, MILITARY, are certain kinds of flags carried with the army. Standards, banners, pennons, guidons, ensigns, colors—all are military flags, each originally having a distinct meaning, now to some extent departed from. The ensigns were the original of those which are now called C., and which especially belong to infantry regiments. The C. are square flags, larger than the standards carried by the cavalry. In former times, there was one for each company; but now there are generally two for a battalion, constituting a 'pair of C.'; one of which is called the royal or first, and the other the regimental or second. Both are about 6½ feet by 6, made of silk, with cords and tassels of crimson and

gold, and fixed to a staff about 10 feet long. The royal color or flag is nearly alike for all the regiments; with a blue ground, an imperial crown, the number of the regiment, and the Union Cross of St. George, St. Andrew, and St. Patrick. The regimental C. depends for its tint on the facings of the uniform of the regiment; in its center is inscribed the number or designation of the regiment, with its crest and motto, if any; and around are the names of the victories and campaigns in which the corps has served.

A subaltern officer carries the colors, and certain non-commissioned officers are set apart as a guard. The C. symbolize the good name and fame of the regiment, and are on that account protected in action with sedulous care; a victor always counts among his achievements the number of C. captured from the enemy. When a regiment obtains new C., they are usually solemnly presented by some lady of distinction. The presentation is made with much military pomp; and the chaplain of the regiment reads a prayer prepared for the occasion. A member of the Heralds' College is 'inspector of regimental colors,' the post being at present held by Garter-King-at-arms.

Besides the 'pair of C.,' there are small *camp* C., of the same tint as the facings of the regiment, to designate the part of the camp the corps occupies. Rifle regiments do not carry colors.

CO'LOR-SE'RGEANT, in the Army, is a non-commissioned officer of higher rank and better pay than the ordinary sergeants. There is one to each company of infantry; and the office is specially given to meritorious soldiers. The C. wears an honorary badge over the Chevrons (q. v.), and receives 2*s*. 5*d*. per day. He fulfils the ordinary regimental and company duties of sergeant; but in addition to these, he attends the colors in the field, or in the front of a camp, or near headquarters in a garrison. A C. may be degraded to the rank of sergeant for misbehavior, but only by the decision of a court-martial.

CO'LT'S-FOOT. See TUSSILAGO.

COLT'S REVO'LVER. See PISTOL, REVOLVER.

CO'LUBER, a genus of serpents which, as defined by Linnæus, included an extremely miscellaneous assemblage of species, venomous and not venomous, agreeing only in the character of having a double row of plates on the under side of the tail. The venomous species are now excluded, not only from the genus C., but from the family *Colubridæ*, of which it is the type. The serpents of this family are very numerous: it includes, indeed, about one-half of all the known serpents in the world. Their geographic distribution is very wide, although they chiefly abound in the tropics. Some of them are terrestrial, and some arboreal in their habits, the latter chiefly natives of the tropical parts of Asia and America. A few are inhabitants of fresh waters, and feed on fish. They are active in the pursuit of their prey, some of them feeding chiefly on small birds and quadrupeds, some on insects. They do not kill their prey by constriction, like the boas. Some of them are singularly and brilliantly colored. A few, particularly of the arboreal species, are remarkable for their extremely lengthened form. None of them grow to a very large size. To this family belong the common Ringed Snake (*Natrix torquata*) of England, the only British species. To the genus *C.* belong the Black Snake (q. v.) of America, and the Serpent of Æsculapius (*C. Esculapii*). figured by the ancients as an attribute of their god of medicine, It is of a brownish color, and attains the length of four or five feet. It is found in the center and south of Europe, is easily tamed, and exhibits the greatest gentleness of manners.

COLU'GO. See FLYING LEMUR.

COLU'MBA, ST. (called also ST. COLUM-CILLE and ST. COLM), one of the greatest names in the early ecclesiastical history of the British Isles, was born (it is believed, at Gartan, in the county of Donegal) in the north of Ireland, on the 7th of December 521. His father, Fedhlimidh, of the powerful tribe of the Cinel Conaill, was a kinsman of more than one chief or prince then reigning in Ireland and in the west of Scotland; and his mother, Eithne, was also of royal descent. To this distinguished parentage, no doubt, he owed some measure of his great influence upon the minds of his countrymen.

He studied first at Moville, at the head of Strangford Lough, under St. Finnian, by whom he was ordained a deacon; and afterwards under another St. Finnian, at Clonard, where he was ordained a priest. Among his fellow-disciples, he is supposed to have had St. Comgall, St. Ciaran, and St. Cainnech; and so conspicuous was his youthful devotion, even in that saintly company, that he received the name by which he is perhaps still best known in Ireland—'Colum-cille,' or 'Columba of the Church.' In 546, when no more than twenty-five, he founded Derry, and, six or seven years afterwards, Durrow, the greatest of all his Irish monasteries. He seems now to have embroiled himself in the civil strifes of his country; and the belief that he instigated the bloody battle of Cooldrevny, in 561, led to his excommunication by an Irish ecclesiastical synod. The justice of the sentence was challenged by ecclesiastics of rank, but it was probably among the causes which determined him to leave Ireland.

It was in 563, when in his 42d year, that, accompanied by twelve disciples, he set sail for the little island of Hy or Ioua, as it was then called—now better known as Iona (q. v.), or I Columcille—of which he obtained a grant, as well from the king of the Picts as from his kinsman the king of the Scots. Having planted a monastery here—built, it would seem, chiefly of wattles—he set himself to the great work of his life, the conversion of the Pictish tribes beyond the Grampians. The Picts dwelling to the south of that mountain barrier had been converted by St. Ninian of Whithern, in the 5th c.; and the Scots who peopled the western shores and islands of Scotland, were either Christians before they passed over from Ireland, or were afterwards converted by Irish missionaries. St. C. now brought the Picts of the north to the true faith; but, unfortunately, very little is known of the way in which he accomplished his task. Bede speaks simply of his 'preaching and example.' Adamnan, extolling his gift of miracles, tells how the gates of the Pictish king's fort burst open at his approach, and how, as he chanted the 45th Psalm, his voice was preternaturally strengthened, so as to be heard like a thunder-peal above the din and clamour by which the Pictish magicians tried to silence his evening-prayer under the walls of the Pictish palace.

We get another glimpse of his missionary footsteps from the *Book of Deer*, a Celtic MS. of the 11th or 12th c., lately discovered at Cambridge. It records how 'Colum-cille and Drostan, the son of Cosreg, his disciple, came from Hy, as God had shown them, to Aberdour' (a beautiful little bay among the huge cliffs which fringe the coast of Buchan, as the north-east district of Aberdeenshire is still called); how 'Bede, a Pict, was then high steward of Buchan, and gave them that town in freedom for evermore;' how 'they came after that to another town, and it was pleasing to Colum-cille, for that it was full of God's grace; and he asked of the high-steward, Bede, that he would give it to him, but he gave it not; and, behold, a son of his took an illness, and he was all but dead, and the high steward went to entreat the clerics that they would make prayer for his son, that health might come to him; and he gave in offering to them from Cloch-in Tiprat to Cloch-Pette-mic-Garnait; and they made the prayer, and health came to him.' In some such way as this, St. C. and his disciples seem to have traversed the Pictish mainland, the Western Islands, and the Orkneys, establishing humble monasteries, whose inmates ministered to the religious wants of the people. The parent-house of Iona exercised supremacy not only over all these monasteries, but over all the monasteries which St. C. had built in Ireland, and over those which were founded by his disciples in the northern provinces of England when they converted the Angles and the Saxons. Thirty-four years appear to have been spent by St. C. in raising up and perfecting his ecclesiastical system in Scotland. But the labor did not so wholly engross him, but that he found time for repeated voyages to Ireland, and for a visit to Glasgow, where St. Kentigern or Mungo was restoring Christianity among the Welsh or British tribes of Cumbria and Strathclyde. The health of St. C. seems to have begun to fail in 593, but his life was prolonged till he reached his 77th year, when he breathed his last as he knelt before the altar of his church in Iona, a little after midnight, between the 8th and 9th of June 597. He was buried within the precinct of his monastery, and his bones—which were afterwards enshrined—the stone pillow on which he slept, his books, his pastoral staff, and other things which he had loved or used, were long held in great veneration. No composition certainly known to be his has been preserved; but there have been attributed to him three Latin hymns of some merit, a short monastic (or rather heremitical) rule in Celtic, and several Celtic poems, among which is a collection of his prophecies.

The strength of St. C.'s character appears to have been in its earnestness. There is no reason to think that he was reputed either wiser or more learned than the better class of the ecclesiastics of his age. But the same enthusiastic temper which won for him in boyhood the name of 'Columba of the Church,' continued to animate him throughout life.

The length and frequency of his fasts and vigils are spoken of as nearly incredible. With this asceticism he combined unwearied industry; no hour passed without its allotted duty of prayer, or reading, or transcribing, or other work. As the prevailing austerity of his disposition was often lighted up by gleams of tenderness and kindness, so it appears to have been clouded at times by anger and revenge. 'But whatever sort of person he was himself,' wrote Bede, in allusion probably to these infirmities, 'this we know of him for certain, that he left after him successors eminent for their strict continence, divine love, and exact discipline; men who follow, indeed, doubtful cycles in their computation of the great festival [i. e., Easter], because, in that far out of the world abode of theirs, none had ever communicated to them the synodal decrees relating to the paschal observance, but yet, withal, men diligently observing those works of piety and chastity,

and those only, which they were able to learn from the writings of the prophets, evangelists, and apostles.'

The ecclesiastical system of St. C. was in so far peculiar that, in the words of Bede, Iona 'had always for its ruler a presbyter abbot, to whose jurisdiction both the entire province, and the bishops themselves also, contrary to the usual order of things, must own subjection, after the example of the first teacher of theirs, who was no bishop, but a presbyter and monk.' The jurisdiction usually reserved to the episcopate was thus transferred to the abbatial office; little more being left to the bishop than the right of ordination, and a certain measure of precedence in the celebration of divine service. St. C. himself, as well as his followers generally, till the year 716, kept Easter on a different day, and shaved their heads after another fashion, than obtained in other parts of Western Christendom. But, with these exceptions, their creed and rites appear to have been substantially the same.

The life of St. C. was written by two of his successors in the abbacy of Iona—Cuimine Ailbe (657—669) and St. Adamnan (679—704). The first of these lives is incorporated in the second, which is altogether one of the most valuable works now extant on the early ecclesiastical history of Scotland and Ireland. It has gone through many editions; the last, and incomparably the best—a book, indeed, beyond praise—being that of William Reeves, D.D., printed at Dublin in 1857 for the Bannatyne Club and the Irish Archæological and Celtic Society, and included in the series of *Historians of Scotland*, published by Edmonston and Douglas. Besides his *Vita Sancti Columbæ*, Adamnan wrote *De Locis Sanctis*, an interesting account of Jerusalem and its neighborhood, from the information of a French bishop, who, in returning from the Holy Land, was driven among the Western Isles of Scotland. This tract has been more than once printed, and its chief passages were transcribed by Bede in his *Historia Ecclesiastica Gentis Anglorum*. We learn from it that waxed tablets for writing were in use among the disciples of St. C. in Iona, at the close of the 7th century.

CO'LUMBAN, or COLUMBA'NUS, ST. one of the most learned and eloquent of the many missionaries whom Ireland sent forth to the continent during the Dark Ages, was born in Leinster about the year 545. Having studied under St. Comgall, in the great monastery of Bangor, in Ulster, he passed over to France, in his 45th year, accompanied by twelve companions, and founded the monasteries of Annegray, Luxeuil, and Fontaine. His adherence to the Irish rule for calculating Easter involved him in controversy with the French bishops about 602; and a few years later, the courage with which he rebuked the vices of the Burgundian court, led to his expulsion from France. Passing through Switzerland into Lombardy, he founded in 612, the famous monastery of Bobbio, in the Apennines, where he died on the 21st November 615. His life, written, within a century after his death, by Jonas, one of his successors in the abbacy of Bobbio, has been repeatedly printed. The writings of St C., which are wholly in Latin, consist of a rule for the government of his monastery, a few poems, several letters on ecclesiastical affairs, and sixteen short sermons. His monastic rule has been printed more than once; but the most complete edition of his works is in Fleming's *Collectanea Sacra*, published at Louvaine in 1667, and now of such rarity that a copy of it sells for about £35. Of the sermons of St. C., M. Guizot remarks, that 'the flights of imagination, the pious transports, the rigorous application of principles, the warfare declared against all vain or hypocritical compromise, give to the words of the preacher that passionate authority which may not always and surely reform the soul of his hearers, but which dominates over them, and for some time at least, exercises paramount sway over their conduct and their life.' The town of San Colombano, in Lombardy, takes its name from the Irish monk, as the town and canton of St. Gall (q. v.), in Switzerland, perpetuate the name of the most favored of his disciples.

COLUMBA'RIUM (Lat.), a dove-cot or pigeon-house. When

used in the singular, C. also signified a particular kind of sepulchral-chamber used by the Romans to receive the ashes of bodies which had been burned. The name was derived from the chamber being surrounded by small niches or holes resembling the holes in a dove-cot (Columbaria) in which the urns (*ollæ*) were deposited. Tombs of this description were chiefly used by great families for depositing the ashes of their slaves and dependants. Several of them are still to be seen at Rome. The annexed woodcut (copied from Smith's *Dictionary of Greek and Roman Antiquities*) represents a very perfect one which was discovered at the Villa Rufini, about two miles beyond the Porta Pia, in 1822. In each niche were two urns, with the names of the persons whose ashes they contained inscribed over them.

COLU'MBIA, the federal district of the United States, and the seat of the general government, lies on the left bank of the Potomac, being territorially within the limits of Maryland. The district contains about 60 square miles—its chief cities being Washington, the capital of the Union, and Georgetown. Pop. (1870) 131,700; (1880) 177,638, of whom 59,402 were colored. This territory was originally 100 square miles in area, but in 1846 the county of Alexandria was incorporated with Virginia, and C. was reduced to its present size. For a long time C. was less favorably situated than the territories in regard to parliamentary representation; but now, like them, it sends one delegate to Congress.

COLUMBIA, the capital of South Carolina, U.S., is situated on the east bank of the Congaree River, about 100 miles N.W. of Charleston. It is the terminus of the navigation of the Congaree, and of three railways that connect it with Charleston and the coast. Before the civil war it was one of the handsomest cities of the southern states, but it suffered largely during the conflict, having had its principal parts destroyed by fire. It is now fast recovering from the effects of that calamity. C. is the center of a rich agricultural district, and has forests of pine, oak, walnut, and maple in its vicinity which produce a large quantity of timber. It has several educational and other institutions, including South Carolina University, founded in 1804. Pop. (1870) 9288, half of whom were colored; (1880) 10,040.

COLUMBIA, a name long applied to the region to the west of the Rocky Mountains, comprehending the present state of Oregon, the territory of Washington, and British Columbia.

COLUMBIA, or OREGON, the largest stream on the west side of America, rises in the Rocky Mountains, draining that range by means of its different head-waters, from about lat. 54° N. to about lat. 42° N. Its two main branches—the C. Proper from the north-north-east, and the Snake from the south-east—meet about lat 46° 5′ N., long. 118° 55′ W., and united, run together to long. 124° 5′ W., where they empty themselves into the Pacific in a latitude corresponding with that in which they joined. This great river, long vaguely believed to exist, was discovered only in 1792, by Captain Gray of Boston in Massachusetts, who gave it the name of his own vessel in place of the floating appellations of the Oregon and the San Roque. The extreme length is rather more than 1200 miles; most of its course—all, in fact, but the upper part of the north branch—being within the limits of the United States. Nevertheless, the entire navigation is equally open to the British and to the Americans. That navigation, however, is of comparatively little value, more particularly to the former nation.

The river is broken by falls and rapids into many separate portions; and of these, even the most important, the maritime reach, does not exceed 90 miles in length. The ingress and egress are embarrassed by a surf-beaten bar. Still, as a harbor, the C. is decidedly the best on the coast between San Francisco, which is nearly 600 miles to the south, and Port Discovery, which is fully 150 miles to the north. The extraordinarily abundant salmon-fisheries of the C. have been largely developed of late; there are near 40 canneries, mostly at Columbia, at the mouth of the river. In 1882, 535,000 cases of canned salmon were packed.

COLUMBIA COLLEGE, city of New York, founded 1754, comprises a department in arts, in law, in medicine, and in mining. The college proper has its government vested in 24 trustees. Besides a sum invested for purposes of instruction, it owns real estate and personal property to the amount of $4,200,000. In all its faculties Columbia College has over 120 professors, instructors, and assistants; and about 1500 pupils in all its schools. It possesses numerous prizes, scholarships, and fellowships. The general college library contains about 20,000 volumes. The first sum of money was obtained from an act passed by the state for raising £2250 by lottery 'for the encouragement of learning, and the founding of a college.'

COLU'MBIA, BRITISH, since 1871 a province of the Dominion of Canada, is divided into two parts—the mainland, commonly called British C.; and Vancouver's Island (q. v.). These were formerly independent colonies, but were united in 1866. The total area of the province (including Vancouver's Island and its 16,000 sq. m. of surface) is officially stated at 356,000 sq. m. The province borders on the United States and on the Canadian North-west

Territories. In 1858 the northern limit was the parallel 55° N., and the total area of British C., 120,000 sq. m. Now it extends between lat. 48° 20′ and 60° N., and long. 113°—136°. As Vancouver's Island has a separate article, and the northern section is hardly occupied, the present article is mainly concerned with the mainland sections south of 55° N. lat. Running parallel with the Rocky Mountains on the east border, which rise, in Mount Browne, to a height of 16,000 feet, two ranges divide the width of the country into three sections of drainage. In the east are headwaters, which find opposite outlets in the estuaries of the Columbia and of the Mackenzie; through the entire middle and part of the east, the Fraser maintains a southerly course, till, at Fort Hope, it is bent sharply to the right by a mountain barrier, so as to enter the Gulf of Georgia barely within the international boundary;* and lastly, across the west, a series of streams generally meeting long and narrow inlets of the ocean, and terminating in the Skeena, which, with its upland reservoir, Babine Lake, of 100 miles in length, is but little inferior to the Fraser itself.

The principal harbors are Burrard Inlet, on the Gulf of Georgia, a few miles from New Westminster, and the chief port for the lumber trade; Howe Sound, north of Burrard Inlet; Bute Inlet, still farther north; Millbank Sound, which will become valuable as the gold mines on the Peace River attract a population; the river Skeena, now ascended by steam-vessels, and one of the routes to the Ominica gold mines; and the river Nass, near the frontier of Alaska, watering a region also believed to be rich in gold.

The interior of British C., i. e., the region between the Cascade Range and the Rocky Mountains, is, on the whole, rugged and lofty, and though rivers are numerous, they do not serve the purposes of irrigation, being often confined within deep ravines. Still the tracts of arable land are of considerable extent, and very fertile. In 1872, some land 1700 feet above the sea-level, yielded, under proper irrigation, 40 bushels of wheat per acre. The pastures of British C. are, however, likely to prove much more valuable than its arable ground. They are almost endless in extent. On the Cariboo road (between Soda Creek and Quesnel), there is a plain 150 miles long, and 60 or 80 wide; and between the Thompson and Fraser rivers there is an immense tract of grazing land. The hills and plains are covered with bunch grass, on which the cattle and horses live all winter, and its nutritive qualities are said to exceed the celebrated blue grass and clover of Virginia.

The forest lands are also of vast extent, and yield most valuable timber. The principal trees are the Douglas pine, Menzies fir, yellow fir, balsam hemlock, white pine, yellow pine, cedar, yellow cypress, arbor vitæ, yew, oak, white maple, arbutus, alder, dogwood, aspen, cherry, willow, and cottonwood. The Douglas pine is almost universal on the sea-coast and up to the Cascade range. The cedar, white pine, and maple are found everywhere; the Scotch fir, the willow, and cotton-wood on the bottom-lands. But the lumber-trade is only beginning; the value of the exports, in 1870, amounting to little more than £25,000. The Fraser river and its tributaries, with the numerous lakes communicating with them, furnish great facilities for the conveyance of timber. The Lower Fraser country especially is densely wooded. Smaller streams and the numerous inlets and arms of the sea do the same thing for the region further north.

The *fisheries* of British C. are perhaps the richest in the world, but their distance from populous centers has hitherto prevented their development. Whales and seals abound off the northern coasts. Sturgeon are plentiful in the rivers and estuaries; they are found weighing over 500 lbs., and are easily caught. The salmon of the Fraser River are famous over the American continent; so are the oulachans, small sprat-like fish, which enter the river in millions; some are so full of oil that, it is said, they will burn like a candle. Cod, herring, halibut, anchovies, haddock, &c., are caught in great quantities.

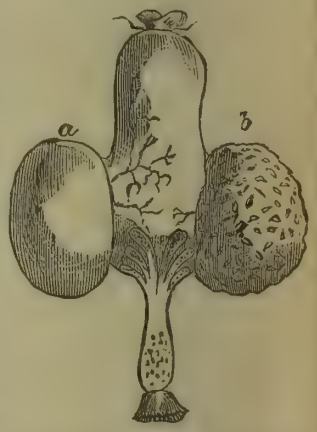
The attractiveness of mining acts as a hindrance to the regular development of the other resources of the province. Copper, lead, cobalt, talc, platinum, cinnabar, and agate occur in British C.; silver has been obtained in considerable quantities. Gold may be said to be universally diffused. New mines were opened in 1871, in the north, in the Peace and Ominica district, and yielded in the same year over £80,000. The total yield for the province in 1875 was about £500,000, and the total yield from 1857 has been estimated at about £7,000,000. The only obstacles to the prosecution of almost inexhaustible gold-mining are the want of roads, the want of capital, and the want of a thorough geological survey. Silver mines have been opened in the Fraser Valley. Coal and iron are also found. Furs are one of the most important products of the country, the value of the exports of that article in 1874 being upwards of £60,000. The most valuable are the black and silver fox, sea otter, red fox, fur seal, mink, martin, beaver, and common otter. Buffalo are found on the plains; bears, and goats, and sheep on the mountains; elk are met with on the coast, and deer on the groups of small islands; wild ducks and geese are abundant; grouse and snipe are found everywhere; and in the plains a kind of tall buff crane, 4 or 5 feet high.

The *climate* varies according to the locality, owing principally to four causes: (1) greater or less distance from the sea; (2) or from the mountain regions; (3) difference in the variety and growth of vegetation; (4) difference of level. The low portions near the sea and on Vancouver's Island have a moderate climate, with a temperature ranging from 20° in winter to 80° in summer. The spring is short, lasting from the beginning of March to the early part of May. A short spring lasts from March till May; summer, from May till September; the next two months are autumn, of which winter is only an aggravation, the snows being light, and the frosts far from severe or lasting.

To its mineral resources, British C. mainly owes its present position. It was the discovery of gold in 1857—coinciding as it did with the expiration of the Hudson's Bay Company's licensed monopoly—that led to the establishment of the colony in 1858. In connection with this same cause, adventurers from the United States, from Great Britain and its dependencies, and from China, have flocked hither. According to the census of 1871, the population of the province was 10,586, exclusive of Indians, who are estimated at from 30,000 to 50,000, but their numbers are diminishing from small-pox, measles, and tribal wars. The census of 1881 showed a total of 49,459. The capital of the province is Victoria (q. v.), on Vancouver's Island (pop. in 1881, 5925); and the chief town on the mainland, New Westminister (4003). During the three years 1879 to 1881, the value of the exports of the province varied from $2,250,000 to $2,750,000, while the value of imports ranged from $2,290,000 to $2,440,000. When the Canadian Pacific Railway is completed, this province will become one of the most valuable in the Dominion. The different routes proposed have provoked much local contention. In the scheme submitted to the Dominion Parliament in 1880, and now being steadily carried out, the completion of the railway within ten years was contemplated.

British C. is represented in the Canadian parliament by 3 senators and 6 members of the House of Commons; but it has also a local legislature, a lieut.-governor, and an executive council. The chief towns are Victoria and New Westminster.

COLU'MBIDÆ, a family of birds, often comprehended under the general English names *dove* and *pigeon*, and forming the genus *Columba* (Lat. pigeon) of Linnæus. They are generally ranked among gallinaceous birds, but exhibit points of resemblance to the order *Insessores*, and have by some naturalists been constituted into a distinct order, intermediate between these. They agree with the true gallinaceous birds in the character of their bill, and in the soft naked tumid membrane at the base of it, in which the nostrils are pierced; also in their *rasorial* (scraping) habits and blunt claws; but they differ very widely from them in their great powers of flight, which are not surpassed in any other family of birds; in having the hind-toe on the same level with the other toes; in having no connecting membrane at the base of the toes; in not being polygamous but pairing, and in the male taking part with the female in the care of the young; in their having generally only two young ones at a time, but breeding often in a year; in their double crop, an expansion of the gullet on both sides, in which they differ from all other birds; and in the secretion, at breeding-time, of a milky fluid by the crop of both parents, as in the parrots, with which the food is saturated in order to fit it for the young, which, unlike those of the true gallinaceous birds, are at first very helpless. The figure represents the gullet and double crop of a pigeon—one side, *a*, exhibiting the usual appearance of the crop; and the other, *b*, showing its appearance when the glands are developed which secrete the milky fluid. The number of species of C. is very great. There is amongst them so much resemblance, that scientific classification has been found very difficult. They are found in all warm and temperate climates, but comparatively few are European. The Indian archipelago particularly abounds in them. Many of the tropical species exhibit a brilliancy of colors scarcely excelled in the humming-birds or sun-birds.



Gullet and Double Crop of a Pigeon.

The chaste beauty of the plumage is always pleasing, even

* The decision of the German emperor (21st October 1872) on the *San Juan Boundary Question*, has affirmed the accuracy of the American interpretation of the treaty of 1846, in virtue of which the boundary of the United States runs through the Haro Channel, and the San Juan archipelago, lying between Vancouver's Island and the mainland, and commanding the outlet to the Pacific, has been assigned to the latter power.

when brilliancy is wanting. The voice is very similar in all the species, the *cooing* of some, however, being harsh, that of others soft and pleasant. Some species are migratory, and some congregate in prodigious flocks. See BRONZEWING, CARRIER PIGEON, DOVE, FRUIT PIGEON, GOURA, GROUND-DOVE, PARTRIDGE PIGEON, PASSENGER PIGEON, PIGEON, TURTLE-DOVE, and VINAGO.

CO'LUMBINE (*Aquilegia*) a genus of plants of the natural order *Ranunculaceæ*, having five colored sepals, which soon fall off, and five petals each terminating below in a horn-shaped spur or nectary. They are natives of the temperate and colder regions of the northern hemisphere. One, the Common C. (*A. vulgaris*), is found in woods in some parts of Britain, and has long been familiar as an inmate of flower-gardens. It is a perennial, generally three or four feet high, with flowers of curious structure and considerable beauty. C. was formerly much esteemed for medicinal virtues, which are now seldom heard of.—Some of the other species are very ornamental, and are pretty common in flower-borders.

Common Columbine (*A. vulgaris*).

COLU'MBIUM, or TA'NTALUM (symbol Ta), is a rare metal found in the mineral tantalite, obtained from Bodenmais, in Bohemia, and from Sweden. It can be obtained as a black powder, which assumes a lustrous aspect when subjected to the process of burnishing. It forms a series of compounds, of which only Columbic Acid (TaO_3) is worthy of notice.

COLU'MBUS, CHRISTOPHER (the Latinized form of the Italian *Colombo*, and the Spanish *Colon*), the great navigator, who added a new hemisphere to our globe, is supposed to have been born at or near Genoa, in the year 1436, or, as others say, 1446. Though virtually the greatest man of his era, there is little definite information about his family and his early life. It would appear, however, that he was the son of a wool-comber; that he attended for some little time the then great school of learning at Pavia, where he evinced a taste for astronomy and cosmography; and that he early went to sea, and made several voyages in the Mediterranean.

Settling in Lisbon in 1470, he there married the daughter of an Italian named Palestrello, who had distinguished himself as a navigator in the Portuguese service, and with her obtained some valuable charts, journals, and memoranda. Lisbon, at this time, was the headquarters of all that was speculative and adventurous in the way of geographical discovery; and here, while constructing maps and charts for the livelihood of his family, C. first appears to have imbibed that idea of land to the westward, which he was destined, after long disheartening years, to establish as fact—the land, indeed, not being, as he had supposed it, a prolongation of the eastern shores of Asia, but a new western continent. With the view, apparently, of better qualifying himself for his great enterprise, C. made several voyages to the Azores, the Canaries, and the coast of Guinea—then the limit of European navigation in this direction. Not until about 1482 or 1483, did C. find opportunity to lay his scheme before John II. of Portugal. This monarch referred it to a junto of nautical and scientific men, who decided against it. The king, however, meanly taking advantage of a detailed plan obtained from C. under false pretences, secretly sent out a vessel to examine the route. Too timid to venture far from the beaten-track, the pilots soon returned to Lisbon, to throw ridicule on the project. Disgusted with the duplicity of his sovereign, C. secretly left Lisbon in 1484, taking with him his little motherless boy Diego. He found his way to Genoa, where the republic, before whom he unfolded his scheme, treated it as the silly product of a visionary brain; and it is said that he also met with like treatment from the Venetians; but it appears doubtful whether he at this time communicated with them. Disappointed, but not despairing, for C. was buoyed up with the belief that Heaven had commissioned him to plant the banner of the cross upon those shores which as yet appeared to exist but in his own imagination, C. turned his steps towards Spain. Weary and hungry, he stopped one day at the gate of the Franciscan convent La Rabida, in Andalusia, to beg some bread and water for his child. This day was the turning-point in his career. The superior of the convent, Juan Perez de Marchena, passing at the moment, entered into conversation with the traveler, and was so struck with the grandeur of his views, that he used all his influence to procure him the favorable consideration of the king and queen. It was not, however, until seven more years of disappointments had passed over—during which C. had applied to other courts, and without avail—that he found himself in command of three small vessels, only one of which was decked, with 120 men, ready to start on his adventurous enterprise.

C. claimed, as reward, to be nominated high-admiral, and governor-general and viceroy, over all the lands he discovered, with a tenth of the produce of the countries. On the 3d of August, 1492, C. set sail from the bar of Saltes, near Palos. Delaying a month at the Canaries to refit, he started thence, on the 6th of September, over unknown seas. His crew soon began to interpose their timid fears, and when these were unavailing, to express their open disaffection; but equally disregardful of both, C. bore steadily westward; himself, however, not without misgiving as to what the variation in the needle (not before discovered) portended. On the 12th of October, his perseverance was rewarded with the sight of land, which proved to be one of the Bahama Islands. Here he solemnly planted the cross, giving the island the name of San Salvador. After discovering several other of the West India Islands, including Cuba and Hayti, or San Domingo, at the latter of which, called by him Hispaniola, he settled a small colony, C. set sail again for Spain, where he arrived on the 15th March, 1493, and was received with every demonstration of joy and admiration, as well by the people as the court. In September of the same year, he set sail from Cadiz on a second expedition, with 17 ships and 1500 men. In this voyage, he discovered the Caribee Islands, Jamaica, &c.; but calumnies at home forced him to return in 1496. Having cleared himself with his sovereigns, he, in 1498, set out on a third expedition. This time, steering more to the southward, he discovered Trinidad, and the mouths of the Orinoco, and landed at Paria, on the coast of South America. After these discoveries, C. steered for Hispaniola, where he found everything in disorder. The king's ear had been again abused; an officer named Bovadilla had been appointed to supersede C. as governor, and by this person C. was sent home in chains. This unworthy treatment excited the indignation of the Spanish people to such a degree, that Ferdinand was fain to disavow all knowledge of the disgraceful affair. But all C.'s efforts to obtain redress from the king were fruitless. The spirit of adventure, however, which had borne him up amid so many disappointments, was not to be crushed by injustice. It still burned bright and strong as ever within the great old man, who, on the 9th May, 1502, with four vessels and 150 men, set out once more to seek a passage uniting the Atlantic and Pacific oceans, which he imagined lay somewhere between Honduras and Paria. But the mutinous character of his crew forced him aside to seek for gold, and after many difficulties and disasters, and having added little of importance to his previous discoveries, he returned to Spain in November, 1504. Isabella was dead; Ferdinand proved basely ungrateful; and so the noblest navigator the world has seen, was permitted to die in poverty at Valladolid, 20th May, 1506. To make up somewhat for his injustice, Ferdinand gave C. a pompous funeral, and erected a magnificent monument to his memory. The bodies of C. and his son were carried in 1536 to San Domingo, and in 1796 were transferred to the cathedral of Havana, where they still repose.

COLUMBUS, capital of Ohio, U.S.A., stands near the center of the state, 100 miles N.E. of Cincinnati. The chief public institutions of the state are situated here—the capitol, the penitentiary, the state arsenal, and the asylums. The manufactures are important, their being numerous machine shops, foundries, breweries, and carriage works. Pop. (1870) 31,274; (1880) 51,665.

COLUMBUS, a city of Georgia, U.S.A., stands on the Chattahoochee River, 300 miles from the mouth, and has some trade. Pop. (1880) 6152.

COLUME'LLA.—1. The central axis which remains, formed of the placentas, when the carpels of some fruits have separated from each other and from them.—2. The central axis of the spore-cases (capsules) of mosses.—3. The central axis around which the whorls of many spiral univalve shells are closely wound.

COLUMELLA, LUCIUS JUNIUS MODERATUS, the most learned of Roman writers on practical agriculture, was born at Cadiz, in Spain, and flourished in the earlier part of the 1st c. of the Christian era. For some time he resided in Syria, but lived chiefly at Rome, and died, most probably, at Tarentum. His great work, *De Re Rustica*, in 12 books—the 10th, On Gardening, is versified—is addressed to one Publius Silvinus, and treats of arable and pasture lands, culture of vines, olives, &c., care of domestic animals, &c., respective duties of masters and servants, &c. A supplementary treatise relates to trees. This ancient 'Book of the Farm' is written in good Latin, and the information is copious, though not precise, and in some points of questionable accuracy. The best editions of C. are by Gesner (1735 and 1773) and Schneider (1794—1797).

CO'LUMN (Lat. *columna*), a pillar or post, usually cylindrical in form, employed for the purpose of supporting a roof, entablature, or other superstructure. As the earliest habitations in almost all countries were formed of wood, it is unquestionable that the earliest columns consisted of the trunks of trees. It is said that even at the present day the Greek peasants of Asia Minor construct their wood-huts so as almost exactly to resemble the form and disposition of parts which we find in the great architectural monuments of classical antiquity. That the Greeks actually made use of wood in the earliest time, even for their monumental structures, we learn on the testimony of Pausanius, who mentions a monument in the market-place at Elis which consisted of a roof supported by pillars of oak; and Pliny tells us that the temple of Juno at Metapontum was supported by pillars made of the stems of vines. From these facts, it is natural to conclude that the stone columns which came first into use would be imitations of the trunks of trees; and this we are also in a condition to prove historically, many of the largest stone columns in Egypt—where, from the scarcity of wood, they were earlier introduced than elsewhere—being manifest imitations of the trunk of the palm (figs. 2 and 3).

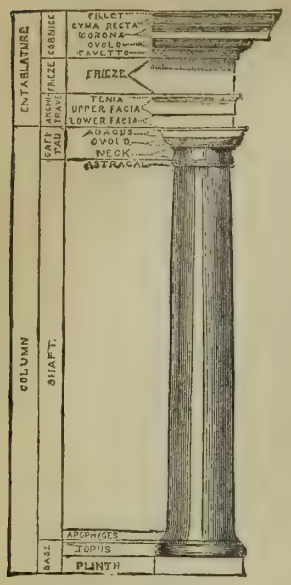


Fig. 1.—Column: Tuscan, with details.

In order to prevent them from being forced into the ground by the superincumbent weight, these early wooden columns were placed upon one or more large flat stones, and on the top another stone was placed, to preserve them from the decay which the rain sinking into the wood would have occasioned. In these primitive arrangements, we plainly perceive the germ of the three principal parts of the classical C.—the shaft, the base, and the capital. As the Doric style of architecture was the earliest of the classical styles, the Doric is naturally the simplest and most severe of the classical columns. One of its most striking peculiarities is what at first sight seems to be the absence of the base (fig. 4). The true account of the matter, however, is, that all the columns in the same line of a Doric temple stand on one base, whereas, in the other orders, each C. has a separate base. But it is in the capitals in all the orders, Egyptian, Classical, and Gothic, that columns differ from each other most strikingly (see below). As classical architecture advanced, greater lightness and elegance were sought after; and this, as regarded the C., was obtained by increasing the height, and diminishing the proportional thickness of the shaft. In the Ionic and Corinthian orders (figs. 5 and 6), as compared with the Doric, this peculiarity may be distinctly seen.

Fig. 2.

Fig. 3.

In almost all columns, the shaft tapers gradually from the bottom to the top, thus imitating the natural growth of a tree, and at the same time conforming to a mechanical rule for obtaining the greatest amount of strength in upright bodies. But in place of tapering regularly, the shaft was generally made with a slight swelling towards the middle, called the *entasis*, and had for the most part in all the classical orders striped incisions from top to bottom called flutes or channels, which were regularly worked, and varied in number from 20 to 32. See FLUTING. The relation which subsisted between the height of the C., and the diameter at the top and bottom, and between these and the entablature, has been calculated with the greatest possible precision in all the principal classical examples, and will be found stated in all professional works on classical architecture. The shaft usually consisted of several cylindrical blocks accurately fitted to one another, whilst the capital was commonly hewn out of a single stone. The separate portions of the shaft were fixed together, not by mortar or cement, but by iron cramps, which were fitted into holes in the center, and thus rendered invisible. Sometimes columns of immense size were hewn in the quarry of one piece of stone, and then rolled over the ground, and raised to their destined positions by various mechanical contrivances. Columns were often used in classical times, and are employed by us in the interior of buildings to support the roof or galleries, as well as for purposes of decoration; and this custom seems to have prevailed in the halls of persons of great distinction even in Homeric times.

In the ancient Basilica (q. v.), a line of columns separated the central space which was open to the sky from the aisles of the building, whilst at the same time they supported the galleries which were placed above the aisles. These columns were the origin of the piers or pillars by which the nave is divided from the aisles in Christian churches. The same arrangement prevailed in the Roman atrium. When, in order to support the roof which covered the gallery or any other superstructure, a second row of columns was introduced, it was usually of the lighter styles, Ionic or Corinthian, the lower columns being commonly Doric. Single columns were erected for various purposes, as for mooring ships

Fig. 4.

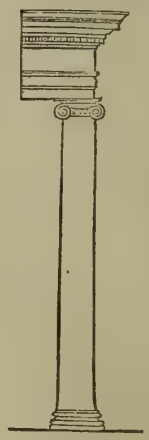


Fig. 5.

Fig. 6.

in harbors, or to commemorate persons of note, or national events. See PILLAR.

Capitals.—In classical architecture, it is by the capitals of pillars, more than by any other feature, that the different orders are distinguished, very much as the Gothic styles are marked by the form of the arch. Till the period of the renaissance, the head of a column, in English, was called chapiter (chapter), its diminutive being chapitrell. The three capitals which alone belong to pure Greek architecture are described in Thomson's well known lines (*Liberty*), so concisely and accurately, that it is needless to dwell on them in prose:

> 'First unadorned,
> And nobly plain, the manly Doric rose;
> The Ionic then, with decent matron grace,
> Her airy pillar heaved; luxuriant last,
> The rich Corinthian spread her wanton wreath.'

To the three Greek orders, the Romans added two others: the Tuscan, which was a variation on the Doric, or rather a corruption of it; and the Composite, which was a combination of the Ionic and Corinthian, the proportions and general character of the Corinthian being retained, but the Ionic volutes being substituted for the Corinthian leafage. As the trunks of trees placed upright, so as to support the roof, unquestionably led to the introduction of the stone pillar, there seems to be almost as little doubt that the capital was suggested by the boughs with which such trees might be supposed to be surmounted, or the garlands with which, on festive occasions, they were probably encircled and crowned. At first, when the power of working in stone was limited, imitation of foliage was scarcely attempted; but the original idea being adhered to, it came at last to be carried out with great success in the Ionic and Corinthian capitals of classical architecture, and in all of the more advanced of the Gothic styles.

Fig. 7.

The forms of Gothic capitals are so various, that it is altogether impossible to particularize them here. Beginning with the Romanic—which is often nothing more than a modification of the Doric, or a further debasement of the Tuscan, the sides being truncated or flattened, and some of the mouldings omitted—they advance very rapidly in adornment; and in the style which we call Early English, they already frequently consist of a mass of foliage, cut with great boldness and freedom, so that the stalks and more prominent of the leafage are entirely detached. It is remarkable that, in the decorated style, the capital lost much of the richness which it possessed in the earlier styles, and often consists only of plain mouldings, with or without a ballflower (q. v.), cut on the bell or bowl of the capital. Where foliation is introduced into this style, it is usually worked with greater freedom, and is free from the

stiffness which characterizes earlier work. Animals, figures in armor, heads of bishops in mitres, and the like, are oftener found in the decorated style, though their introduction was not unknown at a much earlier period. In the perpendicular style, the capitals were stiffer in form, and generally less ornamented than in any of the others; though even here foliage is often introduced, as in the accompanying example from the cloisters of Christ Church, Oxford.

The only invariable characteristics of capitals seem to be something like a moulding at the upper part of the shaft, more or less complicated according to circumstances, and some sort of Abacus (q. v.), or flat portion on the top, on which the architrave rested in the classical orders. These characters belong even to the Egyptian capitals, which in many other respects resemble those of the other styles. The foliation of Egyptian capitals is generally taken from the vegetation peculiar to the banks of the Nile (fig. 2); but the capitals of this, particulary in its later examples, were infinitely varied both in decoration and in form.

COLUMN, in Military Evolutions, is a mass of soldiers several ranks in depth, presenting a formation different from that which arises from spreading them out *in line*. There may be columns of brigades, of regiments, of battalions, or of companies; presenting a front of limited width, but a width depending on the number of elements in the column. If a battalion consists of ten companies, then a 'battalion in C.' has all the companies posted one behind another.

According to the density of the C., it is called *open* or *close*. In a battalion, when the distance between any one company and the one immediately before it is such as to admit of their wheeling into line, the formation is called *open* C.; when the distance between the front rank of one company and the rear rank of the one before it is only a few yards, it is *close* C.; when intermediate between these two, it is *half-distance* column. The relative advantages of C. and *line*, in drawing up troops for action, are among the matters closely studied by the commanders of armies: the French, as a general rule, have rather favored the formation in C.; the English, that in line. Sometimes the name C. is given to that which, in effect, is a small army.

CO'LURE. See ARMILLARY SPHERE.

COLU'TEA. See SENNA.

COLY'MBIDÆ, a family of web-footed birds, distinguished by short wings, legs placed so far back that the bird always assumes an erect position when standing, broad flat tarsi (*shanks*), and a compressed bill, pointed at the tip. They are all extremely aquatic in their habits, and possess great powers of diving as well as of swimming. Some of them have all the front toes perfectly webbed, as the loons or divers, (*Colymbus*); others have the feet lobed, each toe with a separate membrane, as the grebes (*Podiceps*). These are the two principal genera. The guillemots (*Uria*) seem to connect this family with the *Alcadæ*.

CO'LZA. See RAPE.

CO'MA, a Greek word used in medicine, to signify a state of more or less profound insensibility allied to sleep, but differing from natural sleep in its characters, as well as in the circumstances under which it occurs. In C., the patient lies on his back, and is either simply insensible to external impressions, or has a confused and dull perception of them, with restlessness and low Delirium (q. v.). The former kind of C. occurs in appoplexy and epilepsy, and also in many other organic diseases of the brain and its membranes, of which, indeed, it may be said to be the natural termination. It is also seen in narcotic poisoning, and most characteristically in poisoning by Opium (q. v.). In the most fatal forms, the breathing is very slow and noisy (snoring or stertorous), accompanied with puffing of the cheeks; the pulse is at first strong and regular, afterwards feeble; there is often lividity; and the pupils are either contracted or excessively dilated, but in either case immovable, and totally insensible to light. In the second variety of C., there is perpetual restless delirium, without enough of sensibility to lead to spontaneous and regular voluntary movements; the patient mutters slightly, and grasps feebly and without purpose at any object in his way; the pupils are commonly contracted, and the tongue is apt to be dry and brown. This kind of C. is mainly seen in many fevers, and forms one of the modes of their fatal termination. The treatment of C. is that of the disease or accident leading to it.

Where there is a reasonable chance of recovery, the patient must be roused to consciousness as much as possible, either by frequent movements or strong impressions on the skin, or by the use of galvanism, so as to maintain the respiration. See OPIUM. Blistering of the head is also sometimes resorted to with good effect.

CO'MA BERENI'CES (Lat. Berenice's hair), a small and close cluster of stars near the equinoctial colure, south of the tail of the Great Bear.

COMA'CCHIO, a fortified town of Central Italy, in the province of Ferrara, and 3 miles from the Adriatic. The lagoon or marsh, in the midst of which it is situated, is about 140 miles in circumference, and is shut out from the Adriatic by a narrow belt of mud. Its position is very favorable for the manufacture of salt, of which 2,000,000 lbs. are said to be obtained annually. C. is also the seat of a curious branch of industry—viz., eel culture, which forms the principal employment of its inhabitants, who number about 8000. A series of canals have been constructed leading from the Adriatic to admit the fry of the eel, the mullet, the sole, and other fishes into the lagoon, where they are fattened, and speedily attain a marketable value. The fishery is carried on chiefly in the late autumn, when the waters of the lagoon are excited by storms. The fish, then seeking an outlet to the sea, find their way into certain labyrinths leading into reservoirs constructed at the termination of the canals, where they are caught in immense quantities. Religious ceremonies inaugurate the commencement of the season, and when any body of fishermen in one night capture 48,000 lbs., weight of fish, a feast of fish is held, and great rejoicings take place. The eel-harvest occupies from twelve to fifteen weeks; and some idea of its extent may be formed from the fact, that from the years 1798 to 1813 the annual 'take' averaged close upon 2,000,000 lbs. weight. From 1813 to 1825, the average was about 1,612,600 lbs. per annum. An accident for some years greatly reduced these quantities, but the supply is greatly increasing, being upwards of a million pounds weight per annum. The fish are prepared for the market by partial cooking in a large kitchen built for the purpose, the eels of moderate size being roasted alive, in order to their better preservation. The larger fish are chopped into lengths, the heads and tails being sold for the benefit of the poor. Large quantities of the eels are also salted and dried. The workmen, who are lodged in barracks, and submit to a strict discipline, are allowed one and a half pounds of fish per diem. The money-value of these fisheries may be estimated from the fact, that 1 lb. weight of eel-fry will, in the course of three or four years, be worth to the cultivators of the lagoon a sum of £41 sterling.

COMA'TULA. See CRINOIDEÆ.

COMAYA'GUA (formerly VALLADOLID LA NUEVA), chief city of Honduras, Central America, 190 miles east of Guatemala, in a fine but unhealthy valley, 1800 feet above the sea, on the right bank of the Humuva, which flows into the Pacific. The city was founded in 1540, is the see of a bishop, has a cathedral, college, ecclesiastical seminary, several convents, and a rich hospital. Pop. 8000; it was 18,000 previous to 1827, when the city was burned by the monarchical faction of Guatemala, and has never since wholly recovered.

COMB (Sax. *camb*). Combs seem to have been used by the ancients rather for adjusting than for fastening the hair, the pin or bodkin (*acus*) having been chiefly employed for the latter purpose. Both the Greek and Roman combs were generally made of box-wood, which was obtained from the shores of the Euxine; but latterly ivory combs came into general use amongst the Romans, as they had long before been amongst the Egyptians. The precious metals were also used for the purpose, as we may infer from the golden combs ascribed to the goddesses; but this was probably rarer in ancient than in modern and medieval times, from the circumstance of the C. not having been then used as an ornamental fastening. Of the early use of gold combs by our own countrywomen, we have a monument in the well-known ballad of *Sir Patrick Spens*:

'O lang, lang may their ladyes sit,
Wi' their gowd kames in their hair.'

Fig. 1 represents an ancient Irish long rack C. in the museum of the Royal Irish Academy. The sides are hog-backed, and between them are set pectinated portions, varying in breadth from

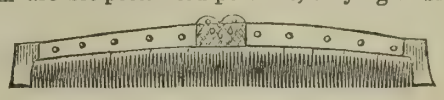


Fig. 1.

half an inch to an inch and a quarter, according to the size of the bone out of which they were cut. The whole is fastened together with brass pins riveted. By this contrivance, any damaged portion could easily be replaced.

Fig. 2 is a specimen of a pocket fine-tooth C., from the same collection; it is drawn two-thirds the size of the original.

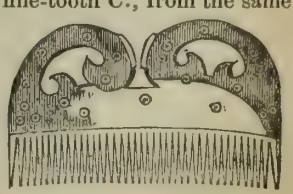


Fig. 2.

Combs are made of tortoise-shell, ivory, horn, wood, bone, metal and india-rubber. The material is first made into plates of the size, shape, and thickness of the C., and then the teeth are cut. The old method of cutting the teeth is by the *stadda* or double saw, which has two blades of steel set parallel to each other, with a space between them equal to the thickness of the intended

tooth. Combs with 50 or 60 teeth to the inch may be cut in this manner. The teeth are then thinned, smoothed, and finished by means of thin wedge-shaped files. Instead of hand-saws, circular-saws of similar construction have been more recently used.

Many combs are now made by a method called 'parting.' By the processes of cutting above described, the material corresponding to the spaces between the teeth is of course wasted; by the method of parting, this is made available to form the teeth of a second comb. The annexed figure will show how this may be effected. The plate of horn, tortoise-shell, &c., is cut through by means of a stamping-cutter, consisting of two thin chisels inclined to each other, as *ac* and *bd*, which represent their edges; between these, and connecting the ends *c*, *d*, is a small cross-chisel. When

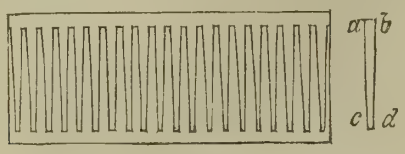


Fig. 3.

this compound cutter descends with sufficient force upon the plate, it will cut one of the teeth shown in the figure. By simple machinery, the table carrying the plate is made to advance a distance equal to the thickness of one tooth while the cutter is rising, and thus the successive cuts are made as represented. A slight pull is now sufficient to part the plate into two combs, the teeth of which only require filing and finishing.

India-rubber combs, now so extensively used, are manufactured by pressing the caoutchouc to the required form in moulds, and 'vulcanizing' or combining it with sulphur afterwards. By this means a high degree of hardness can be obtained.

COMB, or COOMB, an old corn-measure, containing four bushels. In many localities, hollows or valleys among hills are called COMBS or COOMBS (W. *cwm*). The word is allied to the Gr. *kymbos*, a cavity; *kymbe*, a vessel.

COMBE, GEORGE, a well known phrenologist and moral philosopher, was born October 21, 1788, in Edinburgh, where he was educated. Entering the legal profession, he became a writer to the Signet in 1812, and continued to practise until 1837, when he resolved to devote himself to scientific pursuits, for which he had always manifested a predilection. As early as 1816, he made the acquaintance of Dr. Spurzheim, while the latter was on a visit to Scotland, but at first regarded his phrenological system with aversion. Investigation, however, convinced him that phrenology was based on fact. The result was his *Essays on Phrenology* (1819). Five years latter appeared his *System of Phrenology*, which became very popular, and reached a fifth edition in 1843; besides being reprinted in America, and translated into French and German.

But his most important production is *The Constitution of Man considered in Relation to External Objects* (1828; 9th ed. 1860). This work endeavors to demonstrate, what it is strange should ever have been denied, the essential harmony of the nature of man with the surrounding world, and the necessity of studying the laws of nature, in order that we may realize the advantages of the external world, lessen our exposure to outward evils, and carry out successfully man's physical, moral, and social improvement. C.'s doctrines were violently opposed, being considered by many as inimical to revealed religion: but now that the heat of controversy has cooled, it is seen that, in their main aspects, they were not liable to the objections urged; and they are, to a large extent, adopted in the physico-social reforms of the present day. Nearly 100,000 copies of the work have been sold in this country; numerous editions have been printed also in America, and it has been translated into French, German, and Swedish. C. contributed largely to the *Phrenological Journal* (20 vols. 1824—1847). He traveled in Germany and America, and published *Notes* of his experiences. His death occurred on 14th August 1858. Mr. C. married, in 1833, Cecilia, daughter of the celebrated Mrs. Siddons; by whom he was survived. Besides the works mentioned, he wrote *Elements of Phrenology* (1824; 9th ed. 1862); *Lectures on Popular Education* (1833; 3d ed. 1848); *Moral Philosophy* (1840; 3d ed. 1846); *Life and Correspondence of Andrew Combe, M.D.* (1850); *Principles of Criminal Legislation and Prison Discipline* (1854); *Phrenology applied to Painting and Sculpture* (1855); and *The Currency Question considered in Relation to the Bank Restriction Act, 7 and 8 Vict. c.* 32 (1855; 8th ed. 1858), &c. The latest of his works—in which the importance of natural religion, and the duty and advantage of obedience to its precepts, are eloquently enforced—is on *The Relation between Science and Religion* (1857). Endowed with great activity and an earnest apostolic spirit, C. was fond of lecturing on his favorite subjects, and delivered many successful courses not only in various parts of the United Kingdom, but in the United States, and even in Germany. As a citizen, he took a zealous part in promoting parliamentary reform, the abolition of the corn laws, and a system of national education. His books on phrenology were given to the Advocates' Library. See the *Life* by C. Gibbon (1878); and C.'s views and articles on *Education*, collected by Jolly (1879).

COMBE, ANDREW, M.D., brother of the preceding, was born in Edinburgh, October 27, 1797. He studied medicine there and at Paris, and in 1823 commenced to practise in his native city. In 1836 he received the appointment of physician in ordinary to the king of the Belgians, but his delicate health prevented him from retaining this office; and on returning from Brussels, he continued to act only as consulting-physician to his majesty. Afterwards, he became one of the physicians in ordinary to Queen Victoria in Scotland. He died at Edinburgh, August 9, 1847. His principal works are—*Observations on Mental Derangement* (1831); *The Principles of Physiology applied to the Preservation of Health*, &c., (1834; 15th ed. 1860); *The Physiology of Digestion considered with Relation to the Principles of Dietetics* (1836; 10th ed. 1860); and *The Management of Infancy, Physiological and Moral* (1840; 9th ed. 1860, revised by Sir James Clark; 10th ed. 1870). Mild, benevolent, and wise, Andrew C. obtained the esteem and admiration of all who could appreciate purity and excellence of character. In his *Life and Correspondence*, published by George Combe in 1850, we find not only a vivid picture of the man, but an example of patient adherence to physiological principles in the treatment of a delicate constitution, with the result of prolonging a useful life far beyond what he had ventured to hope for. The record of the means by which he combated a serious pulmonary disease for nearly thirty years at home and abroad, is calculated to be highly instructive to persons similarly afflicted. His death was probably hastened by exposure to the poisonous air of an emigrant ship, in which he made a voyage to America: the experience gained on this occasion led him to proclaim, through the *Times*, the urgent necessity of a law regulating the sanitary arrangements in emigrant vessels. The long letter which he wrote on this subject appeared on September 17, 1847, a month after his death, and ere long the Act 12 and 13 Vict. c. 23, provided a remedy for the evil. Dr. C. also exerted himself successfully for the improvement of medical education. A list of his contributions to the *Phrenological Journal* and the *British and Foreign Medical Review* is appended to his *Life*. His character as a man, a physician, and a writer, is affectionately depicted by his friend Sir James Clark, in an Introduction to the 9th edition of *The Management of Infancy*.

CO'MBERMERE VISCOUNT (Stapleton Stapleton-Cotton), a British field-marshal, son of Sir Robert Salusbury Cotton, baronet, of Combermere Abbey, Cheshire, was born in 1773 at Llewenny Hall, Denbighshire. Educated at Westminster School, he, in February 1790, entered the army, and distinguished himself in India at the battle of Mallavelly and the siege of Seringapatam. In 1807—in which year he succeeded his father in the baronetcy—he proceeded, with the rank of major-general, to the Peninsula, in command of a brigade of cavalry; and in 1810 was appointed to the command of the whole allied cavalry under the Duke of Wellington.

He was present at the battles of Talavera, Fuentes de Onoro, Salamanca—where he was second in command, and was severely wounded—the Pyrenees, Orthes, and Toulouse. For his brilliant services in the Peninsular War, he repeatedly received the thanks of parliament, and in May 17, 1814, was raised to the peerage as Baron Combermere. Although not at Waterloo, he had the command of the cavalry of the army of occupation in France; and in 1817 was appointed governor of Barbadoes, and commander of the forces in the West Indies. In 1822, he became commander-in-chief in Ireland; and in 1825 was nominated commander of the forces in India. In that position, he achieved the capture of the strong and almost impregnable fortress of Bhurtpore; and, December 2, 1826, was raised to the rank of viscount. In 1834, he was sworn a privy councillor; and in October 1852 succeeded the Duke of Wellington as Constable of the Tower of London and Lord-Lieutenant of the Tower Hamlets. In 1855, he was made field-marshal. He died in 1865.

COMBINA'TION means the act of uniting or combining certain active elements; and it has come lately, in the legal and political phraseology of England, to mean the uniting together of persons having a common interest, with a view to promoting that interest. Thus, it may refer to employers uniting together to keep up prices or keep down wages; or it may apply to workmen uniting together to keep up wages. The word is now almost exclusively used in relation to the proceedings of the working-classes for retaining a monopoly of certain occupations, or for keeping up wages above their natural amount. C. is one of the most obvious, and in certain circumstances, one of the most justifiable and beneficial arrangements. Like all other human institutions, it has its good and bad shape—the former, when it is used for protection; the latter,

when it is used for oppression. It is a practical exemplification of the precept taught by the old man in the fable, when he recommended union to his sons by showing that the bundle of sticks could not be broken, but that each stick could be easily snapped when separated. The municipal corporations were combinations to protect the citizens against the power of the aristocracy, and a group of these municipal corporations formed themselves into a larger C., well known as the Hanse Towns, whose united influence not only braved the aristocracy, but exceeded that of many of the European monarchies. The guilds and other societies, whether of merchants or artizans, were combinations established for protection in violent times; though they were employed to further monopoly and interfere with freedom of trade, when more equal laws, and a higher social civilization, rendered them unnecessary for mere protection from external oppression.

The free-masons are a relic of a great guild, or secret society, pervading all Europe. The similarity to each other of contemporary Gothic buildings, however far apart, is explained by the circumstance, that they were built by a large C. of workmen, who all learned in the same school the same rules of art, and who had secret arrangements which enabled them to work together, and preserve the monopoly of the building-trade.

The oppressive laws to which the working-classes, even in this country, were subjected, fully justified them in combining for their own protection. The nature of those laws is explained, though not justified, by the fact, that they were less oppressive than the institutions of other countries where the working-classes were in actual serfdom; and that they mark, in reality, the steps of progress onwards from the state of slavery or serfdom in which all the working-classes were of old involved, even in this country. The boasted freedom of our Saxon ancestors was, indeed, very similar to that of the southern states of North America before the late civil war, since it was all enjoyed by the upper class, to whom the inferior persons were slaves; and the term freeman, still used in certain municipalities, of old distinguished those who were not slaves. The statutes of labor still retained a portion of this servitude, laying heavy penalties on workers in the various trades who refused to work at a regular fixed remuneration—often, of course, below the market value, otherwise it would not require to be protected by penalties. By the Poor Law Act, too, those who would not work might be veritably enslaved by being compelled to labor in the service of any householder. It may be said, indeed, to be the last stage of the emancipation of the working-classes from slavery when the C. Act was repealed in 1825. This act, which, after all, was a mild relic of the old laws for coercing workmen, subjected those who, whether verbally or in writing, entered into combinations for keeping up the wages of their labor, or limiting the hours of work, to be punished by imprisonment as criminals. There is no doubt that, in defiance of this act, secret combinations were held of a more dangerous and cruel character than any which have occurred since the repealing act of 1825, which rendered C. itself lawful, but punished any attempts to enforce the views of the combining workmen by violence or intimidation.

Both by the law of the land, and the public opinion on which it rests, it is now allowable for any class of men to combine together for the purpose of fixing the price at which they shall buy or at which they shall sell, provided their C. be entirely voluntary, and subject no one to coercion. All the landlords of a state, for instance, might combine to keep up the price of grain; but if they should get a law to enable them to exact this price by prohibiting any of their body from selling for less, or for prohibiting or limiting the importation of foreign grain, then their C. would be oppressive. In like manner, a hundred bricklayers or a hundred tailors may combine not to work for less than a certain remuneration, or not to work more than a certain number of hours daily; and they are quite free to do so, provided they do not compel any one to join their C., or do not interfere with those who are content to work on lower terms. The difficulty is to define compulsion.

Royal Commissioners appointed to inquire into the subject of trade-unions and combinations of workmen in 1869 and 1875, gave an account of the history and working of the modern law, and its modifications from time to time. It 1871, two acts were passed for the purpose of consolidating and settling the law; these were supplemented by the Trades-union Act Amendment Act, 1876, which more fully defines the nature of the combinations to which the acts apply, the rights of members in certain events, and imposes conditions in reference to registration. 34 and 35 Vict. c. 31, defined what trade-unions were to be deemed unlawful, and when their contracts were not enforceable, and provided for the legislation of trade-unions, and the protection of their property. The other act 34 and 35 Vict. c. 32, repealed all the former laws as to violence, threats, and molestation; but it has now been repealed by the Conspiracy and Protection of Property Act, 1875, 38 and 39 Vict. c. 86, which applies to the United Kingdom. The leading characteristic of this act was to abolish, as much as possible, the appearance of exceptional legislation as to the mutual relations of workmen and their trade-unions, and to make general rules applicable to all businesses and occupations. It was declared that an agreement or combination by two or more persons to do, or procure to be done, any act in contemplation or furtherance of a trade dispute between employers and workmen, shall not be indictable as a conspiracy, if such act committed by one person would not be punishable as a crime. Before that statute, what was innocent when done by one person became indictable when done by three or more simultaneously.

The law relating to compulsion or intimidation is now generalized, as follows: Every person who, with a view to compel any other person to abstain from doing or to do any act which such other person has a legal right to do or abstain from doing, wrongfully and without legal authority (1) uses violence to, or intimidates such other person, or his wife or children, or injures his property; or (2) persistently follows such other person about from place to place; or (3) hides any tools, clothes, or other property owned or used by such other person, or deprives him of, or hinders him in the use thereof; or (4) watches or besets the house or other place where such other person resides or works, or carries on business, or happens to be on the approach to such house or place; or (5) follows such other person with two or more other persons in a disorderly manner, in or through any street or road—may either be indicted or punished summarily by justices of the peace, and fined £20, or imprisoned for three months with hard labor. But any person charged before justices is entitled to object to their jurisdiction, and claim a trial before a jury. If he is convicted by justices, he may appeal to Quarter Sessions. In Scotland, the offence can only be prosecuted by the procurator-fiscal or Lord-Advocate in the Sheriff Court or Court of Justiciary. Though breaches of contract by workmen are not now punished criminally, they are so in case of gas and water supply.

COMBINATION, Laws of, in Chemistry. See Atomic Theory.

COMBINATIONS, in Mathematics. See Permutations.

COMBING, of wool, cotton, &c. See Carding.

COMBRETA'CEÆ, a natural order of exogenous plants, consisting of trees and shrubs, all natives of tropical countries. It contains about 200 known species, most of which are characterized by astringency.

COMBU'STION is the term applied to the process of burning, which usually consists in the oxygen of the air uniting with the constituents of the combustible substance. Thus, the C. of coal is due to the oxygen of the air passing into a state of chemical union with the carbon and the hydrogen of the coal, forming carbonic acid (CO_2) and water-vapor (HO). Such chemical combinations are always accompanied by the production of more or less heat, as in the case of decaying wood and other vegetable matter; but it is only when the action is so rapid as to evolve intense heat accompanied by light, that the process is called burning or combustion. Though the gaseous oxygen has as much to do with the process as the more solid material, coal, wood, paper, or cloth, yet the latter is alone styled the *combustible* or *burning body*, whilst the oxygen is invariably named the *supporter* of combustion. A few substances burn at ordinary temperatures, such as phosphorus, which glows when exposed to the air; but the generality of substances, such as wood, coal, &c., require to be raised in temperature or be set fire to before they possess the power of combining with the oxygen of the air. The amount of heat given out by the various combustibles when burned, is capable of being measured, and is definite. The same weight of the same combustible invariably evolves the same amount of heat during its complete C.; but different combustible substances give off different amounts of heat. The mode in which the heat evolved may be measured, is either (1.) To observe the quantity of ice which a given weight of the combustible will melt when burning; (2.) To notice the weight of water which the combustible will convert into steam; or (3.) To estimate the number of pounds of water which the burning body will raise from 32° to 212° F.

The last plan is the more easily managed and accurate, and serves as the index in the following table, which gives the number of pounds of water raised from 32° to 212° F. during the C. of one pound of each of the burning bodies:

Charcoal, pure	78	lbs. of water.
" from wood	75	"
Wood, dried,	36	"
" undried	27	"
Coal, bituminous	60	"
Turf and Peat	25 to 30	"
Alcohol	67½	"
Olive oil, wax, &c.	90 to 95	"
Ether	80	"
Hydrogen	236½	"

The amount of heat evolved appears, however, to be proportional to the quantity of oxygen required to burn the various combusti-

bles. Thus, when a similar volume of oxygen gas, or even ordinary air, is allowed to flow against the various combustible substances, the following results are obtained:

One lb. oxygen combining with	Raises from 32 to 212 degrees F.
Hydrogen	29½ lbs. of water.
Charcoal	29 "
Ether	28 "
Alcohol	28½ "

While the absolute amount of heat evolved during the C. of any burning body is the same, yet the sensible heat may vary according to the rapidity of the process. Thus, when phosphorus is exposed to the air at ordinary temperatures, it very slowly combines with oxygen, and gives out little heat at any one moment, but it is diffused over a great length of time; whilst if the phosphorus is set fire to in the air, it burns vividly, and gives out much heat and light for a short time; and still further, if the burning phosphorus be placed in pure oxygen, it enters into most vivid C., and evolves a most intense heat and brilliant light for a still shorter time. In the latter instances, the heat evolved at any one moment is greater, because more rapid, than that given off at the same time during the slower process of C.; but when allowed to proceed to a termination, there is as much heat produced during the whole time occupied in its development. The same remark applies to the coal placed in a furnace. So long as the door of the furnace is open, and there is little draft of air through the fuel, a moderate amount of heat is evolved, which may last for several hours; but when the door is shut, and much air is drawn through the coal, the latter is more quickly burned, and more heat is evolved during a shorter period of time than before, but in the long run there is the same amount of heat evolved.

COMÉDIE FRANÇAISE, or THEATRE FRANÇAIS, the national theater of France, subsidized by the state for the advancement of dramatic art. Its history dates officially from 1680, when Louis XIV. amalgamated by a decree the two rival companies of the Hôtel de Bourgogne and of the Hôtel Guénegaud, the latter being a fusion after Molière's death in 1673 of the Théater du Marais and the Troupe de Molière.

In 1682, the king granted to his comedians an annual pension of 12,000 livres or francs (about £480)—their first subsidy. In 1689, they took the name of La Comédie Française, and played under it down to the great Revolution with a succession of such artists as Baron, Adrienne Lecouvreur, Le Kain, and Mlle. Clairon. On the performance of Chénier's play of Charles IX. in 1789, violent political discussions arose among the performers, and they ultimately split into two sections: the Republican party under the young tragedian Talma (q. v.) establishing a new theater under the name Théâtre de la République; while the Royalist section remained in their old quarters under the title Théâtre de la Nation. In September 1793, the latter was suddenly closed by order of the 'Comité de Salut public,' and the players flung into prison, to be, however, gradually released. The Comédie Française is still managed by the regulations dictated by Napoleon at Moscow, modified, however, by resolutions passed in 1850 and 1859. The *sociétaires* are shareholders who divide the profits of the company among its members according to certain rules. To be admitted as *sociétaire*, an artist must have served in the theater as *pensionnaire* for one year, and all *sociétaires* must be re-elected at the end of ten years. After twenty years of service, they are allowed to retire with a pension of 4000 francs. The whole sum received from government annually is 240,000 francs. The theater being thus removed from the fear of temporary pecuniary failure, has been able to rise above the conditions attaching to a playhouse existing as a mere money speculation, and to educate the public taste, while providing an adequate and systematic training for young artists.

CO'MEDY. See DRAMA.

COME'NIUS, JOHN AMOS (properly KOMENSKY), a distinguished educational reformer of the 17th century, was born on the 28th of March 1592, according to some, at Comna, near Brünn; according to others, at Niwnitz, in Moravia. His parents belonged to the community of the Moravian Brethren. C. studied at Herborn, and then at Heidelberg, after which he traveled through Holland and England, and at last settled at Lissa, in Poland, where he was chosen bishop of the Moravian Brethren. In 1631, he published his *Janua Linguarum Reserata*, which was translated into many European, and even into some Oriental languages. In this work, he points out a method of learning languages new at that time, which may be called the intuitive or perceptive system, in which the pupils were taught by a series of lessons on subjects easily understood or appreciable by the senses—such as natural history, the sciences, different trades and professions, &c. C. also published about the same time the *Ratio Disciplinæ Ordinisque Ecclesiæ in Unitate Fratrum Bohemorum* (1632), republished with remarks by Buddæus (Halle, 1702); and his *Pansophiæ Prodromus* (1639).

In 1641, C. was invited to England, to assist in reforming the system of public instruction; but as the breaking out of the civil war prevented the execution of this design, he went to Sweden, where he was patronized by Oxenstiern, who gave him a commission to draw up a plan for the organization of schools in Sweden, which he completed at Elbing, four years afterwards. He next went to Hungary for a similar purpose. Here he composed his celebrated *Orbis Sensualium Pictus*, or the Visible World (Nürn. 1658), the first picture-book for children, which has been often reprinted and imitated. Finally,, he settled in Amsterdam, where he published several other works. C. died at Naarden on the 15th October 1671. In the latter years of his life, C. gave way to fanaticism, misinterpreted the Revelation of St. John to suit his fancies of the existing state of Europe, and expected the milleneium in 1672. An interesting account of the wanderings and sufferings of C., and of his great services in the cause of popular education, is given in Lourie's *Conenius, his Life and Work* (1881).

CO'MÉS, an ancient officer, with territorial jurisdiction. See EARL.

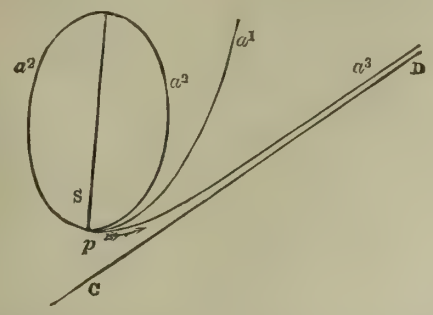
CO'MET. The word C. is derived from the Gr. *kóme*, hair, a title which had its origin in the hairy appearance often exhibited by the haze or luminous vapor, the presence of which is at first sight the most striking characteristic of the celestial bodies called by this name. The general features of a C. are—a definite point or nucleus, a nebulous light surrounding the nucleus, and a luminous train preceding or following the nucleus. Anciently, when the train preceded the nucleus—as is the case when a C. has passed its perihelion, and recedes from the sun—it was called the beard, being only termed the tail when seen following the nucleus as the sun is approached. This distinction has disappeard from all modern astronomical works, and the latter name is given to the appendage, whatever its apparent position. Neither this luminous attendant, the tail, nor the nucleus is now considered an essential cometary element, but all bodies are classed as comets which have a motion of their own, and describe orbids of an extremely elongated form. There are several plain points of difference between comets and planets. The planets move in the same direction, from west to east, which is astronomically called 'direct motion;' but the movements of comets are often from east to west, or retrograde. The orbits of all the planets are confined to a zone of no great breadth on either side of the ecliptic; but the paths of comets cuts the ecliptic in every direction, some being even perpendicular to it. The orbits of all the planets are nearly circular; or, more properly speaking, are eclipses of very small eccentricity. The orbits of comets, on the other hand, present every variety of eccentricity, some of them being eclipses or elongated closed orbits of various degrees of elongation; others, hyperbolas; while the majority have a form of orbit not differing sensibly from the parabola, which is the limiting form of curve to which both the ellipse and hyperbola approximate, under given conditions.

Let *p* be the point of perihelion passage of a C., and let the direction of its motion be in the direction indicated by the arrow. There is a certain velocity of motion at this point which would give the orbit the form of a parabola, pa^1, the direction of motion always approached to being parallel with the straight line through *p*S. Any velocity less than this would cause it to describe a closed curve pa^2a^2; any greater velocity would cause it to describe the hyperbola pa^3, in which case it would approximate to the direction of the straight line CD, and would never return. This would be the case if there were no disturbing force to interfere with the sun's attraction; and conversely, comets approaching the sun along the various paths above described, would pass the perihelion with the various velocities above indicated. Any attraction, however, of an extraneous body interfering with the attraction of the sun might change the orbit from the ellipse to the hyperbola, and *vice versâ*, or from the parabola to either. As, however, there is only one parabola corresponding to infinite sets of ellipses and hyperbolas, an interfering cause is not likely to change the orbit from an ellipse or hyperbola to the parabolic form. Of about 200 comets whose orbits have been obtained with more or less accuracy, 40 appear to have described ellipses, 7 hyperbolas, and 150 orbits that cannot be distinguished from parabolas.

The discovery that comets are celestial bodies, extraneous to our atmosphere, is due to Tycho Brahé, who ascertained the fact by observations of the C. of 1557. Newton succeeded in demonstrating that they are guided in their movements by the same principle which controls the planets in their orbits; and Halley was the first, by determining the parabolic elements of a number of comets from the recorded observations, to identify the C. of 1682 with one which had been observed in 1607 and the observations recorded by Kepler and Longomontanus, and also with a C. observed in 1531 by Apian, at Ingoldstadt, and thus confidently to predict the return, at the end of 1758 or beginning of 1759, of a C. which would have the same parabolic elements. These parabolic elements are elements of a parabola nearly coincident with the elongated elliptic orbit of the comet. They are—1. *The Inclination.* 2. *The longi-*

tude of the node. These two determine the plane of the orbit. 3. The longitude of the *perihelion*, or point of nearest approach to the sun. 4. The perihelion distance, or nearness of approach to the sun. 5. The direction of motion, whether *direct* or *retrograde*.

To determine these parabolic elements, three obsevations of the



C. are sufficient; and by a table of such elements deduced from the recorded observations, it is possible at once to ascertain whether any newly observed C. is identical with any that have been previously observed. To predict, however, with accuracy the time of the return of a C., a much more accurate calculation must be made of the orbit, taking into account the perturbations of the planets to whose influence it is subject. This difficult problem was solved, in the case of Halley's C., by the joint work of Laland, Madame Lepante, and Clairaut, who announced, in November 1758, just as astronomers began to look out for the return of the C., that it would take 618 days more to return to the perihelion than on the preceding revolution. The perihelion passage was fixed about the middle of April 1759; but Clairaut distinctly forewarned the world that, being pressed for time, he had neglected small values, which collectively might amount to about a month in the seventy-six years. The C. passed the perihelion on the 12th March 1759, exactly a month before the time announced, but within the assigned limits of divergence from that date. The elements of its orbit proclaimed it to be the C. of the former periods by their similarity. For the next perihelion passage, the different calculations executed by MM. Damoiseau and De Pontécoulant, fixed the 4th, the 7th, and the 13th November 1835. Subsequently, observations indicated the 16th—that is to say, a deviation of only three days from what turned out the most accurate calculation, and a deviation of 12 days from the most remote. We have adverted to the perihelion passages of this C. in 1531, 1607, 1682, 1759, and 1835. It is also now identified with a C. observed in 1456, and one in 1378, recorded by Chinese observations. There are no sufficietly reliable Europeon observations previous to 1456, but it is conjectured by Arago, that this C. is the same with the C. of 1305; that of 1230; a C. mentioned in 1006 by Hali Ben Rodoan; that of 885; finally, a C. seen in the year 52 before our era.

This account of Halley's C. has been given at length, to illustrate the principles on which the calculations are made. The annexed wood-cut represents some of the appearances which that C. presented, in different parts of its orbit, on its last visit in 1335—*a*, *b*, *c*, in approaching the sun; *d*, *e*, in retreating. There are three other comets whose periodicity is established, and whose paths are accurately known.

1. That of Encke, with a short period of 1204 days. Its orbit does not extend so far as the orbit of Jupiter, and a slight acceleration in its periodic times of return has suggested the possibility of the space, within our solar system at least, being occupied by a resisting medium, though of extreme rarity.

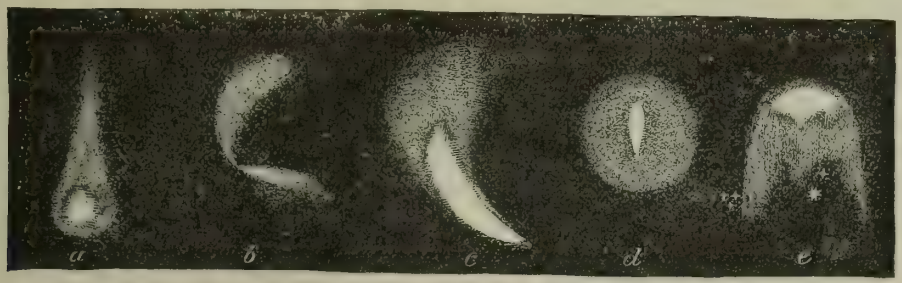
2. That of Biela or Gambart, having a period of six years and three-quarters. During the visit of the C., in 1846, it was seen to separate into two distinct comets, which kept moving side by side till they disappeared. On the return of the C. in the autumn of 1852, the distance between the two nuclei had much increased. Since then, although repeatedly due, it has not again been seen.

3. That of Faye, with a period of seven years and a half.

The orbits of both these last mentioned extend beyond the orbit of Jupiter, but none so far as that of Saturn.

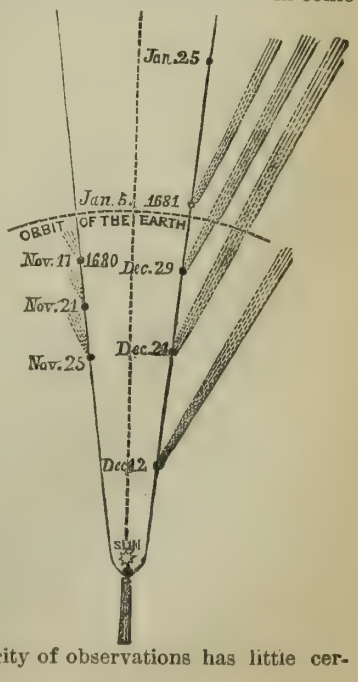
Besides these three, there are others whose orbits are ascertained with a less degree of accuracy and certainty, requiring the test of future returns to fix their periodicity. In all, some fifteen periodic comets are known. One other deserves mention from the great peculiarities of its course.

In the month of June 1770, Messier discovered a C. which remained visible a long time, and enabled Lexell to ascertain the orbit to be an ellipse whose major axis was only three times the diameter of the earth's orbit, and corresponded to a periodic revolution of 5½ years. This suggested grave difficulties. It had been found impossible to identify this C. with any previously observed, and yet it was difficult to conceive that a bright C., with so short a period of return, should have previously escaped observation. What was still more remarkable, it was never seen again, though anxiously looked for in the places where Lexell's orbit would have brought it. It became popularly called Lexell's lost C., and gave occasion to many sarcasms by the wits of the day at the expense of astronomers, who nad so much boasted of having found the key to the cometary movements. In the present day, the explanation is complete. The C. was never seen before 1770, because its orbit previously had been totally different, its nearest point to the sun having been as distant as the path of Jupiter. Its appearance that year arose out of the fact, that in 1767 it was in such close contact with Jupiter, moving in the same direction, and nearly in the same plane, that the attraction of this planet entirely changed its orbit. But why has the C. not since been seen? Its passage to the point of perihelion in 1776 took place by day;



and in 1779, before another return, it again encountered the vast body of Jupiter, and suffered a fresh orbital derangement, the attraction of the planet deflecting it into more distant regions, and so changing the form of the orbit, that if it had again been visible, it would not have been recognized as identical with Lexell's comet.

The celebrated C. of 1680, which furnished Newton with the occasion for proving that comets revolve around the sun in conic sections, and that, consequently, they are retained in their orbits by the same force as that which regulates the movements of the planets, appears to have been about the most remarakable for brilliancy of any of which we have authentic accounts. This C. is supposed to be identical with the one that appeared about the time of Cæsar's death (44 B.C.), with that which was seen in the reign of Justinian in the year 531, and with another in the year 1106, in the reign of Henry II., the period of revolution, according to the orbit calculated for it by Whiston, being about 575 years. There is, however, some doubt among astronomers as to the real form of its orbit, the one assigned to it by Encke giving it a period of 8813 years. This C. approached nearer to the sun than any known, except perhaps the C. of 1843, the calculation of whose perihelion distance, from the paucity of observations has little cer-



tainty. The C. of 1680 approached the sun within the 163d of the semi-diameter of the earth's orbit. The annexed diagram shows a part of its path; the same diagram shows the direction of the tail. This is nearly always away from the sun, frequently assuming a curved form. It increases in length with its proximity to the sun, but does not acquire its greatest length till after passing the perihelion. These are usual characteristics of comets, which were exemplified by this one in a remarkable degree. These phenomena might be accounted for if we were to regard the train as vaporization produced by the intense heat to which the body of the C. is exposed in its approach to the sun.

In the present century, the most brilliant comets have been those of 1811, 1843, 1858 (Donati's), 1861, 1880, 1881, and the great comet of (*b*) of 1882.

Spectroscopic investigation, so far as yet pursued, points to the conclusion that the nucleus is self-luminous, but that the tail shines with reflected light. It has been discovered recently, in determining the tracks of those streams of dark bodies that cause meteoric showers, that some of the tracks coincide with the orbits of well-known comets. From this, it is inferred that star-showers and comets may be only different manifestations of the same thing (see METEORS).

What the matter of the comets consists of is, of course, only a subject for speculation. The composition of the nebulosity and the tail is, at all events, something of almost inconceivable tenuity, as shown by three considerations. 1. Stars seen through them suffer no diminution of brightness, though the light must have to

Appearance of Halley's Comet at Constantinople in 1456.

traverse sometimes millions of miles of the cometary atmosphere. 2. Though the thickness of the tail of a C. may be millions of miles, and its length of course much greater, the comets have never been observed to cause any sensible disturbance of the planetary motions, though approaching near enough to be themselves so much effected as to change the entire character of the orbit. 3. The curvature of the tails, and the acceleration of the periodic time, in the case of Encke's C., indicate their being affected by a resisting medium, which has never been observed to have the slightest influence on the planatary periods, though so long observed. Even the nuclei of comets appear to be of extremely small density. This may be inferred, though with less force than regards the tails, from the two last considerations above mentioned; and, moreover, there are reliable accounts of stars of a very low order of magnitude being seen through the nuclei themselves.

Comets have been alternately regarded with terror and with welcome in the popular mind. The appearance of Halley's C., in 1456, just as the Turks had become masters of Constantinople, and threatened an advance into Europe, was regarded by Christendom with a superstitious dread, and to the Ave Maria was added the prayer: 'Lord save us from the devil, the Turk and the comet.' At Constantinople, the occurrence of a lunar eclipse at the same time, increased the portentousness of the event. The discoveries of science of the magnitude of the space filled by their bodies, and their prodigious velocity, together with the confessed impossibility of always predicting their approach, produced fears of another kind, which have sometimes been, especially in France, extravagantly exaggerated in the public mind. The groundlessness of such alarms, from the extreme improbability of collision with the nucleus, the probable innocuousness of a contact with the extremely attenuated surrounding matter, and possibly, to the greater part of the world, of a collision with the nucleus itself, will be sufficiently evident from what has been said above.

It is probable that already, on many occasions, some of the attenuated vapor in the tail of comets must have come within the earth's attraction, and been absorbed in its atmosphere. Whether the effect is deleterious or salubrious, or whether it has any perceptible influence at all, is only matter of speculation. The salubrity of cometary influence is now a popular idea; and the vintages of 1811 and 1858 were favorable seasons, whose produce is often advertised as the C. wines. It is scarcely worth while, however, to follow further speculation on these subjects, and it has been considered preferable to confine this article chiefly to the description of the general characteristics of comets, and the facts respecting them afforded by science.

Common Comfrey.

CO'MFREY (*Symphytum*), a genus of plants of the natural order *Boragineæ*, distinguished by a 5-cleft or 5-partite calyx, and a corolla enlarged upwards, its throat closed by awl-shaped scales. The species, which are not numerous, are natives of Europe and the north of Asia. They are perennial plants of coarse appearance, although occasionally to be seen in flower-borders. *S. officinale* (the COMMON C.) and *S. tuberosum* are natives of Britain, frequent in shady and moist places *S. officinale* was formerly much esteemed as a vulnerary, on account of its astringency. Its young leaves and its blanched shoots are also occasionally used as boiled vegetables. The Prickly C. (*S. asperrimum*) a native of Siberia, 6—10 feet in height, has been highly recommended for feeding cattle.

COMINES, or COMYNES, PHILIPPE DE, Sieur d'Argenton, a French statesman, and the author of some very interesting and valuable *Memoirs*, was born at the castle of Comines, not far from Lille, in 1445. After receiving a careful education, he passed into the court of Burgundy about 1466, and attached himself particularly to Charles the Bold (then Comte de Charolais.

In 1472, C., who was anything but punctilious in his notions of honor, entered the service of Louis XI., the rival and enemy of Charles, who immediately covered him with honors, and made him one of his most confidential advisers. He proved himself a very suitable agent for carrying out the designs of the crafty monarch; but after the death of Louis, by his adherence to the party of the Duke of Orleans, C. incurred the displeasure of the government of Anne of Beaujeu, and was sentenced to a forfeiture of a fourth of his estates and to ten years' banishment. This punishment, however, does not seem to have been carried out, for after a few years we find C. again employed in important affairs of diplomacy. Though engaged in the service of Charles VIII. and the Duke of Orleans, afterwards Louis XII., C. failed to win the confidence of these masters. He died at his castle of Argenton, October 17, 1509. C.'s *Memoirs* are admirably written, and afford abundant proof that he possessed a clear, acute, and vigorous mind. He seems to have looked keenly into the heart of every man who crossed him in life, and with cool, severe anatomy, dissects him for the benefit of posterity. The best edition of his *Memoirs* was edited by Lenglet Dufresnoy (4 vols., London, 1747).

COMI'SO, a town of Sicily, in the province of Syracuse, about 40 miles west-south-west of the city of that name. It has paper manufactures, and a population of (1871) 16,694.

COMI'TIA (Lat. *cum*, with or together, and *ire*, to go) were the legal or constitutional meetings of the Roman people, convened by a magistrate, for the purpose of putting a question to the vote. This definition at least comprehends all the C., except the *C. Calata*, where the people were merely present as spectators. There were several kinds of C. (*C. centuriata*, *C. tributa*, &c.) held for different purposes; and according to the mode of constituting the C., the preponderance lay with the patricians or with the plebeians.

CO'MITY OF NA'TIONS—more frequently mentioned by its Latin equivalent, *comitas gentium*—is that species of international legal courtesy by which the laws and institutions of one country are recognized and given effect to by those of another. 'In the silence of any positive rule,' says Mr. Justice Story, 'affirming or denying, or restraining the operation of foreign laws, courts of justice presume the tacit adoption of them by their own government, unless they are repugnant to its policy or prejudicial to its interests.' From the existence of so great a number of independent states on the continent of Europe, and of federated states in America, the *comitas gentium* is more called into play in these countries than in our own, and it has consequently been more exten-

sively discussed by their legal writers. See Story's *Conflict of Laws*. See INTERNATIONAL LAW.

CO'MMA, in the mathematical study of sound, is applied to two small intervals, which, by comparison and calculation, arise as the difference between the proportions of certain other intervals of the diatonic scale. The larger, but seldomer occurring C. is called the *C. ditonicum*, or the Pythagorean C., being the difference between the true octave, whose ratio is 2 : 1, and the interval which arises when the octave is obtained by tuning a progression of twelve perfect fifths, or arithmetically by adding their values together; by which process it is found that the last sound is greater than the true octave in the proportion of 531,441 to 524.288. The smaller C., *C. syntonum*, or C. of Didymus, is—First, the difference between the large whole tone, the ratio of which is 9 : 8, and the small whole tone 9 : 10, which is found in the compound of these ratios produced by multiplying together respectively their antecedents, 9 and 9, and their consequents, 8 and 10, to be 81 : 80. Second, The difference between the great limma, 27 : 25, and the half-tone, 15 : 16, which is found by the same process, and then reducing the resulting ratio to its least terms, to be also 81 : 80. Third, The difference between the diesis, 128 : 125, and the diaschisma, 2048 : 2025, which by the same process gives 81 : 80; and lastly, the difference between the *small* limma, 135 : 128, and the small half-tone, 24 : 25, which again gives the proportions 81 : 80. The difference between the *C. ditonicum* and the *C. syntonum* is exactly the *schisma;* therefore, the aggregate of the diaschisma and schisma, if they be added together, is neither more nor less than the syntonic comma. This C., again added to the diaschisma, makes up the diesis, and added to the great half-tone, makes up the great limma. It follows therefore that, practically, two enharmonic tones in perfect tune never differ by a syntonic C., and it is wrong to say that *d* flat is higher than *c* sharp by a C., while the real difference is that of a diesis, 128 : 125. In the equal-tempered scale, these varieties do not exist. The term *syntonic* comes from the Greek, and means equal-sounding.

COMMANDA'NT, in military matters, is a temporary commander, in place of the real chief; such as a captain-commandant, lieutenant-commandant, &c. In foreign armies the designation is more frequently applied than in the British, especially to the commanders of garrisons.

COMMA'NDER, in the British Navy, is an officer next under a captain in rank, and serves either as second in command in a large ship, or in independent command of a vessel smaller than the sixth rate. In matters of etiquette, he ranks with a lieutenant-colonel in the army. There were, in 1873, 155 commanders in commission, with pay of £1 a day; while there were 154 on half-pay, but eligible for re-employment, and 326 on retired half-pay; but the whole list of those employed, or eligible for employment, is to be reduced to 200. In 1880 there were 140 commanders in commission, and 146 staff-commanders and navigating-lieutenants. Retirement is optional at the age of 45; and compulsory at 50, or after 5 years without employment.

COMMANDER-IN-CHIEF, is the highest staff appointment in the British army. It is held by the general commanding all the forces in India, and would probably be given to the leader of any *large* army in the field, whether abroad or at home. Formerly, the army at home was administered by an officer of this rank; but since the death of the Duke of Wellington in 1852, the military administration has vested in an officer holding no higher commission than that of 'General on the Staff;' who is called the general (or field-marshal, according to the holder's army rank) commanding in chief. Since 1855 this officer has been strictly subordinate to the Secretary of State for War. The office of the C., technically known as the 'Horse Guards,' is a department of the War Office, and comprises the sub-departments of the military secretary, the adjutant-general, and the quartermaster-general, with a staff of clerks. Under the 'War Office Act' of 1870, and by orders in council of that year, the officer commanding in chief is one of the three great officers who administer the military affairs of the country under the Secretary of State for War; his department being that of military command, discipline, and promotion. In practice, he makes all promotions and military appointments; though, in theory, these are all made on the responsibility of the Secretary of State. Appointments to very important positions on the staff would not be made without the supervision of the minister and probable concurrence of the cabinet. The officer commanding in chief is responsible for all recruiting operations, and for the appropriation of troops to particular localities; but he exercises rather a general inspectional control than any immediate command over the men. The actual command vests in the general officers commanding the districts into which the kingdom is parcelled.

A *naval* C. is the chief admiral at any port or station.

COMMANDITE, SOCIETE EN, or PARTNERSHIP IN, an expression used for at least two centuries in France, to express a partnership in which one may advance capital without taking charge of the business, or may become a 'sleeping partner,' as it is called in this country. The term owes its origin to the old meaning in the commercial nomenclature of France of the word command, which was applied to one person authorizing another to transact business for him. The working partner had a *commande* from him who merely advanced capital. The term has acquired importance of late in political economy, because the law of France could exempt the sleeping partners from responsibility beyond the amount they might agree to be responsible for. On the other hand, by the law of the United Kingdom, down to the passing of the limited liability act, every partner of a company was liable for all its debts. Hence, in the discussions about the question, whether it would be prudent to relax this law, and permit persons to invest money in trading companies without undergoing this responsibility, such companies were called 'partnerships in commandite.'

COMMELYNA'CEÆ, a natural order of endogenous plants, consisting of herbaceous plants, with flat, narrow leaves, usually sheathing at the base. The calyx is 3-partite; the petals three, sometimes cohering at the base. The stamens are six, inserted under the ovary, which is 3-celled; the style is single. The fruit is a capsule, with 2—3 cells and 2—3 valves, bursting through the middle of the valves. The seeds are often in pairs, inserted by their whole side on the inner angle of the cell; the embryo lies in a cavity of the albumen. The order contains more than 260 known species, natives chiefly of warm climates; but a few occur in North America. None are European. *Tradescantia Virginica*, or SPIDER-WORT, common in our flower-gardens, is a familiar example of the order. *Commelyna cœlestis* is a fine ornament of our flower-gardens. The treatment is somewhat like that of the dahlia.

COMMEMORA'TION, or ENCÆ'NIA, the great festival of the Oxford academic year, usually takes place on the third Wednesday after Trinity Sunday. It is of very ancient date, public exercises and recitations having been held from time immemorial in honor of the Act, or period when Masters of Arts and Doctors complete their degrees. The proceedings consist of a Latin oration in honor of the founders and benefactors; the presentation of the honorary degree of D.C.L. to strangers eminent in science, politics, &c.; and the recitation of the Newdigate or English prize poem, the Latin prize poem, and the Latin and English prize essays. The more strictly academic and solemn portion of the proceedings was frequently wont to receive scanty attention from a great part of the audience; and the noisy humors of the gallery have often encroached on the stately periods of the public orator. In 1876 the undergraduates were removed from the special gallery they had hitherto occupied, and distributed amongst the general audience, which includes ladies and strangers as well as members of the university.

COMME'NDAM. When a clerk is promoted to a bishopric, all his other preferments become void from the moment of consecration; but a method was devised by which the substantial interest in the living was retained by its being *commended* to the care of a bishop (called the commendatory) by the crown, till a proper pastor should be provided for it. Such a living was called an *ecclesia commendata*, and it was said to be held *in commendam*. The holding on this title might be really temporary for one, two, or three years, or it might be perpetual. By 6 and 7 Will. IV. c. 77, s. 18, it is provided that no ecclesiastical dignity, office, or benefice shall be held in C. by any bishop, unless he shall have held the same when the act passed.—Stephen, iii. 37.

COMMENDA'TORS, in Scotland, in Roman Catholic times, were stewards appointed to levy the fruits of a benefice during a vacancy. They were mere trustees; but gradually the pope assumed the power of appointing C. for life, without any obligation to account. 'This was chiefly intended as a cloak for the plurality of benefices, and to evade the canon of the second council of Nice, by which one benefice only was allowed to be given to one and the same churchman; but all commendators were by our law prohibited, even during popery, by 1466, c. 3, except those that should be granted by bishops for a term not exceeding six months.'—*Erskine's Instit.*, vol. i. p. 98, Ivory's edit. See ABBOT.

COMMENTRY, a town of France, in the dep. of Allier, eight miles south-east of Montluçon, on the Œuil. It stands in the center of one of the most important coal-fields of France, and within the last fifty years has risen from a mere village to be a busy and populous town. Pop. 10,000, mostly engaged in the coal-mines and iron-works. A railway connects it with Montluçon and other places, and with the Canal de Berry. In 1846, a fire consumed an enormous quantity of the coal in the mines.

COMME'NSURABLE. Two quantities or numbers are said to be commensurable which are of the same kind, and each of which contains a third quantity or number a certain number of times without remainder. See INCOMMENSURABLE MAGNITUDES.

COMME'RCIAL LAW. See MERCANTILE LAW.

COMMINA'TION is from the Lat. *comminor*, to threaten, and is the name given to a penitential service used in the primitive church. In the earliest ages, those who were guilty of grievous and notorious sins were put out of the church, until, on their repentance, and after long trial, they were restored to full communion. It seems that, at least from the beginning of the 8th c., there was an office of this kind for public penitents on the first day of Lent; but from various causes, the penitential discipline became extinct, both in the Eastern and Western Churches, and the office for Ash-Wednesday (so called from the penitents coming clad in sackcloth and ashes) is the only memorial of it left. The office, as used in the Church of England, is nearly the same as those found in the Salisbury and York missals. The curses contained in Deut. xxvii. against impenitent sinners are read, and the congregation answer 'Amen' to every sentence, as acknowledging the justice of the sentences. See Bingham's *Antiquities*.

COMMISSA'RIAT is a name for the organized system whereby armies are provided with food, and daily necessaries other than those connected with actual warfare. Among the ancients the Romans attended best to the C.; the *quæstors* were the commissaries. In feudal times, the soldiers were mainly dependent for food on their lords; but they lived very much by plunder. During the wars of the Crusades, the C. was so utterly neglected, that thousands died of starvation.

In England, the first germ of the modern C. appeared in the office of *proviant-master*, in the time of Queen Elizabeth. Under Charles I., commissaries were stationed in the different counties. Under Marlborough's command, the troops were supplied by contract; he received a percentage, and peculation was very common. After many changes during the 18th c., a commissary-general was appointed in 1793, to superintend all contracts for food and forage. The dire experience of the Crimean war showed how greatly reform was required in this important department. In 1858 and 1859, accordingly, it was newly organized; and remained, until 1870, a War-office department, under a commissary-general-in-chief.

In 1870, the Commissariat was merged with other supply departments in the great 'Control Department,' which, under the Surveyor-General of the Ordnance, performed all the civil administrative duties of the army. In Dec., 1875, the Control Department fell from its high estate, and the 'Commissariat and Transport Department' arose from its ashes. Its duties are the provision of food, fuel, lodging, and transport: a function on which it is needless to say the very existence of the army depends. The Department is administered by the Director of Supplies, at the War Office, who is an officer on the staff of the Surveyor-General. The ranks of Commissariat officers are commissary-general (ranking as brigadier-general), deputy-commissary-general (as colonel), assistant commissary-general (as lieut.-colonel), commissary (as major), deputy-commissary (as captain), assistant-commissary (as lieutenant), and sub-assistant commissary.

CO'MMISSARY, in general, is any one to whom the power and authority of another is committed. In this sense it is nearly equivalent to commissioner. In ecclesiastical law, a C. is an officer appointed by a bishop to exercise jurisdiction in parts of the diocese which are so distant from the episcopal city that the people cannot be conveniently summoned to attend the principal court.

When the papal authority, and all jurisdiction which flowed from it, was abolished in Scotland, by the Acts 1560 and 1567, a supreme C. court was established in Edinburgh, by a grant of Queen Mary, dated February 8, 1563. This court had jurisdiction in actions of divorce, declarators of marriage, nullity of marriage, and all actions which originally belonged to the bishop's ecclesiastical courts. Its powers were gradually con-joined with those of the Court of Session, and it was finally abolished in 1836 (6 and 7 Will. IV. c. 41), the small remains of its once important jurisdiction being united in the sheriff of Edinburgh. The inferior commissariats, which had usually been commensurate with the dioceses, were dealt with by a previous statute (4 Geo. IV., c. 97), each county being erected into a separate commissariat, of which the sheriff was commissary.

The jurisdiction of these courts so conjoined with that of sheriffs was, in 1876, finally transferred to the sheriffs absolutely, and the separation between the two sets of officers ended, except in the case of the Commissary Clerk of Edinburgh. See Alexander on *Practice of the Commissary Courts in Scotland*, 1858, which gives a very interesting sketch of the history, constitution, and jurisdiction of these courts.

COMMI'SSION, a writing, in the form of a warrant or letter-patent (see PATENT), authorizing one or more persons to perform duties or exercise powers belonging to another, or to others. Instruments of delegation, bearing this title, are issued by the crown to officers in the army and navy, judges, justices of the peace, and others.

Another class of commissions are those granted sometimes by the crown, and sometimes by parliament, to a body of persons, either to inquire into the condition of certain institutions or branches of the public service, or to exercise certain powers, or execute certain measures for their improvement. Persons holding such commissions, deriving no other title from their appointment, are called commissioners; e. g., the English Ecclesiastical Commissioners, the Commissioners for the Relief of the Poor, the Commissioners for the Affairs of India, the Emigration Commissioners, &c.

COMMISSION DEL CRE'DERÉ. See DEL CREDERE COMMISSION.

COMMISSION MERCHANT, or AGENT, called also a broker, or factor, is a person employed to sell goods consigned or delivered to him by another who is called his principal, for a certain percentage, commonly called his commission or factorage. As the goods thus received are said to be consigned, the C. M. or agent is often called a consignee.

COMMISSION OF ASSEMBLY. See GENERAL ASSEMBLY.

COMMISSIONAIRES are a class of attendants at continental hotels, who perform certain miscellaneous services. Employed to attend at the arrival of railway-trains and steam-boats to secure customers, they wait to take charge of luggage, see it passed through the hands of the custom-house officers, and send it on to the hotel; for all which service they charge a fee. They likewise procure visés to passports, and act as valets-de-place. Lately, a body of C. has been established in London, and also in Edinburgh, consisting of maimed soldiers who have retired with a pension, and are of unexceptional character.

COMMISSIONS, ARMY, are warrants for serving the crown in certain military offices. Those holding such authority are called *commissioned officers*. Non-commissioned officers form a step intermediate between commissioned officers and private soldiers. First commissions in the probationary rank of sub-lieutenant are granted by competitive examination open to every British subject of proper age and character. Subsequent—i. e., higher—commissions are given, up to the rank of lieutenant-colonel, by 'selection tempered by seniority.' The commission of colonel is attained by service only, and commissions as major-general, lieutenant-general, and general follow by pure seniority. These remarks apply to cavalry and infantry only: commissions in the Artillery and Engineers are obtained—first, by passing a severe course of study at Woolwich Academy, admission to which is by open competition; later commissions by seniority entirely. Before November 1, 1871, commissions in the cavalry and infantry were partly obtained by purchase, under the system, now abolished, called the PURCHASE-SYSTEM. The prices of commissions rose gradually from the time of Charles II. until the Russian war of 1853, when the *regulation prices* were as follows:

Rank.	Regulation Price of Commissions.	Diff. in value between the several Com. in succession.
LIFE GUARDS.		
Lieutenant-colonel	£7250	
Major	5350	£1900
Captain	3500	1850
Lieutenant	1785	1715
Cornet	1260	525
DRAGOON GUARDS AND DRAGOONS.		
Lieutenant-colonel	£6175	
Major	4575	£1600
Captain	3255	1350
Lieutenant	1190	2035
Cornet	840	350

(The prices of cavalry commissions were reduced in 1861 to infantry rates.)

FOOT GUARDS.		
Lieutenant-colonel	£9000	
Major, with rank of Colonel	8300	£ 700
Captain, " Lieut.-col	4800	3500
Lieutenant, " Captain	2050	2750
Ensign, " Lieutenant	1200	850

(In 1857, purchase was limited to the lower three ranks.)

LINE REGIMENTS.		
Lieutenant-colonel	£4500	
Major	3200	£1300
Captain	1800	1400
Lieutenant	700	1100
Ensign	450	250

The conditions of promotion, and the operation of the purchase system, will be considered under PROMOTION and PURCHASE-SYSTEM. In the navy also, the chief officers hold their authority by commission. See OFFICERS; PROMOTION.

COMMI'SSIONER, in Scotch Bankruptcy. This office has little or no resemblance to that of the judge in England bearing once such a title. In Scotland, three commissioners are appointed by the creditors to advise, and in certain cases to superintend the trustee, who is the party charged with the realization and distribution of the estate. The commissioners audit the trustee's accounts, they fix his remuneration, and they have to ascertain that the moneys collected by him have been duly lodged in bank.

They themselves are not entitled to remuneration; and they cannot purchase any portion of the estate. Their qualification is to be creditors, or mandatories of creditors; but any disqualification for the office of trustee also unfits for this office.

COMMI'TMENT is the imprisonment of any person by warrant or order. When C. is by warrant of a magistrate after examination and before trial, the confinement of the accused, being for safe custody and not for punishment, is regulated by special statutes as to diet, optional employment, visits, &c. C. may be for trial or further examination. It is also used with reference to imprisonment of debtors in certain cases under the Debtors Act, 1869.

COMMI'TTEE (Fr. *comité*), a portion, generally consisting of not less than three members, selected from a more numerous body, to whom some special act to be performed, or investigation to be made, is *committed*. But though a C. usually consists of several members of the body by which it is appointed, it may consist of one member, or, what is more frequent, of the whole members acting in a different capacity from that which usually belongs to them. This latter form of C. is known in parliament as a C. of the whole House. In order to mark the distinction between the House itself and the same body when thus resolved into C., the Speaker in the Commons, and the Chancellor in the Lords, as soon as the C. is formed, leave the chair, which is occupied by the Chairman of C., a paid official, who is appointed at the commencement of every parliament. In the Commons, moreover, the mace, which usually lies on the table, is put under it when the House goes into committee. Of committees of the whole House, the most familiar examples are Committees of Supply (q. v.) and of Ways and Means (q. v). The vote of a C. is of no force till it has been reported to and received by the House. In the case of every public bill, moreover, a C. of the whole House is constituted after the second, and before the third reading, in order that the details of the measure may be more carefully adjusted. In private bills, analogous functions are performed by select committees. Occasional matters requiring special investigation are also remitted to select committees. These, for the most part, conduct their investigations in public; but there are instances also in which the public safety seems to require secrecy, in which they deliberate with closed doors, and they are then called *Secret Committees*. In 1883, the House delegated part of its functions to *Grand* or *Standing* Committees—one for law affairs, the other for trade, shipping, and manufactures. Bills are in every case to be committed to them by order of the House. Each committee has from 60 to 80 members, nominated by the committee of selection; and the procedure is as in select committees.

CO'MMODORE, in the Navy, is a rank intermediate between an admiral and a captain. It is not permanent, but is bestowed for a time on a captain. Usually, a C. commands more ships than one, detached from a fleet on some special service; he hoists at that time a pendant. If a C. of the first class, his pendant is broad and red, pointed at the outer end; if of the second class, blue. A C. is privileged to have a commander under him in his ship, in the same way as an admiral is privileged to have a captain. The C., in matters of etiquette, ranks on a level with a brigadier-general in the army.

CO'MMODUS, Lucius Aurelius, a Roman emperor, born 161 A.D., was the son of Marcus Aurelius Antoninus. When he was summoned to the throne on his father's decease, 17th March 180, he manifested a shameful eagerness to plunge into the dissipations of Rome. At that period he was successfully fighting the Marcomanni and other tribes on the Upper Danube, and, not to be balked of his anticipated pleasures, he hastily concluded a treaty with the barbarians, and, reached the capital in the beginning of the autumn. The cruelty to which he was always prone, was especially called into action after a conspiracy by his sister Lucilla against his life had been discovered in the year 183. Nearly all who, by virtue, ability, and learning, had risen to honor during his father's lifetime, were sacrificed to appease his savage jealousy of the good and the great. Gross prodigality in the expenditure of the resources of the state on the amusements of the amphitheater also marked his reign. He was proud of his own physical strength, and exhibited it in gladiatorial combats. For each of these exhibitions, he charged the state an enormous sum. He used also to sing, dance, play, act the buffoon, the peddler, or the horse-dealer, and engage in all the filthy and horrible orgies of Egyptian sacrifice. A glutton, a debauchee, who wallowed in the most sensual abominations, he yet demanded to be worshiped as a god, and assumed the title of Hercules Romanus. Many plots were devised against the life of this mingled monster and madman, and at last one of them accomplished its purpose. His mistress, Marcia, in concert with the prefect Laetus and the imperial chamberlain Eclectus, after they had failed in an attempt to poison him, caused him to be strangled by Narcissus, a famous athlete, on the 31st of December, 192.

CO'MMON, in Law. This is one of the numerous instances in which a different meaning is attached to the same term in the legal systems of England and Scotland. In England, a C., as defined by Blackstone, is 'a profit which a man hath *in the land of another*, as to feed his beasts, to catch fish, to dig turf, to cut wood, or the like.' In Scotland, again, where the law has adopted the divisions, and followed the nomenclature of the civil law, and of the legal systems of continental Europe, all these profits, or rights to derive profit, are known as *Servitudes* (q. v.), whereas a C., or Commonty, as it is more frequently called, is a common right of property existing in several individuals, frequently the inhabitants of a whole village, in a piece of ground. In each individual, the right of course is limited, so as in reality to amount to little more than a servitude; but there is no over-lord, the land is not the land of another, but the land of the community as a body.

The division of C. lands, or those over which C. is claimed among the parties possessed of such rights, or the permission to the owner to enclose the lands or making compensation to the owners of C. rights, has been the subject of regulation by a very great number of statutes. Many of these are private acts, but the 6 and 7 Will. IV. c. 115 laid down general rules for effecting the purpose in future, without the necessity of obtaining an act of parliament, where the consent of two-thirds of the parties interested could be obtained, and the C. to be enlosed lay more than ten miles from London, and a specified distance from any other large town. By a subsequent statute (8 and 9 Vict. c. 118, amended by several later acts), a Board of Commissioners (see Enclosure Commissioners) is appointed to inquire into the propriety of any proposed enclosure or partition, and to report to parliament, which then may pass a public act authorizing the proceedings. This is the course generally adopted.

In Scotland, *commonties* or commons were made divisible by an action in the Court of Session, at the instance of any having interest, by the stat. 1695, c. 38.

On the subject of enclosing commons, Mr. J. S. Mill (*Dissertations and Discussions*, vol. ii. p. 213) expresses the following decided opinion: 'We must needs think, also, that there is something out of joint, when so much is said of the value of refining and humanizing tastes to the laboring-people—when it is proposed to plant parks and lay out gardens for them, that they may enjoy more freely nature's gift alike to rich and poor, of sun, sky, and vegetation; and along with this a counter-progress is constantly going on of stopping up paths and enclosing commons. Is not this another case of giving with one hand and taking back more largely with the other? We look with the utmost jealousy upon any further enclosure of commons. In the greater part of this island, exclusive of the mountain and moor districts, there certainly is not more land remaining in a state of natural wildness than is desirable.

'Those who would make England resemble many parts of the continent, where every foot of soil is hemmed in by fences and covered over with the traces of human labor, should remember that where this is done, it is done for the use and benefit, not of the rich, but of the poor; and that in the countries where there remain no commons, the rich have no parks. The common is the peasant's park. Every argument for ploughing it up to raise more produce, applies *à fortiori* to the park, which is generally far more fertile. The effect of either, when done in the manner proposed, is only to make the poor more numerous, not better off. But what ought to be said when, as so often happens, the common is taken from the poor, that the whole or great part of it may be added to the enclosed pleasure-domain of the rich? Is the miserable compensation, and though miserable not always granted, of a small scrap of the land to each of the cottagers who had a goose on the common, any equivalent to the poor generally, to the lovers of nature, or to future generations, for this legalized spoliation?'

COMMON, Tenancy in. This is an Estate (q. v.) or a right in property accruing to two or more persons; and the nature of it is, that each has a distinct right to his own share, although no division has yet been made. But the common owners may agree to a partition, or one of them may, in equity, compel a partition. If the estate is one which passes by inheritance, the heir of each owner takes his share, and there is no benefit of survivorship. A tenancy in C. may be created either by a conveyance in express words, or by the parties obtaining their titles at different times, or at the same time from different parties. But if the title accrues

by descent from the same ancestor, even though at different times, it is a tenancy in Coparcenary (q. v.).

COMMON BENCH. See BENCH and COMMON LAW, COURTS OF.

COMMON CHORD. See CHORD.

COMMON COUNTS. Short formal statements of the cause of action made in a Declaration (q. v.).

COMMON DEBTOR. See DEBTOR and CREDITOR.

COMMON FORMS are the ordinary clauses used in writs and deeds in England. It has been attempted to substitute, for some of these, short expressions conveying all the meaning of the C. F.; but the statutes by which the attempt was made (8 and 9 Vict. c. 119 and c. 124), being permissive merely, have as yet not affected practice. A main reason for the preservation of C. F. was the general rule that conveyancers were paid not according to value, or the difficulty of their task, but according to the length of a deed. A statute of the session (23 and 24 Vict. c. 145) made a further effort to abolish the C. F. used in appointing trustees, &c., by giving to them the powers which were formerly contained in the common forms. Brevity, however, gains ground.

COMMON GOOD. See CORPORATION.

COMMON HOUSE, or COMMON ROOM, was an apartment in a monastery in which a fire was constantly kept burning for the use of the monks, who frequently were allowed no fire anywhere else. The C. H. was presided over by a monk, who was called the master. It was the prototype of the common rooms in the colleges and halls of the English universities.

COMMON LAW, in England. These words, in their proper sense, signify the ancient consuetudinary law of England. The C. L. is therefore distinguished from the statute law and from equity. It is wholly overruled by the statute law. On the 2d November 1875, the C. L. courts were merged in the Supreme Court of Judicature by the act of 1873 (see COURTS OF COMMON LAW), with a view to incorporate equity also, when the two systems conflicted. Accordingly, the old relation between law and equity subsists, and the former maintains its force in spite of any discordant rules of equity, which can therefore now take effect through the intervention of a court by which the C. L. is in each particular case corrected or superseded. For an enunciation of cases in which this result is shown, the reader is referred to the article under the heading EQUITY.

The C. L. is, in one sense, an unwritten law. Its rules have been handed down by tradition, sometimes in a complete and definite shape, such as the law of primogeniture, the jurisdiction of the courts, &c.; sometimes as a mere spirit or tendency, according to which, in novel cases, as they may arise, the law is to be expounded. Thus, the law-merchant is chiefly part of the C. L., although only some of its rules are of real antiquity, and the greater portion of them were developed no later than the last century. Therefore, in such cases, the C. L., though accounted traditional, is expanded by the judges who declare it, who enounce new rules suited to new combinations of circumstances, and merely bearing an analogy to what the ancient C. L. had established in cases which fell within its purview. It is therefore not wonderful that there should frequently be dispute as to what the C. L. is, and that different courts should occasionally give different decisions upon such questions.

As the C. L. has never been formally enacted, nor has yet been reduced to a regular code, it is to be sought for in the treatises of institutional writers, and in the decisions of the courts of law. These last are of the highest authority, and where they are consistent, they are taken as irrevocably establishing the law. But being declarator merely, and not imperative, a single judgment of a court is not held conclusive upon courts of equal jurisdiction, though it is commonly accepted as binding by inferior courts.

A court may even depart from its own decision, if it shall come to be of opinion that the law has been incorrectly stated. But this principle perhaps undergoes an exception in the House of Lords, which being the highest court of all, it is laid down by some of the law peers that its judgments have the force of statute, and that the rules it has once sactioned can be altered only by statute. The point has long been regarded as settled; and it is almost the only correct theory on which a court of supreme jurisdiction, like the House of Lords, can continue to exercise its functions.

The C. L. is applicable to the whole realm, but it is part of its principles, that in particular circumstances it may recognize rules which are not of universal application; thus, in certain courts, it adopts as its own the provisions of codes which it entirely rejects in other courts. The civil and canon law are in some of their rules recognized as part of the C. L. in the Maritime and Ecclesiastical Courts (including under the latter denomination the new courts of Probate and Divorce), but they are of no authority otherwise in the courts by which the main branches of the C. L. are administered. So also, in particular localities, customs exist which the C. L. sanctions, although they may be at variance with its general provisions. Such are the rules regarding succession which prevail in Kent under the name of Gavelkind (q. v.), and in certain towns under the name of Borough English (q. v.). But customs of much more circumscribed operation are, when proved, equally accepted by the C. L. as part of itself within the limits in which it prevails; for the C. L. deems it not inconsistent to adopt a contrary rule to its own, if clear and uniform and confined to one locality. In order to entitle a custom to the force of law, it must be of such endurance 'whereof the memory of man runneth not to the contrary.' The period thus indicated is more precisely defined as extending to the commencement of the reign of Richard I. By this is meant, however, not that the custom must be proved to have been in perpetual vigor since that remote epoch, but that proof of its non-existence within that period will invalidate it. If no such proof is adduced, the custom will be established by the evidence of experienced living witnesses, or by such documentary evidence as is inconsistent with any other assumption.

COMMON LAW, COURTS OF. These are generally divided into Superior and Inferior. The superior sit at Westminster, and hence are often called the Courts at Westminster. They had the names of the Court of Queen's Bench, the Court of Common Pleas or of Common Bench, and the Court of Exchequer. These are all offshoots of the great court, the *aula regia* of the early Norman kings, which, under the presidency of the chief-justiciar, and composed of the great officers of state and of the household, of the principal nobility, and of the justices learned in the law, attended the king's person wherever he went, and formed the sole superior court of the kingdom. But the inconvenience attending so transitory a judicature led to the demand, conceded in Magna Charta, c. 12, that *communia placita*, common pleas, should be held in a fixed place, and hence arose the establishment of the court of that name. Afterwards, under Edward I., the office of chief-justiciar was abolished, and the judicial functions of the aula regia partitioned among the Court of Chancery and the three courts of C. L. above named. In 1873, the Judicature Act, 36 and 37 Vict. c. 66, was passed, which rearranged all the Superior Courts in England, consolidating them into one Supreme Court of Judicature, but having five divisions called the High Court of Justice. Three of these divisions were called the Queen's Bench division, the Common Pleas division, and the Exchequer division, respectively. The kind of business dealt with in each division was substantially the same as under the previous arrangements, the chief difference being the new names of the courts and the principle now common to them all, that thereafter they should administer justice without distinction as to its being theretofore known as Common Law or Equity. In 1881 it was further resolved that the offices of Chief-justice of Common Pleas and of Chief-baron of Exchequer should be abolished, and the three Common Law divisions consolidated. The Common Pleas and Exchequer have accordingly disappeared from the list of divisions of the High Court of Justice; and Queen's Bench, presided over by the Lord Chief-justice of England, has now not four but fourteen puisne justices. The former distinctions existing in the jurisdiction of the courts may still be briefly indicated under the head of each court.

1. *Court of Queen's Bench.*—This court was composed of the Chief-justice of England, and five puisne judges or justices. Its peculiar powers lay chiefly in the exercise of supervision over the proceedings of inferior courts and magistrates to the effect of restraining them from exceeding their jurisdiction, or of compelling them to perform their duty, and in the control of corporations in the event of illegal procedure, and in criminal jurisdiction.

2. *Common Pleas.*—This court retained exclusive jurisdiction over real actions so long as they existed, but latterly it held but few peculiar powers. A remnant of its original authority was reserved to it in the disposal of the actions which came in lieu of the old writs of dower to this court, and in the rule that certain deeds affecting land must be registered here. This court was also the court of appeal from the revising Barristers (q. v.). There was a Chief-justice of Common Pleas, and five puisne justices.

3. *Exchequer.*—This court possessed exclusive authority in all matters relating to the revenue. It was at one time a court of equity, as well as of common law, but the equity branch was abolished by 5 Vict. c. 5. It was composed of a chief-baron and 5 puisne barons.

The Chief-justice is appointed by the crown; the puisne judges, by the Lord Chancellor. The salary of the Lord Chief-justice of England is £8000; and that of the puisne judges, £5000 per annum.

The Queen's Bench used to sit also as a Bail Court (q. v.). The appeal formerly from these courts was to the Exchequer Chamber and thence to the House of Lords. But now the appeal is to Her Majesty's Court of Appeal in the first instance, and thence to the House of Lords. This last court of appeal consists of the Lord Chancellor and the Lords of Appeal appointed to sit as peers; and

it may besides include those peers who hold or have held high judicial offices in England, Scotland, or Ireland.

The sittings of the above superior courts are held only during Term (q. v.), when they are said to sit *in Banc* (q. v.), and decide on all questions of law that may arise in the actions brought before them. But questions of fact, unless both parties decide to leave them to the decision of the court (17 and 18 Vict. c. 125, s. 1), are decided by a jury, and the courts in which they are tried are held out of term-time, before one or two judges only, not necessarily of the court to which the action belongs. These trials take place either on Circuit (q. v.), or at the London and Westminster sittings, which are in or after ever term, and in either case are called trials at *nisi prius*. The verdict is returned to the court to which the action belongs, by which it is disposed of according to law.

The authority of the superior courts of C. L. extends over the whole of England, and over common law rights of every description. But since the remodelling of the county courts, it has been enacted by several statutes, with a view to discourage resort to such high judicatures in trifling cases, that in some species of actions in which less than £20, and in other species in which less than £5 shall be recovered, in the superior courts, no costs shall be allowed the plaintiff, unless the judge who tries the case shall certify that there was sufficient reason for its being brought in the superior courts.

The inferior courts are restricted both in respect of place and matter. They were extremely numerous, but now nearly all have been formally abolished; but they are now with few exceptions—the principal of which is the modern County Court (q. v.)—matter of interest to the antiquary rather than either to the practical lawyer or the public. They may therefore be passed over with very brief explanation.

The *Court Baron* was a court composed of the tenants of each lord of a manor. It might decide on all real actions (now abolished) arising within the manor, and on personal action below the value of 40*s*. but subject to review by the court at Westminster. In a manor comprising Copyholds (q. v.), it is still of importance. The *Hundred Court* was a similar court, composed of the freeholders within the Hundred (q. v.), and had like powers with the Court Baron. The Court of *Pie Poudre*, or dusty foot, was held by the steward of a manor to which a market belongs, for the decision of all questions of bargaining at the markets. The *Forest Courts*, of several classes, were for the preservation of the beasts of the chase, and the protection of the subject from oppression by the officers of the forest. The *Courts of Requests* in boroughs were for the recovery of small debts, but are now abolished.

A few *Borough Courts* still exist, and are held under the presidency of the Recorder (q. v.). From them a writ of error lies to the superior courts. The *Lord Mayor's Court*, and the *City Court* in the city of London, have a considerable amount of business. The *Court of Hastings* in London is practically obsolete. The *Court of the Cinque Ports* is held before the mayor and jurats of each port, from which error lies to the Lord Warden of the Cinque Ports Court at Shepway, and thence to the Queen's Bench. The *Stannary Courts* in Cornwall and Devonshire are also still in use, and exclude, as to the tin-workers, the jurisdiction of all the other courts, except in pleas of land, life, or member. They are held before the vice-warden of the Stannaries, and appeal lies only to the warden, assisted by two of the judges; and thence to the High Court (2 and 3 Vict. c. 58, 18 and 19 Vict. c. 32, and 32 and 33 Vict. c. 19). There are in some counties also *Barmote Courts*, for regulating questions relating to the mines (14 and 15 Vict. c. 94). The Courts of the Chancellors of the universities of Oxford and Cambridge have also exclusive jurisdiction (except as regards freeholds), where the defendant is resident in the town, and a scholar or privileged member of the university is a party.

The Court of Common Pleas in Lancaster, and the Court of Pleas in Durham, have jurisdiction in all personal actions, and now form part of the High Court of Justice.

COMMON LAW BAR, that portion of the English bar which devotes itself to practise in the common law courts, distinguished from the equity bar, which practises only in the Courts of Chancery.

COMMON LODGING-HOUSES. See LODGINGS.

COMMON PLEAS. See COMMON LAW, COURTS OF.

COMMON PRAYER-BOOK. This book contains the forms of public worship and administration of the sacraments and other rites and ceremonies according to the use of the United Church of England and Ireland. It is, for the most part, a translation of such portions of the services of the ancient Catholic Church as were considered by the Reformers free from all objection. Before the Reformation, the liturgy was in Latin, and the form generally adopted in the south of England was that after the use of Sarum. The first steps towards its reformation were taken by Henry VIII., the main objects in view being the abolition of what was superstitious, and the translation of the services into the vulgar tongue. In the year 1540, a committee of bishops and divines was appointed for the purpose, and what was done by them was revised by convocation in 1543. In the year 1545, the *King's Primer* came forth, containing, amongst other things, the Lord's Prayer, Creed, Ten Commandments, 'Venite,' 'Te Deum,' Litany, and other hymns and collects in English, several of which were in the same version as at present used. It was, however, in the reign of Edward VI. that the most important steps were taken for framing a new service-book. In opposition to the practice introduced by the Roman Catholic Church, an act of parliament was passed, ordering the communion to de administered to the laity in both kinds, and a formulary was drawn up for this purpose, and used at the end of the Latin mass. In the following year, a complete service-book was drawn up, including offices not only for Sundays and holidays, but for the administering of baptism and confirmatiou, for matrimony, the burial of the dead, and other occasions, together with the above-mentioned office for the communion considerably altered. This book was compiled by Cranmer and Ridley, assisted by eleven other divines; it was revised by convocation, and confirmed by king and parliament, and published in 1549, and is known as the FIRST PRAYER-BOOK of Edward VI. It differed from the one now in use by beginning the daily service with the Lord's Prayer, by retaining prayers for the dead, and directing the use of the sign of the cross in confirmation and visitation services, and the anointing of the sick. It was drawn up with great prudence, retaining as much, and altering as little as possible of what had been familiar to the people. In 1550, the ordination service was added, taken principally from that used by the Roman Catholic Church, but omitting certain ceremonies, and adding most of the questions proposed to the candidates. This service differed but little from that now in use, as authorized in 1662.

In 1551, objections, as might be expected, were made from various quarters to this *first* prayer-book, and Cranmer proposed to revise it, and called to his assistance two distinguished foreign reformers—Martin Bucer, and Peter Martyr. In this revision, some of the principal alterations were the addition of the opening sentences, the exhortation, confession, and absolution at the beginning of the service, the disuse of oil in baptism, of unction of the sick, and of prayers for the dead. The book thus altered was confirmed by act of parliament in 1552, and is called the SECOND PRAYER-BOOK of Edward VI.

In the reign of Queen Mary, the acts of 1549 and 1552 were repealed, and therefore, at the accession of Elizabeth, it was neccessary to reverse this repeal; and this afforded a fresh opportunity of revising the whole. The question then arose (1560) as to which of King Edward's two books should be adopted. The queen herself would probably have preferred the first, as containing many of the old ceremonies to which she was attached, but the second was chosen, and a few unimportant changes introduced. This may be called the THIRD COMMON PRAYER-BOOK. No alteration was made by it as to the use of church ornaments and vestments, which were directed by the act of uniformity, 1559, to be retained as they were left by the authority of parliament in the second year of Edward VI.

On the accession of James I., after the Hampton Court Conference, the book was again revised; and a few judicious changes made, e. g., some forms of thanksgiving were added for special occasions, and the explanation of the sacraments by Dr. Overall after the catechism; midwives and laymen were also prohibited from baptizing. In this state, the C. P. was left until the Restoration, when, at the request of the Presbyterians, the king consented to a fresh revision, 1661. Twelve bishops were appointed to confer with an equal number of Presbyterian divines, each side having nine coadjutors. They were to consider the principal objections raised against the liturgy as it then stood. This was called the Savoy Conference. The Presbyterians brought forward all the objections that had been made by the Puritans for the last century, adding new ones of their own. Baxter went so far as to say that it was incapable of amendment, and was bold enough to offer an entirely new liturgy of his own composition to be received in the place of the authorized one. It is hardly necessary to add, that the conference broke up without anything being done, except that the bishops proposed a few alterations, which were adopted by convocation in 1662, and confirmed by act of parliament. Among these changes, the new authorized version of the Scriptures was adopted, except in the psalms (which follow the version of Coverdale's Bible, and had become familiar to the people), and in the commandments and the sentences at the communion service; the general thanksgiving was added, and the form of prayer to be used at sea. It is proper to observe that the four forms of prayer known as the *State* Services—viz., for Gunpowder Treason, on November 5; for King Charles's Martyrdom, January 30; for the Restoration, May 29; and the King's Accession; were never properly a part of the C. P., but were annexed to it by order of the king in council at the beginning of every reign. Upon an address of both Houses of Parliament, in con-

formity with the wish of the clergy, an order in council was given by Queen Victoria for discontinuing the first three.

There have been four acts of uniformity—viz., in 1548 and 1552, both of which were repealed by that of Elizabeth in 1559; and the last in the 14th year of Charles II., 1662, which left that of Elizabeth unrepealed. In the Great Rebellion, 1643, the Long Parliament prohibited the use of the common prayer-book. At the Revolution in 1688, no change was introduced into the prayer-book; for although a commission was appointed for the purpose, the second downfall of Episcopacy in Scotland in 1689 caused such alarm in the English Church that the matter was dropped.

Concerning the use of the English C. P. in Ireland, it is sufficient to say that, in 1551, the first prayer-book of Edward was introduced by the king's authority, after some opposition; and the same prayer-book continued to be used on both sides of the Channel till the Irish branch of the United Church was disestablished. In 1875, the General Synod of the Church of Ireland adopted a Revision of the C. P., but without essential alteration. In Scotland, which had as yet no settled liturgy, Laud attempted to introduce the English prayer-book, but with alterations in the communion service which were likely to be very offensive to a people so hostile to the Church of Rome. This attempt was followed by riots, and ultimately led to the abolition of the Scotch Episcopate and to the Solemn League and Covenant. The English C. P. is now used in most of the Episcopal churches in Scotland, but in some a liturgy resembling that of Laud, but framed by the Nonjurors more on the model of the Eastern liturgies, is used in the communion service. In the United States, also, the English C. P. is used with some slight changes.

COMMON SENSE, The Philosophy of. There are certain beliefs that have been current among men in all ages, which, when canvassed by one set of philosophers, have been declared to be groundless illusions. Of these, the most remarkable instance is the belief in an external, material world, independent of any mind to perceive it. The doctrine put forth by Bishop Berkeley, as opposed to the common opinion, was, that 'the whole universe subsists, and can only subsist, within such a sentient, invisible, and conscious thing as the mind is known to be. In this way, each human mind must have within it a separate universe of its own, but so exactly the same in all minds, that every object of sense, and every movement of every object that is to be found in the universe of one mind, is to be found also in the universe that is within the other mind; the general effect of all which conditions is much the same as that which would be produced if several people were all dreaming, exactly at the same time, exactly the same dream.' 'The result of Berkeley's inquiry,' says Dr. Reid, 'was a serious conviction that there is no such thing as a material world—nothing in nature but spirits and ideas; and that the belief of material substances, and of abstract ideas, are the chief causes of all our errors in philosophy, and of all infidelity and heresy in religion.

His arguments are founded upon the principles which were formerly laid down by Des Cartes, Malebranche, and Locke, and which have been very generally received. And the opinion of the ablest judges seems to be, that they neither have been nor can be confuted; and that he hath proved, by unanswerable arguments, what no man in his senses can believe. Hume proceeds upon the same principles, but carries them to their full length; and as the bishop undid the whole material world, this author, upon the same grounds, undoes the world of spirits, and leaves nothing in nature but ideas and impressions, without any subject on which they may be impressed.'—*Inquiry into the Human Mind*, c. 1, s. 5.

A dead-lock in philosophy was the result of those doctrines of Berkeley and Hume; and the solution offered by Reid consisted in setting up C. S. as an arbiter from which there could be no appeal; that is to say, the universally admitted impressions of mankind were to be taken as corresponding to the facts of things without any further scrutiny. Reid's philosophy of C. S. has thus found a place in the thinking-world; and it is only the same view otherwise expressed, when it is declared by other philosophers that the deliverance of consciousness must be presumed true. Sir W. Hamilton, in the most elaborate vindication of the C. S. philosophy that has ever been produced (edition of Reid's works), dwells largely upon this last view of the subject. The following extract is a specimen of his mode of reasoning: 'When, for example, consciousness assures us that, in perception, we are immediately cognizant of an external and extended *non-ego* (not-self); or that, in remembrance, through the imagination, of which we are immediately cognizant, we obtain a mediate knowledge of a real past; how shall we repel the doubt—in the former case, that what is given as the extended reality itself is not merely a representation of matter by mind; in the latter, that what is given as a mediate knowledge of the past, is not a mere present phantasm, containing an illusive reference to a real past? We can do this only in one way. The legitimacy of such gratuitous doubt necessarily supposes that the deliverance of consciousness *is not to be presumed true*. If, therefore, it can be shown, on the one hand, that the deliverances of consciousness must philosophically be accepted *until* their certain or probable falsehood has been positively evinced; and if, on the other hand, it cannot be shown that any attempt to discredit the veracity of consciousness has ever yet succeeded; it follows that, as philosophy now stands, the testimony of consciousness must be viewed as high above suspicion, and its declarations entitled to demand prompt and and unconditional assent.'

'In the first place, it cannot but be acknowledged that the veracity of consciousness must at least, in the first instance, be conceded. Nature is not gratuitously to be assumed to work, not only in vain, but in counteraction of herself.' 'But in the second place, though the veracity of the primary convictions of consciousness must, in the outset, be admitted, it still remains competent to lead a proof that they are undeserving of credit. But how is this to be done? As the ultimate grounds of knowledge, these convictions cannot be redargued from any higher knowledge; and as original beliefs, they are paramount in certainty to every derivative assurance.' 'It will argue nothing against the trustworthiness of consciousness, that all or any of its deliverances are inexplicable—are incomprehensible. To make the comprehensibility of a datum of consciousness the criterion of its truth, would be indeed the climax of absurdity.' (P. 745.)

The conclusiveness of this reasoning is disputed by many, who object, that conciousness (q. v.) is a very wide word, comprising indeed everything that we call mind; and it is proverbially unsafe to argue in generalities. Suppose, it is argued, we were to substitute 'memory' in the above reasonings, and to maintain that the veracity of each one's memory was beyond all question or dispute, it would be apparent at once how the case really stands. In one meaning, and in one set of circumstances, memory is sure, or even, if we please, infallable—that is, when we record an observation the moment after we have made it. For a short interval of time, a simple fact, or a brief statement, may be recollected with entire certainty. On the other hand, the lapse of days, months, or years, and the complicacy of the fact, not to mention the bias of the feelings, are known to cause great uncertainty in our recollections, and in such circumstances we do not implicitly rely on it. In a word, *experience* is the criterion of how far the memory is to be trusted. Possibly, therefore, the same thing may turn out to be true of the larger fact named consciousness.

The truths of C. S., or consciousness, are such as these: the laws of Identity, Contradiction, and excluded Middle (see Identity); the axioms of Mathematics; the law of Casuality (see Cause); the doctrine of an innate moral sense (see Ethics); the doctrines of man's Moral Liberty (see Free Will); the existence of an external world independent of every percipient mind. Such truths are designated by a variety of other names, with a view to contrast them with what we learn in the course of our education and contact with the world; they are termed Intuitions, Intuitive Cognitions, Instincts, Feelings, Beliefs, Principles, Ultimate or Primordial Elements, Truths, *à priori*, Transcendental Cognitions, Truths of the Reason, &c.—*Hamilton's Dissertations*, note A. The philosophy of C. S., as promulgated by Reid, bore reference especially to the denial by Berkeley of the received view of the material world—a subject which falls to be considered under Perception.

COMMON TIME, in Music, is that species of measure which contains two minims or two crotchets in a bar.

COMMONS, the dinner provided in English colleges and inns of court for their members. In the inns of court, it is provided only during term. Separate tables are appointed for the benchers (q. v.), for the barristers, and for the students and other members of the inn.

COMMONS, House of. See Parliament.

COMMU'NION signifies, in ecclesiastical language, that relation, involving mutual claims and duties, in which those stand who are united by uniformity of belief in one religious body or church. To exclude from this relation and its involved rights, is to *excommunicate*. The most visible symbol of this relation being the partaking together of the Lord's Supper, that rite is often called the Communion. See Lord's Supper.

COMMUNION SERVICE. See Common Prayer-book and Liturgy.

CO'MMUNISM, the name given to one class of the arrangements by which certain speculators have proposed to dispense with those laws of social and political economy which are supposed to keep society together, through the influence of the domestic affections and the spirit of competition, and to substitute in their stead a set of artificial rules for the government of mankind. The word Socialist has generally been applied to those who only propose to interfere with labor by abolishing competition and wages, leaving men to work under the influence of public spirit, and

making an equal division of the produce. See SOCIALISM. The term communist, on the other hand, has been applied to those who go a step further, and propose to abolish the relation of husband and wife, along with the system of domestic government which is founded on the parental authority. While Louis Blanc may be considered the head of the Socialists—though his ultimate aim was work according to capacity, and payment according to wants—the representatives of the Communists are Robert Owen, St. Simon, Fourier, Proudhon, and Enfantin.

Although we usually consider C. an especially French fallacy, the first consistent practical teacher of it was our own countryman, Robert Owen.

He published in 1813, *A New View of Society, or Essays on the Principle of the Formation of the Human Character and the Application of the Principle to Practice*—in which he printed in large capital letters, as the keynote of his system, the following announcement: 'That any character—from the best to the worst, from the most ignorant to the most enlightened—may be given to any community, even to the world at large, by applying certain means, which are to a great extent at the command and under the control, or easily made so, of those who possess the government of nations.' No alarm was felt either at such a text or the comments made on it; nor did the world see what the author meant by the hint that there were special artificial means for improving the breed, as it were, of mankind, until he struck at the root of the domestic organization, by such announcements as the following: 'The affections of parents for their own children are too strong for their judgments ever to do justice to themselves, their children, or the public in the education of their own offspring—even if private families possessed the machinery (which they never do) to well-manufactured character from birth.' He formed an organization, too complex to be here detailed, by which families were to be subjected to a discipline which, that it might be perfectly uniform, should be carried out in parallelograms. Anticipating the results, he said: 'These new associations can scarcely be formed before it will be discovered that by the most simple and easy regulations all the natural wants of human nature may be abundantly supplied; and the principle of selfishness—in the sense in which that term is here used—will cease to exist, for want of an adequate motive to produce it.' He attested his reliance on the efficacy of his invention by sinking his own fortune in an attempt to build a parallelogram. It was commenced in the year 1825, at Orbiston, in Lanarkshire; but he did not meet with sufficient co-operation, and as his own funds only sufficed to build one corner of the parallelogram, it was impossible to give effect to arrangements which were fitted only for a completed edifice in that geometrical form. A considerable number of people—about 200, it is said—lived for some time in the building, little to their own advantage or that of the neighbors, who were naturally prejudiced against them, and probably exaggerated their irregularities; the building was soon deserted, and afterwards was totally obliterated.

Owen had another opportunity of trying his parallelogram organization in 1843, when 'Harmony Hall' was established in Hampshire by the zealous efforts of his followers, who formed a sort of sect in England. Still his theory had, as he deemed it, anything but fair play, since so far did his disciples depart from that absolute undeviating conformity to the 'rational' system, as laid down by him, that they got tired of his incessant reiteration of it, and deposed him from his office of 'President of the Congress.'

Attempts to realize C. abroad were not more fortunate. Fourier's system was to be realized in 'phalanxes,' each containing 400 families, or about 1800 persons. A sum of about half a million of pounds is said to have been spent in the establishment of a 'phalanstery' at Rambouillet. It failed, and the founder of the system, like Owen, attributed the failure to the scheme being but imperfectly developed. The St. Simonians established a college or corporation at Menilmontant, with a 'supreme father' at their head. The leaders were brought to trial by the government of Louis-Phillippe, on a charge of undermining morality and religion. They were subjected to imprisonment, and not having public feeling with them, they were unable to bear up against the contumely thus thrown on them.

Communism, in the sense of having all things in common, is not to be confounded with the idea for which the communists of Paris fought in 1871 (see PARIS); that idea was political rather than social, although the same persons may often hold both doctrines. *Commune* is the designation of the lowest administrative division in France, corresponding in rural districts to an English parish or rather township, and in regard to cities, being equivalent to municipality. The communist doctrine is, that every such commune, or at least every important city commune, like Paris, Marseille, &c., should be a kind of independent state in itself, and France merely a federation of such states. This idea has taken deep hold of the extreme democrats, not only among the town populations of France, but also in Spain, and, to a less extent, in other parts of the continent. It was the very opposite idea for which the great civil war in the United States was fought and won.

COMMUTA'TION OF TITHES. See TITHES.

COMNE'NUS, the name of a family, originally Italian, of which many members occupied the throne of the Byzantine empire from 1057 to 1204, and that of Trebizond from 1204 to 1461. See BYZANTINE EMPIRE and TREBIZOND.—ANNA COMNENA (q. v.), who lived in the first half of the 12th c., is both of historic and literary celebrity.—DAVID C., the last representative of the imperial race in Trebizond, was executed at Adrianople in 1462, with all his family, by command of Mohammed II. The attempt which has been made to trace the descent of the Bonaparte family from a branch of the Comneni settled in Corsica, is not supported by valid evidence.

CO'MO, a city of Lombardy, Northern Italy, beautifully situated at the south-west extremity of the Lake of Como. It lies in a valley, surrounded by hills, clad with luxuriant gardens, olive-plantations, and orange-groves, with here and there an old ruin cropping out. The city is surrounded by old walls flanked with towers, the gateways by which the walls are pierced being fine specimens of middle-age military architecture. Among the principal buildings of C. are the cathedral, built of marble, and containing some interesting pictures and monuments; the town-hall, also of marble, dating from the beginning of the 13th c.; and the churches of San Fedele and St. Abondio. There are also many fine mansions of the nobility in C. and its suburbs. The port of C., on the lake, is formed of two piers, each terminating in a square pavilion, from which magnificent views are obtained. The inhabitants—including the suburbs—number (1881) 25,560, and are very industrious. The chief articles of manufacture are silk, cotton, woollens, yarn, and soap, the last article having a high reputation. By means of its port, C. carries on extensive trade in the produce of the district with Switzerland. C., in the time of Pliny the Younger, had attained to a high degree of prosperity as *Comum Novum*. With the fall of the Roman empire, C. passed out of sight until 1107, when it began to war with Milan, and in the course of twenty years was utterly destroyed by its antagonist. It was rebuilt in 1155, by Frederick Barbarossa, and remained a republic for two centuries, when it fell into the hands of the Viscontis, its history since that time being bound up with that of Milan.

COMO, LAKE OF (Ital. *Lago di Como*, ancient *Larius Lacus*), a sheet of water in Lombardy, Northern Italy, lying at the foot of the Lepontine and Rhetian Alps, chiefly formed by the river Adda, which enters it at its north, and issues at its south-eastern extremity. The total length of the lake from Como to Riva is about 35 miles. About 15 miles from its northern extremity, the promontory of Bellagio divides it into two branches, the longer of which is between 18 and 20 miles; the other branch is about 12 miles long. The three arms of the lake sometimes receive different names—the upper part as far as Bellagio being called the Lake of Bellano; the longer branch, on which the town of Como is built, the Lake of Como; and the shorter, the Lake of Lecco. Lake Como, however, is the general designation. The greatest breadth of the lake is not more than 3 miles, but throughout the greatest part of its length, it is much less. The beauty of the surrounding scenery, and the salubrity of the climate, have made the Lake of C. the most celebrated and most resorted to in Italy, its shores being everywhere studded with fine villas. Queen Caroline once had a residence here. Numerous steam-boats ply upon the lake.

COMODO', an island in the Eastern Archipelago, 35 miles in length, by 16 in average breadth, lies between Flores on the east, and Sumbawa on the west, being separated from the latter by the Strait of Sapi. It is a penal settlement of the kingdom of Bima in Sumbawa. The exports are dried fish and good grinding-stones.

COMORI'N, CAPE, the most southerly extremity of the peninsula of Hindustan, being, in fact, a sandy accretion to the termination of the Western Ghauts; while, on the outside of it, are a few detached rocks as a natural breakwater. The headland itself is so low as not to be visible at the distance of more than ten miles from the deck of a large ship; and, long before it can be itself distinguished, it is fixed in position, to the eye of the approaching mariner, by a conspicuous peak of the great chain behind it. Its lat. and long. are 8° 5′ N. and 77° 37′ E. Cape C. is in the protected principality of Travancore; and close to it there stands, amid a clump of trees, a village of the same name, with a few fishermen's huts, some venerated temples, and a Dutch church.

CO'MORN, properly KO'MORN, a town and fortress in Hungary, situated on the island of Schütt, at the junction of the Waag and the Danube, which is here crossed by a bridge of boats, about 50 miles west-north-west of Pesth. This island is remarkable for fertility, as is, indeed, the whole surrounding district. The town.

which is irregularly built, with narrow gloomy streets, contains (1880) 13,108 inhabitants, almost exclusively Magyar. The fortress was erected by Matthias Corvinus, and was restored at great expense in 1805. Its works and intrenchments extend about seven miles along the banks of the rivers, and it requires for its defence at least 15,000 men and 400 pieces of artillery. It has the reputation of being impregnable, and justified it in the Hungarian war, for the Austrians besieged it in vain from October 1848 to September 1849, and only became masters of it at last in virtue of a capitulation. It has manufactures of woollen and leather, and an active trade in corn, wine, honey, fish, and timber.

CO'MORO ISLES, a group of four islands in the Mozambique Channel, between Africa and Madagascar, in lat. 11°—13° S., long. 43°—45° 30′ E. The islands, which are of volcanic origin, are called Angaziya or Great Comoro, Anjouan or Johanna, Mayotta, and Mohilla. They are mountainous, the highest peaks rising above 6000 feet. The soil is fertile. The inhabitants, about 80,000 in number, are principally Mohammedans, but fetichism prevails to some extent. The manufactures are coarse cloths, jewelry, and firearms. The island of Mayotta was ceded to France in 1842, and the cession was confirmed in 1845. The total exports (mostly sugar) have an annual value of from £30,000 to £50,000; the imports, of £20,000 to £30,000. Great Comoro, which has an active volcano, suffers from want of water. The people of Johanna find their principal employment in connection with ships calling for provisions. The trade of Comoro and Mohilla is of the same character, but these islands are not so much frequented by ships for the purpose of victualling.

COMPANIES' CLAUSES CONSOLIDATION ACT. See RAILWAYS.

CO'MPANY. See JOINT-STOCK COMPANY and PARTNERSHIP; see also GUILDS, LIVERY.

COMPANY, in Military Organization, is an aliquot part of a regiment or battalion. In the British service, the companies in an infantry regiment are generally either ten or twelve, or, if there are two battalions, each has this number of companies. The arrangement is made to facilitate command and evolutions. The captains, lieutenants, and sub-lieutenants are all *C. officers*. The captain is the chief of a C., and the lieutenant and sub-lieutenant are his subalterns or assistants. The C. is further separated into two *subdivisions*, of two sections each. In round numbers, and without reference to special instances, a full C. may be considered to comprise about 100 men, a subdivision 50, and a section 25. Under the captain's superintendence, the lieutenant commands the first and second divisions, the sub-lieutenant the third and fourth, with a sergeant to each section. Each C. has its own arm and accoutrement chests, and keeps its own books. A cavalry regiment is subdivided into *troops* instead of companies; the engineers and marines into companies; but the artillery corresponding term is *battery*. In the German army, a company comprises about 250 men, under a captain, who is a mounted officer, and 3 subalterns.

COMPANY, of a ship, is considered to include the whole of the persons engaged on board, and paid for specific duties—exclusive, therefore, of troops and passengers, but including naval officers as well as crew. See CREW.

COMPA'RATIVE ANA'TOMY. See ANATOMY.

COMPA'RISON, in Grammar, and as applied to Adjectives (q. v.), is that which marks the *degree* in which the quality is attributed to the object, as compared with other objects. There are three degrees of comparison. The *positive* indicates the quality generally, without comparison; the *comparative*, a higher degree of the quality than is attributed to other things; and the *superlative*, the highest degree that is attributed to any of the things under consideration. There are two ways of expressing these degrees. 1. By an inflection or change on the word; as, *hard, harder, hardest; happy, happier, happiest.* This mode prevails almost exclusively in Greek and Latin. 2. By an additional word, as *more happy, most happy.* This may be called logical C.; the other, grammatical. In French, with the exception of a few irregular adjectives, all adjectives follow the logical method. In English, the logical method is preferred in every case where the grammatical would produce a word difficult or harsh in the pronunciation.

This is generally the case in English when the simple adjective is of more than one syllable; but it is not always so. Thus, *éarnester, prúdenter*, would make harsh combinations; not so *políter, discréeter, háppier.* The difference is, that in *éarnester, prúdenter*, the accent being on the first syllable, two unaccented syllables of discordant character are thrown together; in *políter, discréeter*, the unaccented syllables are separated; and in *háppier*, though they come together they are of a kind readily to coalesce. Thus, the laws of euphony—which mean, the ear and organs of speech consulting their own convenience—determine this point, as they do much else in language. In general, it is only adjectives of quality that admit of C.; and even adjectives of quality cannot be compared when the quality does not admit of degrees; as a *circular* space, a *gold* ring, a *universal* wish.

Adverbs (q. v.) are compared exactly like adjectives.

CO'MPASS, MARINER'S, is the name given to the instrument by which sailors are enabled to steer their course on the ocean out of sight of land, and when neither sun nor stars are visible. The ancients, to whom it was unknown, could seldom venture to lose sight of the coast. The directive power of the magnet seems to have been unknown in Europe till late in the 12th century. It appears, however, on very good authority, that it was known in China, and throughout the East generally, at a very remote period. The Chinese annals indeed assign its discovery to the year 2634 B.C., when, they say, an instrument for indicating the south was constructed by the Emperor Hou-ang-ti. At first, they would appear to have used it exclusively for guidance in traveling by land. The earliest date at which we hear of their using it at sea is somewhere about 300 A.D. According to one account, a knowledge of the C. was brought to Europe by Marco Polo, on his return from his travels in Cathay. It was long contended that the C., as a nautical instrument, was first invented by Flavio Gioja, a native of Amalfi, about the year 1362; and that that part of the kingdom of Naples where he was born has a compass for its arms. For

this there is no authority whatever, as the C. was well known as a nautical instrument before his time. It is probable, however, that Gioja may have made some improvement in the instrument or in the mode of suspending it. See *British Annual for* 1837.

The essential part of the C. is the magnetized needle, balanced freely upon a fine point; such a needle has the property of arranging itself in the meridian, one end always pointing to the north, and the other to the south (see MAGNETISM); yet not exactly, but with a deflection or *declination* (q. v.), which varies from time to time in magnitude, and may be towards the west or the east. The form of the needle is various, some being long flat prisms, others lozenge-shaped. The center of the needle is pierced, and a piece of agate generally inserted, with a conical hole sunk in it, to receive the fine point of the steel pin, so that the free motion may not be hindered by friction. The construction of the rest of the instrument depends upon the purpose it is to serve. For a mariner's C., the needle is fixed to a circular card, on which there is a star of 32 rays (see the figure), marking the 32 *points* of the heavens. The north point of the card is immediately over the north end of the needle, and the card moves with the needle. The cardinal points are marked with the letters N., S., E., W.; and the intermediate points, by an ingenious system of notation, the principle of which is readily seen by inspection of the figure. The points are often subdivided into quarters, which are thus marked: N.¼E. (read, 'north one-fourth east'); N.½E.; N. by E.¼E., &c. A point of the C., being $\frac{1}{32}$ of the circle, is equal to 11° 15′. The C. thus formed is enclosed in a cylindrical brass box; and in order that the C. may remain horizontal in all positions of the ship, the box is supended by Gimbals (q. v.). The whole is then placed in the Binnacle (q. v.), in sight of the helmsman. Inside the box, in the direction of the ship's bow, is a vertical black line called the *lubber-line*, and the steersman must keep the point of the card which marks the prescribed course always in contact with the black line. Compasses differing in some respects from the mariner's C. are also used in surveying and land-measuring; and for the minor they are perhaps as necessary as for the sailor.

The great difficulty connected with the use of the mariner's C. arises from the disturbing influence of the magnetism of the ship. This difficulty is particularly felt in iron vessels, where the deviation of the needle is frequently so considerable as to render the compass almost useless. Various means of obviating this have been suggested; one of these is to place bars of soft iron or magnets in the immediate neighborhood of the binnacle, which being so placed as to cause a contrary disturbance to that of the iron of

the ship, leave the needle comparatively free. This is found to answer well in iron ships plying between British and continental or North American ports; but where, as in the Australian passage, they change considerably their latitude, such an agreement is found to be worse than useless, as the magnetism of the vessel changing with the magnetic latitude, causes an ever-varying deviation of the needle. It has likewise been suggested to place a compass as a standard at the mast-head, where it would be comparatively free from the attraction of the vessel, by which the ship's course might be shaped, the ordinary C. being used merely to give immediate direction to the steersman. In the royal navy this error is to a large extent obviated in the followlng way. A C. is placed so high above the deck as to clear the bulwarks, and allow the bearings of a distinct object on shore or a heavenly body to be taken while the ship's head makes a complete circuit. In this way the deviation caused by the iron of the ship in all different positions may be ascertained, and afterwards taken into account.

COMPASSES, instruments for transferring and marking off distances, or for drawing circles, ellipses, &c. The *common C. or dividers* are simply two rods or 'legs' joined together at one end by a pivot-joint, and pointed at the other; when used for drawing circles, the lower part of one of the legs is replaced by a pen or pencil. *Spring dividers* are much in use by workmen; in these, the legs are united by a strong steel spring, the action of which is to stretch them open; but half-way down, a screw passing between the legs, regulates the degree of opening. The value of these depends upon the permanency with which they retain any degree of opening given to them, pivot C. being liable to slip.

Beam C. consists of points sliding on a long bar, to which they may be clamped at any distance from each other. They are used for greater openings than pivot C. can safely span, and, when delicately made, for more accurate dividing. See GRADUATION.

Proportional C. have a point at each end of each leg and the pivot between, thus forming a double pair of C. opposite to each other, end to end. If the pivot is midway between the points, the opening of each pair of points will be equal; if the distance from one pair of points be double that from the other, the openings will be as two to one; and so on for any ratio. When a single fixed proportion only is required, the pivot is fixed accordingly; but to adapt them for variable proportions, the pivot is a clamping screw, which moves in an elongated interval in the legs, and may be fixed at any point.

Triangular C. have three legs, so that the points of a triangular may be all transferred at once.

Calliper Compasses. See CALLIPERS.

COMPA'SSIONATE ALLOW'ANCE is an allowance made to the children of deceased British military and naval officers left in necessitous circumstances. The annuities vary from £8 to £20 a year, according to the rank of the deceased officer; and are tenable up to the age of 18 in the case of boys, and to that of 21 as regards females, or until marriage if that happen earlier. This measure is more general than a C.A. which arose out of the sympathy of the British nation with the army during the Crimean War. Royal warrants were issued in 1855 and 1856, defining and explaining allowances made to the widows and children, or other specified relations, of military officers who, after the date of the declaration of war with Russia, had been killed in action, or had died of wounds received in that war. The claims on this fund die out as years advance, of course.

COMPENSA'TION (Lat. *compensatio*). The doctrine of C., which the law of Scotland and of most of the other states of Europe have borrowed from the civil law of Rome, corresponds to that of *set-off* in England. It provides that where two parties are mutually debtors and creditors, their debts shall extinguish each other, if equal, and if unequal, leave only a balance due. C. must be pleaded, as it does not operate *ipso jure*, but, when pleaded, it is held to operate from the period of concourse, the interest on either side being stopped from that time.

Compensatio Injuriarum is a defence against actions of damages for slander or the like. It is not a bar to action, but a *set-off* or counter-claim. In England, it is not allowed to set-off one trespass or tort against another—a cross-action is requisite; and in Scotland, the leaning recently has been in the same direction.

COMPENSATION OF ERRORS, in Physics, a method of neutralizing errors which cannot be avoided, by introducing others into the experiment or observation, of an opposite nature, and equal in amount. The compensation pendulum illustrates the principle. See PENDULUM.

COMPETI'TION (Lat. a seeking together) has been well defined by Dr. Johnson as 'the act of endeavoring to gain what another endeavors to gain at the same time.' Its most apt exemplification is a race, where all are going to the same point, and all strive to be first there, while though only one can achieve this object, some others will have the satisfaction of being nearer to success than the competitors who are behind them. The most important practical use of the word C. is in the political economy of commerce, where it is the great motive-power of production and enterprise.

People work, or embark in trade, avowedly for the purpose of making money. It is the object of the law of the land, as well as of religion and morality, to prevent money-making by immoral means; but within the bounds thus drawn around it, money-making is the object of man's exertion. When the money is made, the next point, always within the same bounds, is to make it go as far as it will. C. works through the co-operation of these motives. The purchaser wants the best article he can get at the lowest price; the producer strives to beat all his fellows, and offer the best article for the price. So thoroughly is this principle established as one consistent with commercial morality and honor, that our railway companies, managed by men of rank and fortune, many of whom are members of the legislature, do not hesitate to make travelers pay a larger fare for going 20 miles on their line to a station not touched by a rival company, than they will charge the same passenger for a journey of 40 or 50 miles, if it be to a station which he could reach otherwise.

Whatever may be hereafter accomplished, what we chiefly know of the attemps to supersede C. by some other motive to exertion, is, that they have not been successful. We see every day C. increasing the necessaries and comforts of life, and enlarging the wealth of the community. It is said that there are other and better motives which should produce the same effect, but they have not yet been found. It was an object of the ruling party in the French provisional government of 1848 to abolish C., and place all workmen on a par, as some expressed it, or, according to others, to remunerate them, not according to their services, but according to their wants. A great experiment was tried at the Hôtel Clichy, where 1500 tailors were employed to make the uniforms for the national guards, the price of which was to be equally divided among the workmen; but even in that climax of enthusiasm, they did not work up to the mark of the lowest paid of the Paris tailors under the competitive system. As each one felt that the value of any extra exertion would be divided among the whole 1500, instead of being enjoyed by himself, his zeal relaxed, and even the thought of 'liberty, equality, and fraternity' was insufficient to rouse it. It appears wonderful that large bodies of the French people should have been so easily deceived by statements of which the fallacy, or rather the actual inaccuracy would be at once seen through by any working-man in this country. Louis Blanc supposes three competitors for a job. A has a wife and family; he wants 3 francs of wages. B has a wife only; 2½ francs will do with him. But C is a bachelor, who can subsist on 2 francs; therefore, he gets the job, and the others starve. See the second chapter of his *Organisation du Travail*, the title of which is, 'Competition is for the People a System of Extermination.' But he leaves out entirely one side of the bargain. Employers compete to get work as much as workmen compete for employment. If the work of B and C be worth, in the market, 3 francs, they will get that whether they have families or not, and it is not the practice of a working-man, any more than of the rest of the human species, to give his work at a third less than its value because he is a bachelor.

The Socialists have referred to the public departments—especially to the post-office arrangements in Britain—for instances of services performed without competition. There is, however, in reality, much C. in all the government departments. Although tradesmen may not endeavor to undersell each other by making goods and offering them to the government, yet they endeavor to undersell each other by offering to undertake contracts at the lowest price. Doubtless, the practice of entering on government-contracts is open to abuse, if the officers who look after them are careless, and neglect the detection of fraud or inefficiency. But the service of government by contract may be made as effective as any other kind of competition.

There are circumstances in which it is necessary to dispense with the external form of C., but where its influence still rules. For the convenience of the public—especially of travelers—rates of fares are established for cab-drivers, porters, ferrymen, and the like. These men cannot be forced to undertake such functions; they do so because it pays them. Instead of making a separate contract for each job—an arrangement open to fraud and inconvenience—they make a general bargain with the public to serve all-comers. The rate of remuneration they receive ought to be the closest possible approximation to what C. would fix. Whether it is so or not, can be easily tested. If men do not come forward in sufficient numbers to serve the public, then the fixed rate is too low; on the other hand, if there is a superfluity of hands, a percentage of them being at all times unemployed, it is clear that the rate is too high, and that even partial employment in the line is sufficient to induce men to leave other occupations.

One of the most plausible arguments against free C. is, that it throws away labor by producing more goods than are required. Five hundred hats are wanted, but a thousand are produced, and therefore half of them are wasted. In some such shape, the folly

and waste of C. are generally illustrated by continental writers. It is very rarely that dealers are so utterly blind to the demand for the article in which they trade. It must be admitted, however, that C., like all other useful things, has its peculiar abuses, and of these perhaps the chief is the propensity which some tradesmen have to carry rivalry to the extent of vicious excitement, and to endeavor rather to get the better of each other than to make their separate fortunes. From this spirit, it frequently happens that when one man has established a successful business in some new locality, another, instead of trying a different business in the same place, or the same business in some other and similar place, sets himself down as a rival, and ruins both. One sets up, for instance, a grocery-shop in a new suburb; he succeeds, but there is not business enough for two; and if a rival sits down beside him, both are ruined; whereas the success of the grocery should rather have hinted that a butchery or a bakery might have a good chance in the same place, or a grocery in some other suburb of similar character. Speculators in omnibuses and other horse-hired vehicles are signally liable to this sort of rivalry, often seeming unable to endure the sight of a brother of the trade driving a good, quiet, tolerably paying business.

C. for public offices—that is to say, the appointment to them of those young men who have shown the highest proofs of ability according to tests—has so recently been adopted, that there is little opportunity of judging of its effects. But it must be kept in view, that this is something quite different from the kind of C. referred to above. Clever men may be secured to the public service by such a test, but it is clear that the motive for these clever men, as well as other public servants, doing their duty, must be something in the shape of promotion or otherwise, which will have a constant influence on them after they are appointed. See EXAMINATIONS FOR THE PUBLIC SERVICE.

COMPIÈGNE, a town in France, in the department of the Oise, stands on the river Oise, a little below its junction with the Aisne, and 33 miles east-south-east of Beauvais. A fine stone-bridge crosses the river at this point. The town, which is irregularly built, has a tribunal of the first instance and one of commerce. The inhabitants, numbering (1876) 12,923, are employed in hosiery, rope-making, boat-building, and in traffic in wood and corn. But what best deserves observation at C. is the magnificent palace, built anew by Louis XV., and splendidly fitted up by Napoleon, who often occupied it. It contains a library, a picture-gallery, and other objects worth seeing. The park is extensive, and adjoining the gardens is the beautiful forest of Compiègne, extending over about 30,000 acres. C. is mentioned in the times of Clovis under the name of *Compendium;* and it was the seat of several political assemblies and ecclesiastical councils. It was at the siege of this town, in 1430, that the Maid of Orleans was captured; and here in 1810, Napoleon and Maria Louisa of Austria first met, on the occasion of their marriage.

CO'MPLEMENT is that which completes or makes up a given magnitude to some fixed magnitude. It is most commonly used in mathematics, to signify the arc or angle by which a given arc or angle falls short of a quadrant or right angle: thus, the C. of an arc of 60° is one of 30°; and that of 30° is one of 60°. —The arithmetical C. of a number is the number by which it falls short of the next higher number expressible by tens: thus, the arithmetical C. of 64 is 100 — 64 = 36.

COMPLEMENT, in Music, the quantity required to be added to any interval to complete the octave: for example, a fourth is C. of a fifth, a third is that of a sixth, &c.

CO'MPLINE. See CANONICAL HOURS.

COMPO'NÉ, or GOBONY, in Heraldry. When a bordeur, pale, bend, or other ordinary, is made up of two rows of small squares, consisting of alternate metals and colors, it is called componé.

COMPO'SITÆ (called by Lindley ASTERACEÆ, and by some botanists SYNANTHERÆ), a natural order of exogenous plants, distinguished by *compound* or *composite flowers*, i. e., heads of flowers which are composed of a greater or smaller number of florets (generally of small size) congregated upon a common receptacle, and surrounded by bracts which form a leafy or scaly involucre, so as to resemble single flowers, which name they ordinarily receive. Another very marked characteristic is, that the anthers of each floret cohere into a cylindrical tube. The order contains both herbaceous plants and shrubs; those which are natives of cold climates being generally herbaceous, and those found in warm regions shrubby, or even arborescent. They have alternate or opposite leaves, without stipules. The florets are either unisexual or hermaphrodite—those of the circumference (or ray) often differing in this respect, as well as in form and color, from those of the center (or disc) of the same head. Bracts (*paleæ*) are often interspersed with the florets upon the receptacle. The calyx is superior, closely adhering to the ovary, and essentially united with it, and afterwards with the fruit, its limb either obsolete or membranous, crowning the ripened fruit, often divided into bristles, hairs, and feathers, which form a PAPPUS (q. v.). The corolla is of one petal, superior, either strap-shaped or tubular, both forms often appearing in different parts (ray and disc) of the same flower (or head) sometimes 2-lipped, very often 5-toothed. The stamens are equal in number to the teeth of the corolla, 4 or 5, and alternate with them. The ovary is 1-celled, with a single erect ovule; the style simple, with 2 stigmas; the fruit dry and not opening (see ACHENIUM); the seed destitute of albumen.—This is the largest of the natural orders of flowering-plants, containing upwards of 1000 genera, and almost 10,000 known species. They are distributed over all parts of the world; but increase in number from the poles to the tropics, and thence, again, diminish towards the equator. In the Linnæan sexual system, they form a distinct class, SYNGENESIA. Jussieu subdivided the order into three sections, and although other subdivisions have been proposed, these are generally recognized as sub-orders—CYNAROCEPHALÆ, having the florets all tubular; CORYMBIFERÆ, having a disc of tubular florets, surrounded by a ray of strap-shaped florets; and CICHORACEÆ, having all the florets strap-shaped. The *Cichoraceæ* abound most in cold, and the *Corymbiferæ* in warm climates. The Artichoke and Thistle are familiar examples of the *Cynarocephalæ;* the Daisy, Aster, Dahlia, Chrysanthemum, Chamomile, and Sunflower of the *Corymbiferæ;* and the Dandelion, Chicory, and Lettuce of the *Cichoraceæ*.

By cultivation, many of the *Corymbiferæ* are changed so that the florets of the disc assume the same appearance with the florets of the ray, as may be seen in the Dahlia, Chrysanthemum, Aster, &c., and they are then said to be double, although the change they have undergone is very different from that which has taken place in double flowers of other kinds. The C. are not, in general, of very great importance in domestic economy or in the arts, although many of them are among cultivated and useful plants. Only a few, as the Artichoke, Scorzonera, Salsafy, Jerusalem Artichoke, Endive, and Lettuce, are used for food, and these are of inferior importance in that respect. A very few, as Safflower and Saw-wort, afford dye-stuffs; and a very few, as the Jerusalem Artichoke and Chicory, are occasionally cultivated for food of domestic animals; the use of chicory-root as a substitute for coffee is well known. From the seeds of some, a bland fixed oil is expressed—the Sunflower, Madia, and Ram-til being the most important. Many are valuable for their medicinal properties, as Chamomile, Arnica, Wormwood and some other species of Artemisia, Elecampane, Tussilago, Blessed Thistle, &c. Many are characterized by bitterness; stimulating properties are of frequent occurrence; also anodyne, diaphoretic, diuretic, and narcotic properties. Some, as Arnica, are very poisonous. A large number are esteemed ornaments of our flower-gardens, particularly in the latter part of summer and in autumn. Amongst these, the Dahlia perhaps holds the first place; and others, scarcely less admired, belong to the genera Aster and Chrysanthemum. The wood of the Siriehout (*Tarchonanthus camphoratus*), a small tree of the Cape of Good Hope, is close-grained, heavy, and very beautiful.

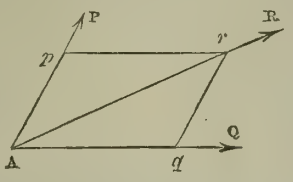
CO'MPOSITE O'RDER, in Architecture. See COLUMN.

COMPOSI'TION, in Art, signifies such an arrangement of the separate objects represented as that they shall all manifestly tend to bring out the center thought or idea which animates the whole. Episodes and digressions are less admissible in æsthetic works of art than in poetry, and less in plastic art than in painting. In all works of art, it is to be borne in mind that the story is to be told to, and apprehended by the eye alone. There is no surer proof of failure in æsthetic C. than when a picture is found to be totally unintelligible, even to intelligent persons, without the aid of a description in a catalogue. Rules are of little or no avail in this matter. There is but one canon of universal application—viz., that the artist should, in the first place, make it clear to his own mind what his work is to express; and that he should then consider by what arrangement of the objects that must, or may, be introduced into the picture, this will be best accomplished.

COMPOSITION, in Bankruptcy, a certain sum per pound which creditors agree to receive from a bankrupt in lieu of full payment of his debts, and the acceptance of which operates as a discharge to the bankrupt, and reinvests him in his estate. In Scotland, the acceptance of a C. bill, unless the contrary be stipulated, only entitles the creditors to rank for the C., and not for the full amount, in the event of a second bankruptcy. If no C. bill be accepted, and there be no accession to a C. contract, it has been held that the creditor may, in a second bankruptcy, rank for his full debt. In a Scotch sequestration, the bankrupt must find security for payment of the C. to the satisfaction of a certain proportion in number and value of the creditors, which proportion varies according to circumstances. The cautioner is only bound for two years, but recourse against the bankrupt is unlimited. The English Bankruptcy Acts give facilities to debtors to compound with their creditor, and to compel minorities to

agree to the C.; but all must be called together, and the proceeding goes through stages analogous to a regular bankruptcy.

COMPOSITION AND RESOLUTION OF FORCES AND MOTIONS. 1. The fundamental problem in statics is to find the magnitude and direction of the *resultant* of two forces; in other words, to compound them into a single force, which shall be in every respect their equivalent. Intensity and direction being the only elements necessary to entirely describe a force, forces in statics are represented by lines, which are obviously capable of being made to represent them both in magnitude and direction. When two forces act along the same straight line on a particle, it is sufficiently obvious that if they act in the same direction, the resultant will be their *algebraical* sum; if in opposite directions, their *algebraical* difference. This being premised, the relation between two forces acting at the same point, but not in the same line, and their resultant is set forth in the following theorem, which is known as the *Parallelogram of Forces:* If two forces, P, Q, acting on a particle A, be represented in direction and magnitude by the lines Ap, Aq, then the resultant will be represented in direction and magnitude by the diagonal Ar of the parallelogram described upon Ap, Aq. The proof of this depends upon the simple principles, that a force may be supposed to act at any point of its direction, that point being conceived to be rigidly attached to the particle on which the force acts; and what may be accepted as an axiom of universal experience, that when any number of forces are impressed on a particle or body, each exerts itself, as if the others were not acting, to produce its full effect.



See any elementary treatise on Mechanics. The doctrine of the parallelogram of forces has given rise to much controversy, not as to its truth, but as to its derivation, some appearing to contend that it is directly deducible from the axiom above stated, without the necessity of further reasoning.—Knowing how to compound two forces acting at a point, we are able to compound or determine the resultant of any number. If the forces, though in the same plane, do not act at the same point of a body, those of them whose directions meet may be compounded by the preceding rule; if they are parallel, their resultant is a force parallel to them and equal to their algebraical sum, counting those acting in one direction as positive, and in the opposite direction as negative. For the position of the resultant in this case, see PARALLEL FORCES. The singular case is that of equal parallel forces acting in opposite directions. These constitute a couple, and cannot be represented by any single force. See COUPLES.

2. The resolution of forces is the converse problem. To resolve a given force R, whose direction and magnitude is Ar, into two forces acting in any directions that may be chosen, as AP, AQ, we have only to draw parallels through r, which determine the lines Ap, Aq, representing the magnitude of the forces required. It is evident that there is an indefinite number of pairs of forces into which Ar might be resolved, according to the direction in which the new forces are to act. It is usual, however, to resolve a force into forces that are at right angles to each other.

3. The composition of motions is analogous in every way to that of forces; motions are the results of forces, and the analogy might be expected. If a body be actuated simultaneously by two velocities having different directions, it will evidently move in a direction intermediate to the two, and with a velocity which will in some way depend on each of them, and which is called their resultant. The proposition which sets forth how to find the resultant, is called the *Parallelogram of Velocities*. It is: If two velocities, with which a particle is simultaneously impressed, be represented in direction and magnitude by two straight lines drawn from the particle, the resultant velocity of the particle will be represented in direction and magnitude by the diagonal of the parallelogram described on those two straight lines. The proof is very simple. There is no reason why the full effect of both velocities should not be produced, as if the body moved first with one of them, and then with the other in their respective directions. If in one *second* the body moving with the one velocity would reach p, and if we suppose it then to move on pr for another second, parallel with the other velocity, it would at the end of the second second be at r. Hence, under their joint influence, it will be at r at the end of one second.

4. The resolution of motions is altogether analogous to that of forces.

COMPO'SITOR. See TYPE.

COMPOS MENTIS. See INSANITY.

COMPOSTE'LLA, MILITARY ORDER OF ST. JAMES OF. St. James, the elder, was adopted as the patron saint of Spain, after the victory of Clavijo, and his relics were preserved at Compostella (see SANTIAGO DE COMPOSTELLA). The marvels supposed to be performed by these relics drew vast numbers of pilgrims, for whose support hospitals were established by the pious canons of St. Eloy. The vicinity of the Moors having subsequently rendered the high-roads unsafe, thirteen noblemen united for the protection of the pilgrims, and, in conjunction with the canons, resolved to found an order of the same kind as that of the Hospitallers or Templars. The pope granted his assent in a bull, dated 5th July, 1175, accompanied with the statutes of the order. Whatever conquests were made from the infidel were declared the property of the order, and a council of thirteen knights was vested with authority to elect and depose a grand master. The knights made vows of poverty, obedience, and celibacy, and professed their belief in the immaculate conception. To protect Christians, and convert infidels, they vowed to be the only object in their wars with the Saracens. In most of the great battles between Christian and Moor, the red cross of the order was conspicuous. The conquests of the order itself, combined with the grateful munificence of the nation, speedily increased its wealth and power beyond those of any of the other orders of knighthood. In addition to the three large commanderies of Leon, Castile, and Montalvan, it possessed nearly 200 minor commanderies, comprising, it is said, more than 200 priories with many fiefs, cloisters, hospitals, castles, boroughs, two towns, and 178 villages, exclusive of its possessions in Portugal. This enormous wealth and power of the order excited the jealousy of the crown, in which, in 1522, the grand mastership was permanently vested by the pope. Having thus become merely honorary and dependent on the crown, the order rapidly decreased in importance.

Cross of the Order Compostella.

CO'MPOSTS are a kind of Manure (q. v.), consisting of mixtures of substances adapted to the fertilization of the soil, which being allowed to ferment, and undergo chemical changes for a considerable time in heaps, become more valuable than they were at first, or ever could have been if applied separately. C. were formerly made of farm-yard manure, and earth or lime in addition.

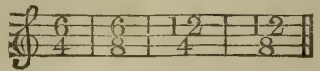
Road-scrapings, peat-moss, leaves, and clearings of ditches, also formed materials for the purpose. By allowing these to lie in heaps for six months, of from three to four feet in depth, food was prepared for plants. The mass was usually applied to the turnip-crop, and when artificial manures were unknown, considerable benefit arose from such dressings. The use of guano and other light manures has superseded in a great measure the necessity of this laborious process, and C. for the turnips or barley-crops are now little used. The wonderful effects that have resulted from the application of small doses of nitrogen and phosphoric acid, have impressed farmers in general with the truth, that the most energetic elements bear a small proportion in weight to the whole mass of farm-yard dung or C., and that the mixing of manures in heaps with earth does not so much add to its virtues as to repay the labor expended in the process. More care is now rightly bestowed in preserving manures from washings by rain. C. formed of leaves, ditch-scourings, road-scrapings, or any earthly matter containing a large percentage of vegetable matter, with the addition of lime, may still be used with benefit for pastures that are deteriorating, or where the soil is stiff. Where moss prevails, lime should enter largely as a component. On the other hand, where the soil is of a strong and clayey nature, earthly substances containing vegetable matter in larger proportions should be used. Vegetable matter has the effect of imparting a softness to the surface, that is particularly conducive to the free growth of pastures. Compost made of turf, leaves, earth, and bone-dust is used with great benefit by gardeners for vines and fruit-trees which are injured by too concentrated manures.

CO'MPOUND A'NIMALS, are those animals, exclusively of the lowest classes, in which individuals distinct as to many of the powers of life, are yet united in some part of their frame, so as to form one living system. Examples of this union are found in many animalcules and zoophytes, also in cestoid worms and ascidian mollusks. The whole living system in all C. A. appears to originate from a single egg or germ, and each is at first simple; the subsequent multiplication of individuals, having distinct organs, but permanently retaining their connection with the system, has some analogies with some of the modes of true reproduction. It is important, also, to observe that many C. A. exhibit very close relations to other animals which in no degree possess this remarkable character.

The subject of C. A. is in many respects an extremely interesting one. This occasional peculiarity in animal life may perhaps be regarded as affording some countenance to the theory of Darwin concerning plants, that each bud is to be accounted a distinct individual. But the term individual must be modified in

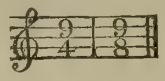
its sense, when applied to the buds of a tree, or the polypes of a polypidom.

COMPOUND COMMON TIME, that species of measure containing the value of two dotted minims in a bar, or two dotted crotchets, marked thus:



COMPOUND INTEREST. See INTEREST.

COMPOUND TRIPLE TIME denotes a measure of nine crotchets or quavers in a bar, and is marked thus:



COMPOU'NDING OF FE'LONY, in England, is the offence of taking value for forbearing to prosecute a felony, and is punishable with fine and imprisonment. Compounding of informations upon penal statutes, and compounding of misdemeanors, are also illegal, unless with leave of one of the courts at Westminster, and are punishable in a lighter degree. But in misdemeanors affecting many private (and not public) rights, the court will often permit the defendant to make the prosecutor some pecuniary amends, and thereupon withdraw the prosecution. A species of C. of F. is the advertising a reward for stolen property, coupled with words implying that no questions will be asked, or that no prosecution will be instituted, or that a pawnbroker returning the property will be paid what he has advanced for it; and this offence, by 24 and 25 Vict. c. 96, s. 102, is punishable by a fine of £50, on the advertiser, publisher, and printer. And whosoever shall take money or reward for restoring a stolen dog is liable, by 24 and 25 Vict. c. 96, s. 20, to imprisonment for eighteen months.

COMPRE'SSED-AIR BATH, a large chamber in which patients sit under increased atmospheric pressure for a greater or shorter period. An attempt at this kind of treatment was made as early as 1662 by Dr. Henshaw, but failed, owing to the imperfection of the apparatus. The apparatus, as now used, is the invention of M. Emile Laburié of Paris, who in 1832 conducted a series of careful experiments upon the effects of the atmospheric air at different densities upon the human frame.

The bath is a chamber 9 feet in diameter, and 12 feet high; it is constructed of iron plates rivetted together like those of a boiler of a steam-engine, so as to be perfectly air-tight; it is provided with two close-fitting iron doors, which can be opened without affecting the pressure of the air within the chamber; the interior is lined with wood, and furnished with seats; a steam-engine of seven horse-power works a pair of large air-pumps, communicating indirectly with the chamber by a pipe that opens by means of numerous small holes in the bottom of the floor, so that the air enters imperceptibly into the chamber; from the roof, a pipe similarly arranged allows the breathed air to escape. Each of these tubes is supplied with a screw valve, by means of which the inlet and exit of the air are regulated. Two barometers hang on the walls of the chamber, to show the rate of increase and decrease of pressure. The pressure is raised at the rate of 1 lb. every 4 minutes, and the lowering takes place at the same rate. The pressure is usually raised to 7 lbs. per sq. inch, in addition to the usual pressure of the atmosphere. The period generally prescribed for remaining in the bath is 2 hours.

The diseases in which the C. B. is said to be most efficient are phthisis, asthma, and chronic bronchitis. The effects are attributed to two causes: 1. A greater quantity of air, and consequently of oxygen, is inhaled in a given time; and not only so, but the amount absorbed is increased in proportion to the pressure of the gas against the walls of the air-vesicles. The increased absorption of oxygen and excretion of carbonic acid enables the lungs to perform their functions more efficiently, and thereby removes any congestion existing in these organs. 2. The increased mechanical pressure of the air upon the mucous membranes, when in a state of chronic congestion, has a bracing effect, and imparts renewed vigor to the entire structure of the lungs and bronchi. At Ben-Rhydding, the C. B. is used in cases of the kind above named, along with the usual appliances of the water-cure.

COMPRESSED-AIR ENGINE. One mode of employing air as a motive-power is described in CALORIC ENGINE (q. v.). Another obvious way is to compress it, and then apply it in the manner of high-pressure steam. Although compressed air has been used for working small engines in confined situations, such as Tunnels (q. v.), it is not at all likely that it will ever come into extensive use, owing to the great waste of power attending it. This waste arises from two causes—first, the friction due to forcing the compressed air along a great length of pipe; and secondly, the loss from the dissipation of the great heat which results from its compression. If, say, 100 cubic feet of air is compressed into 1 cubic foot, it will become very hot, and although it is very easy to keep in the air, it is impossible to keep in the heat.

In spite of every precaution, the heat will find its way through the vessel in which the air is confined, and through the pipes in which it is being trasmitted, and this is equivalent to a portion of the air itself leaking out, because, when the air is permitted to expand in working the engine, it will not attain the bulk it originally had of 100 cubic feet. The greater the original compression of the air, the higher its temperature will rise; and as this caloric, which cannot be kept from escaping, is practically a part of the bulk of the air, it follows that the loss of power from this cause will increase with the pressure of tension of the air. Even were it possible to prevent the escape of the heat, by covering the vessels and pipes with some non-conducting substance, it would not be practicable to use the hot air in the same way as steam is used, because the lubricating material necessary to keep the piston and slide-valves from 'tearing' would be decomposed by the high temperature. In steam-engines, there is always a small quantity of water in the cylinders and slide-valves, arising from the condensation of a portion of the steam, and this suffices to lubricate the piston and valves. It is well known that when steam is *superheated* so highly as to prevent a slight condensation in the cylinder and slide-valves, they are very rapidly destroyed. Air rises in temperature when very much compressed, and we cannot use it until its temperature falls; and as this involves a great waste of power, it follows that where economy is of any consequence, air cannot be used as a mode of transmitting mechanical power. Indeed, no fluid can be economically used for transmitting power for any great distance. We have just seen that compressed air is very unsuitable; steam is even more wasteful because it condenses into water in long pipes. Water itself loses much of its force from friction in passing through long pipes, unless they are of very large size; and in applying it to Hydraulic Cranes (q. v.), where the weight to be raised varies, great waste of power arises from the fact, that the cylinder, in which the ram works, has to be filled every time the crane is worked with water at the full pressure of 600 or 700 lbs. to the square inch, even when a pressure one-tenth of that amount would suffice to raise the weight. In short, the power actually used in working a hydraulic crane is always the maximum, even when the weight to be raised is a minimum. It *uses* as much power to lift a hundred-weight as it does to lift a ton. The extreme handiness and other practical advantages possessed by the hydraulic cranes leave a large balance in their favor, notwithstanding their waste of power.

In boring the Mont Cenis Tunnel (see TUNNEL), air was compressed at the mouth of the tunnel by the abundant water-power easily obtainable there, and forced along to the working face through small iron pipes, for working the boring-machines. The tunnel through the Hoosac Mountain in Massachusetts has also been bored by compressed air working the rock-drills. A plan has been proposed for using ordinary steam-boilers and engines close to the working face in the tunnel, and drawing out the smoke and vitiated air through a wooden trunk. Another fairly successful application of compressed-air engines has been in the working of coal-cutting machines. Of these machines, Firth's in England, Gladhill's in Scotland, and Brown's in America, have been in practical operation for several years; but they can as yet only be economically worked under exceptionally favorable circumstances. Experiments have been recently tried to propel tramway cars with compressed air. Engines for the compression of air are used in making ice. See REFRIGERATING MACHINES.

COMPRESSIBI'LITY is that property of bodies by which they admit of being forced or pressed into less space than they formerly occupied. The particles composing bodies are in all cases at greater or less distances from one another; and whatever brings the particles closer together, diminishes the volume or bulk of the body. This may be effected by various agencies, as e. g., by the withdrawal of heat (q. v.); but the effect is called compression only when it is caused by mechanical force, as by pressure or percussion. All bodies are compressible, but in different degrees. Many solids, especially those of a compact structure, have this property only in a slight degree. It was believed at one time that liquids were incompressible; more accurate experiments, however, have proved that this is not the case; water, for instance, subjected to a pressure of 15,000 lbs. on the square inch, loses $\frac{1}{20}$ of its volume. Gases, on the other hand, are strikingly compressible; by means of a common condensing syringe, a number of cubic inches of air can be forced into the space of one inch. Compression is in almost every instance accompanied by an evolution of heat. When a piston, having a piece of German-tinder attached to the bottom, is forced rapidly to the bottom of a shut condensing syringe, and rapidly withdrawn, the tinder is found ignited.

In a restricted sense, those gases are said to be compressible which, under great pressure, become liquid. This is the case with carbonic acid gas, chlorine, sulphurous acid gas, and others. Atmospheric air and its components have hitherto resisted all at-

tempts to liquefy them; though it is believed that only a sufficient degree of pressure and cold is necessary to make any gas liquid. Carbonic acid and some other gases are liquefied in small quantities by enclosing the ingredients necessary for generating the gas in a strong glass tube, keeping them separate till the tube is hermetically sealed. The gas, as it is produced, is condensed into a fluid by its own pressure, which is aided by keeping one end of the bent tube in a cooling mixture.

COMPU'LSION. Acts done or grants made under the influence of C.—i. e., either force or fear—are reducible by the law of Scotland. But the fear must be such as would shake a man of ordinary firmness and resolution. In like manner, the plea of *vis major*—that is, that the individual acted under the influence of power greater than his own—may relevantly be set up as a defence against such offences as rebellion, piracy, &c. See DURESS.

COMPURGA'TORS were twelve persons whom the law of our Saxon ancestors permitted the accused to call in proof of his innocency, and who joined their oath to his. They were persons taken from the neighborhood, or otherwise known to the accused. It was rather in the character of jurymen than of witnesses that the C. acted, for what they swore to was not their knowledge, but their belief, and the institution belonged to a time when what has since been spoken of as the Saxon jury was taken from the persons in the neighborhood best acquainted with the matter to be investigated, and when they performed the combined functions of jurors, witnesses, and judges. The system of C. was adopted even in civil actions for debt, and the ceremony of what was called canonical purgation of clerks-convict, was not abolished in England till 18 Eliz. c. 7.

COMPUTA'TION OF TIME. See DAY.

CO'MRIE, a village and parish in the middle of Perthshire, on the Earn, a little east of Loch Earn, and 20 miles west of Perth. It lies amid the very picturesque scenery of the clay-slate band of Scotland, and is noted for frequent slight shocks of earthquakes. It has woollen and cotton weaving, and distilleries. Pop. (1881) 2038.

COMTE, AUGUSTE, the founder of the 'Positive Philosophy,' was born at Montpelier in 1795 or 1797. He studied at Paris; and at an early period, it is said, attracted the attention of his companions by the boldness and novelty of his speculations, maintaining that the time was come when philosophy must undergo another great change, such as it had done in the days of Bacon. G. H. Lewes, who regarded C. as the Bacon of the 19th c., only much greater, informs us that C. was but *fourteen* when 'the reforming spirit awoke' in him (see *Exposition of the Principles of the Positive Philosophy*, by G. H. Lewes, Bohn, London, 1853). Shortly after this, and while still laboring under the excitement of his new convictions, he became acquainted with St. Simon; entered enthusiastically into his theories, which had not a little in common with his own, and which possessed in addition this advantage, that they were the results of natural thinking (St. Simon being between fifty and sixty); and in 1820, was appointed by the master himself to prepare an exposition of the *Politique Positive* of the St. Simonian Society. The work did not satisfy St. Simon, who deplored the absence of the 'religious and sentimental aspects' of his system. In 1825, on the death of St. Simon, C. broke off altogether from his *confrères*, and in after years, was accustomed to speak slightingly of his old master's abilities. In 1826, C. was attacked by a cerebral disorder, brought on by 'overwork and heart-anxieties.' He recovered, however, and in 1832, was appointed professor of mathematics at the *Ecole Polytechnique*, which situation he was forced to resign in 1852, on account of differences with his colleagues. He died at Paris, September 1857.

C.'s works are—*Cours de Philosophie Positive* (6 vols., Par. 1830—1842; freely translated into English, and condensed by Harriet Martineau, 2 vols., 1853), *Traité Elémentaire de Géométrie Analytique* (1843), *Traité d'Astronomie Populaire* (1845), *Discours sur l'Ensemble du Positivisime* (1848), *Système de Politique Positive* (4 vols., 1851—1854; Eng. trans. 1875 *et seq.*, Longmans), and *Catéchisme Positiviste, ou Sommaire Exposition de la Religion Universelle* (1 vol., Par. 1852). It is impossible here to do more than state, in the briefest way, C.'s central and governing doctrine. It is this: The race (like the individual) necessarily passes through three intellectual stages—1. The *theological*, in which a supernatural origin is sought for all phenomena, and the *Deus ex machinâ* is the only explanation of events; 2. The *metaphysical*, in which the *sensuously* supernatural is set aside as incredible, and an effort is made to demonstrate the existence of 'abstract forces or entities supposed to inhere in various substances, and capable of engendering phenomena;' 3. The *positive*, in which the mind affirms the futility both of theological and metaphysical inquiries, abandons all vain search after the *causes* and *essences* of things, 'restricts itself to the observation and classification of phenomena, and to the discovery of the invariable relations of succession and similitude which things bear to each other; in a word, to the discovery of the *laws* of phenomena.'

This last is the stage at which C. conceives Europe to have arrived. Theology and metaphysics are alleged to be in their dotage, and all the anarchy of modern life to arise from the presence of these disturbing elements. To deliver us from their hurtful influence, C. employs the principles of positivism to organize a new social doctrine which shall embrace the entire wants of man as an intellectual and emotional being. C. thus aims at being not only the founder of a new philosophy, but also of a new religion, and has even assumed the title of *Fondateur de la Religion de l'Humanité*. His views, which are very original and comprehensive, have excited much attention among thinkers in France, England, and Germany, and obtained not a few ardent adherents.

CON, or COL, an Italian particle, meaning 'with,' much used in musical terms, as 'con spirito,' 'con brio.'

CONCAN, a territory in the presidency of Bombay, lies between the Arabian Sea and the watershed of the Western Ghauts, in lat. 15° 44′—20° 22′ N., and long. 72° 52′—73° 45′ E. Its length is 330 miles, and it varies in breadth from 25 to 50 miles. The more easterly section appears to be a succession of rocky terraces, of apparently volcanic origin. The maritime portion, averaging an elevation of 100 feet above the sea, rises here and there to far greater heights, partly in isolated hills, and partly in short ranges. The broad estuaries into which the rivers expand were formerly the retreats of pirates. Of the land that is available for cultivation, the larger part is found on the banks of the rivers—the growth of rice in particular being promoted by annual inundations. The chief peculiarity of the climate is, that the south-west monsoon, arrested in its career by the lofty barrier on the east, has been known to yield, in one year, a rainfall of nearly 300 inches. To omit the city of Bombay, as not being on the mainland, the principal towns are Junera, Ratnagheriah, Viziadroog, and Vingorla. It was in 1818, on the fall of the Peishwa of the Mahrattas, that C. became British territory.

CO'NCAVE. A surface is said to be C. when lines drawn from point to point in it fall between the surface and the spectator; and convex, when the surface comes between him and such lines. The terms, it is obvious, are mere terms of relation. See LENS and MIRROR.

CONCEA'LMENT, in Criminal Law. The C. of an offender, after the commission of the crime, with the view of shielding him from justice, is an offence which may be punished arbitrarily; but C., in consequence of an agreement before the crime was committed, envolves the concealer in a charge of art and part in the principal crime (Hume, 274,281).

CONCEALMENT OF PREGNANCY AND BIRTH. See PREGNANCY, CONCEALMENT OF; INFANTICIDE.

CONCENTAI'NA, a town of Valencia, Spain, picturesquely situated on a slope of the Sierra Mariola, 28 miles north of Alicante. It is surrounded by old walls, flanked with towers; has some interesting old buildings; and manufactures of linen, woollen, paper, soap, &c. The fair annually held here is one of the largest in Spain. Pop. 8100.

CONCE'NTRIC. Circles are C. when they have the same center, but radii of different lengths.

CONCEPCION. 1. A city near the mouth of the Biobio, the principal river of the republic of Chili, in lat. 36° 50′ S., and long. 73° 5′ W. In 1835 the place was almost destroyed by an earthquake, the cathedral and most of the other public buildings having been thrown down. The city is nevertheless one of the most regular and handsome in the republic, and numbers (1875) 18,277 inhabitants. The cathedral and several of the other public buildings are noteworthy. The industry of the place is chiefly in the hands of foreigners, especially Germans. The discovery in 1852 of coal-fields a little to the south of C. has done much to forward the prosperity of the city. Talcahuano, the port of C., is the safest and best harbor in all Chili, and ranks next to Valparaiso as a mart of foreign trade. Hides and tallow are exported. —2. The bay of the Pacific Ocean which forms the harbor of the city above mentioned. It affords good anchorage, communicating with the interior by means of the Biobio, and being sheltered from the open sea by the island of Quiriquino.—3. The province of which the city above mentioned is the capital. Occupying the entire breadth between the Andes and the coast, it is bounded on the S. by independent Araucania, and contains 3850 square miles. In 1875, the population amounted to 151,365.

CONCE'PTION, in Psychology. See IDEA.

CONCEPTION, IMMACULATE. See IMMACULATE CONCEPTION.

CONCEPTION OF OUR LADY, an order of nuns, founded in 1484, in honor of the immaculate conception, by Betrix de Sylva, sister of James, first Count of Poralegro, in Portugal. It

was confirmed in 1489 by Pope Innocent VIII., who granted the sisterhood permission to follow the rule of the Cisterciana; but after the death of the foundress in 1489, Cardinal Ximenes put the nuns under the direction of the Franciscans, and imposed on them by the rule of St. Clara. The order subsequently spread into Italy and France. Besides the grand office of the Franciscans, the nuns recite on Sundays and holidays a lesser office, called the office of the Conception of the Holy Virgin. Their dress consists of a white gown, a blue mantle, and a scapulary, on which is worn the image of the Virgin.

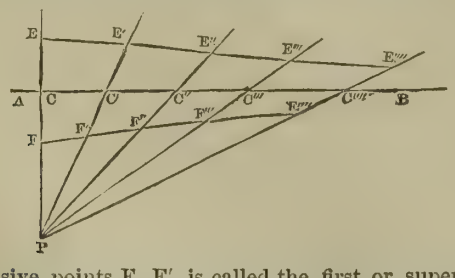
CO'NCERT, a musical entertainment of concerted pieces, symphonies, &c., sometimes interspersed with songs, performed by an orchestra of many instruments. C. performances are now established in almost every city in Europe, and societies are formed to foster and encourage the art. Among the oldest institutions of this kind are the Gewandhaus Concerts in Leipsic, established in 1742; and the Concerts Spirituels in Paris, established in 1725. Of more recent institution are the concerts of the Philharmonic Society in London, of the Conservatoire in Paris, and the Symphonic concerts in Berlin, &c.

CONCERTI'NA, a musical instrument of modern invention, the sounds of which are produced by free vibrating springs of metal, as in the accordion. The scale of the C. is very complete and extensive, beginning with the lowest note of the violin, G, and ascending chromatically for three-and-a-half octaves to C. Violin music can be performed on the C. with good effect. Every sound in the scale is double, and can be produced either by pulling the bellows open, or by pressing them together. Wheatstone of London is the inventor. Concertinas are now made in France and Germany, but not so perfectly as in England.

CONCE'RTO, a musical composition for a solo instrument, with orchestral accompaniments, calculated to give the performer an opportunity to display the highest mechanical skill, as well as intellectual cultivation in the art. The C. consists of three movements, each of which, like the whole, has a certain character, and like the symphony or the sonata, requires a clear development and treatment of the motives, and a strict adherence to the rules of form. When the form is in any way abridged, it is then called a concertino. From the beginning of the last century to the present time, the pianoforte and the violin are the solo instruments mostly used for the concerto. The oldest violin concertos are those by Tartini and his scholars. The French and Germans afterwards improved on these, and fixed the forms, which all the great masters of modern times have adhered to. Innumerable concertos have been written for the pianoforte, amongst which compositions of the most masterly kind are to be found. Concertos for wind-instruments have been less regarded, and are generally written by the performers themselves, and seldom deserve to be called classical works.

CONCHI'FERA (Lat. shell-bearing), in Lamarck's arrangement of mollusks, a class containing those which have bivalve shells *Lamellibranchiata* (q. v.) and *Brachiopoda* (q. v.). The term is still sometimes used.

CO'NCHOID OF NICOME'DES, a curve invented by Nicomedes, with the view of trisecting an angle, of constructing two geometrical means between two given straight lines, and of 'doubling the cube.' It is generated as follows: Let AB be any straight line, and P any point not upon it; then let a succession of lines PE, PE', &c., be drawn, cutting AB in points C, C', and let CE, CF be laid off from the points of intersection, each equal to a given line: then the curves traced by the successive points E and F form the conchoid. That branch which is above AB, and described



by successive points E, E', is called the first or superior C., and the other branch traced by points F, F', is called the second or inferior conchoid. Both branches are infinite in extent, and they have the line AB for a common asymptote. AB is also called the directrix, and P, the pole of the curve. The constant distance CE, of the points E and F, from the points of intersection, is sometimes called the modulus of the curve. If we take C in the line EP as origin, and the lines AB and EP, at right angles to one another, as axes, the equation to the C. is $x^2=\frac{(b+y)^2(a^2-y^2)}{y^2}$, where a is the modulus of the curve, and b = the perpendicular distance of P from AB. The curve may easily be described mechanically, and is frequently used in architecture as a bounding line of the vertical section of columns. The name is Greek, and means shell-shaped.

CONCHO'LOGY (Gr. *konchos*, a shell, *logos*, a discourse), the science which treats of shells and of the animals inhabiting them. C., as a science, is at least as old as the days of Aristotle; the study of it was resumed along with that of the other sciences, when the dark ages had passed away; but since the beginning of the present century, it has given place to a more extended and comprehensive study of molluscous animals, now sometimes designated MALACOLOGY; the presence or absence of a shell having been found not to constitute one of the most important characters which distinguish different classes of mollusks. C., indeed, was only the form of the science suited to a time when the shell was more considered than its inhabitant. Yet the relations between shells and the mollusks which possess them are such, that the labors of the merest conchologists have contributed to the real advancement of science, both zoological and geological. It is upon the knowledge of these relations that many of the conclusions of the geologists are founded.

In systems of C., shells were usually divided into three orders, *Univalves*, *Bivalves*, and *Multivalves*, according to the number of pieces—one, two, or more—of which they are composed. The first two were established by Aristotle, the third was added in modern times.

CO'NCLAVE (Lat.), either the place where the cardinals assemble for the choice of a pope, or the assembly itself. The practice of a C. originated at the election of Gregory X. at Viterbo in 1271, and was regulated by the Council of Lyon in 1274, with formalities still substantially in force. The C. must consist of a single apartment, having only one door, which is kept securely locked. Food and other necessaries are handed through a window, and are subjected to a rigorous examination, in order to prevent communication with the outer world; the cardinals not being allowed to leave the place, or to receive or to send out letters, until a new pope is chosen. As the C. was generally held in the Pauline Chapel at Rome, a number of little cells were erected in one of the galleries, each to form the lodgment of a cardinal.

A *Conclavist* is a spiritual or secular attendant on the cardinals during the C. Each cardinal is allowed three. They are sworn to silence, and are not allowed to leave, except in dangerous illness. Formerly a sum of 10,000 crowns was divided among the conclavists at each election.

CO'NCORD, the capital of New Hampshire, U.S.—called RUMFORD before the American Revolution, from which Count Rumford took his title—is on the right bank of the Merrimac River, 59 miles north-west of Boston, lat. 43° 12′ 29″ N., long. 71° 29′ W. C. is a handsome village, extending two miles along the river, with state-house, state-prison, state lunatic asylum, city hall, two railroad dépôts, nine churches, four or five newspapers, and manufactures of carriages, iron, steel, machinery, musical instruments, woollens, &c. Pop. (1870) 12,241; (1880) 13,836.

CO'NCORD, by English writers on music, is defined as the relation, harmony, or agreement between two or more consonent sounds; such as the union of the major or minor third with the perfect fifth and octave. The German musical technology gives a wider meaning to this term, defining C. as every simultaneous sounding of tones, whether in single intervals or in complete chords, and whether consonant or dissonant.

CONCO'RDANCE, a book arranged in alphabetical order, and showing in how many passages all, or at least all the more important words in any work occur. For writings of universal import, from which passages are continually being adduced to prove or support principles affecting our daily life and action, such a handbook is indispensable. The necessity of a C. for the Bible seems to have been felt at an early period. The first was executed by Antonius of Padua (b. 1195, d. 1231), who published it under the title *Concordantiæ Morales*. He was followed by Hugo de St. Caro (1244) and others, all of whom based their labors on the Latin Vulgate. A Greek C. by Euthalios of Rhodes was prepared about the year 1300, but has been lost. The Alexandrine C. of the Old Testament was compiled by Conrad Kircher in the 16th c., and Xistus Vetuleius published in 1546 a C. of the Greek New Testament, which was republished and amended by Stephens in 1600.

In Hebrew, a C. was drawn up by Rabbi Isaac Nathan, in 1438, amended by Marius of Calassio (Rome, 1620), by John Buxtorf (1632), and by Fürst (Leip. 1837—1841). The chief concordances for Luther's translation of the Bible are those of Lankisch, Büchner, Wichmann, and Schott. For the authorized English version of the Bible, the best C. was compiled by Alexander Cruden, and first published in 1737. Among the best editions of this work we may mention those bearing the dates 1810 and 1824. The C. of Parallels, by Crutwell (1790), is esteemed a valuable work. Among

secular works of this kind, the *Complete Concordance to Shakspeare*, compiled by Mrs. Cowden Clarke (Lond. 1845), is one of the most remarkable.

CONCO'RDAT (Lat. *concordatum*, 'a thing agreed on'), although sometimes used of purely secular treaties, is now almost exclusively employed to designate a compact on ecclesiastical affairs between the pope, as head of the Roman Catholic Church, and the temporal ruler of a particular kingdom or state. Concordats commonly relate to things which are neither purely spiritual, as faith, the sacraments, or worship, nor purely temporal, as civil rights, taxation, &c., but mixed matters, regarding which each power makes certain claims, in regard of which the action of the two powers can with difficulty be dissociated; and in which, therefore, in the hope of harmonious co-operation for the public good, each is willing to cede to the other a portion of its peculiar right. Concordats are of two kinds—the first in the form of a treaty, to which both the contracting powers are formally consenting parties; the second, in which the terms are concerted by both, or, at least, are mutually accepted, but are published only by one, most commonly by the pope, in the form of a bull, reciting the enactments which result from the agreement. This difference is only in form. In both it is a settled doctrine of Roman Catholic canonists, and especially of those of the Ultramontane (q. v.) school, that the pope never absolutely cedes purely spiritual powers. Thus, in the presentation to bishoprics, while the king 'nominated' or 'elected,' the pope always reserved to himself the power of 'canonical institution.'

We shall briefly enumerate the most important concordats. (1.) *Concordats with Germany.*—The earliest subject of negotiation between church and state in Germany was the mode of electing the popes, to which subject may be referred the compact of Otho I. with John XII., and the constitution of Leo VIII.; but the well-known concordat of Worms in 1123, regarding investitures, is commonly regarded as the first concordat strictly so called.

Similar agreements took place on the question of the *Regalia* (q. v.), between the Roman see and the emperors Otho IV., Frederic II., and Rudolph of Hapsburg. A more comprehensive compact on church matters is that of which the foundation was laid at Constance in 1418, and which was subsequently modified, by the 'Frankfort' or 'Princes' Concordat,' by the concordat of Aschaffenburg, and by that of Vienna; which last, although practically disregarded by Joseph II. and Leopold, continued in use till the suppression of the Emperor of Germany in 1803. Its place was supplied, under Pius VII. and his immediate successors, by separate concordats with Bavaria, 1817; Prussia, 1821; Baden, Würtemberg, and other minor states, 1818; Hanover, 1824; Saxony, 1827; and the Netherlands in the same year. The last German concordat was that concluded at Vienna, August 18, 1855. The chief articles were that the pope should have direct communication with the bishops, clergy, and people, and archbishops and bishops with their clergy and their flocks, and the right to govern their sees according to the canonical law. Education was placed entirely under the control of the church. The bishops were to settle what books should be used. The chief inspector of schools was to be chosen by the emperor from among the individuals selected by the bishops. The government bound itself to prevent the dissemination of books pointed out as dangerous to religion by the bishops or archbishops. All questions of marriage, except in so far as they might involve civil consequences, were reserved exclusively to the ecclesiastical courts. Priests guilty of crimes were to be tried in the temporal courts; but the bishop was to be duly notified of the fact, and convicted priests were to be imprisoned apart in a monastery or other ecclesiastical building. The emperor was to choose bishops, but with the advice of the existing bishops and archbishops. The church might acquire new property, but once acquired, it could not be sold or mortgaged without the consent of both pope and emperor. The concordat was set aside in 1868 in all the dominions of the Emperor of Austria. (2.) *With France.*—The Pragmatic Sanction, ascribed to St. Louis, but really of later date, has some of the characteristics of a concordat; but the first proper concordat is that of Francis I. with Leo X. in 1515 and 1516, which continued in force, although with more than one conflict of the two powers, till the Revolution.

In re-establishing the church in France, Napoleon Bonaparte, as first consul, concluded with Pius VII., through the agency of Cardinal Consalvi, the celebrated concordat of 1801; which he afterwards compelled the pope, then a captive at Fontainebleau, to modify by a new act in 1814. Both were ignored at the Restoration; but an attempt to produce a substitute in 1817, and again in 1819, led to no practical change. (3.) *With Italy.*—In Italy, an agreement regulating the election of bishops was concluded with Nice and Savoy by Nicholas V. in 1451; and a formal concordat was made with Sardinia by Benedict XIV. in 1740. The ecclesiastical affairs of Naples were anciently regulated by the terms of what was called the *Monarchia Sicula;* but a formal concordat was concluded with Charles III. by the same pope in 1741, and a new concordat was made by Pius VII. in 1818. (4.) *With Spain.*—Charles V. concluded a concordat for his Spanish kingdom with Adrian VI. and Clement VII.; and a further concordat was made by Clement XII. and Philip V. in 1737. (5.) *With Portugal.*—Benedict XIV. made a concordat with Portugal in 1741.

CO'NCRETE (Lat. *concrescere*, to grow together) is opposed to abstract (see ABSTRACTION). A concrete notion is the notion of an object as it exists in nature, invested with all its qualities, as any particular flower, leaf, or tree; an abstract notion is the notion of any attribute of that flower, leaf, or tree, such as its color, form, or height; qualities which may be thought of independently of the objects in which they inhere, though they cannot so exist.—The abstract method of handling a subject is adapted to speculation and reasoning; the C., to poetic effect and impressive illustration.

CONCRETE, a mixture of hydraulic or other mortar with gravel or shingle, which, on hardening, forms an artificial conglomerate. The best C. is made by well mixing hydraulic mortar (see CEMENT) with sand and sufficient water for complete hydration, and then adding the shingle or screened ballast, and mixing them well together. An inferior C. may be made by laying the shingle into the foundation or other place where the C. is required, and then pouring mortar upon it, to fill the interstices between the pebbles.

The principal use of C. is to form a basis of artificial stone for buildings that rest upon loose or damp subsoils. Such a basis, if well made, forms a solid foundation-slab upon which the weight of the whole structure is equally distributed. It also resists the capillary ascent of moisture from the soil, which would otherwise take place through brickwork or porous stone. A very extensive and important application of C. in this manner has been made in the lower part of Pimlico and Thames Bank. An extensive district that, only a few years since, was a pestiferous marsh, is now covered with high-class houses, and forms one of the fashionable quarters of the West End of London. The houses, and, in fact, the streets altogether, may be said to rest upon a substratum of artificial rock formed of C., which, besides giving stability to the buildings, shuts out the exhalations from the soil, and prevents the ascent of the moisture so abundant below.

C. is occasionally used for building walls by ramming it into moulds, giving it the form desired. A very beautiful application of C. for making mosaic floors is common in Italy. A stratum of cement is laid, and the surface carefully levelled; then pebbles of variegated colors are sifted over it; before it is quite hardened, these are beaten down, so as to be imbedded in the cement, and form the top layer. When the C. has completely hardened, the rounded surfaces of the pebbles are ground down by means of a large slab of stone, which, together with sharp sand, is rubbed over the surface until it is quite smooth; and thus a variegated pavement is formed by the flattened surfaces of the colored pebbles and the cement between them.

CONCRE'TION, in Medicine, a formation of solid unorganized masses within the body, either by chemical precipitation from the fluids, or by the accidental aggregation of solids introduced into the system from without. In the former case, a C. is termed a Calculus (q. v.); in the latter, the C. may be either wholly composed of solids foreign to the body, or these may be mingled with the elements of the secretions, as with mucus, or calculous matter. Thus beans, peas, needles, &c., introduced into the cavities of the body, have become the nuclei of concretions, by attracting around them mucus, or crystalline deposits from the urine. The most remarkable forms of C., however, are perhaps those formed in the stomach and intestines of man and the lower animals, from the more solid and indigestible parts of the food, or of substances improperly swallowed. Thus, young women have been known to acquire the habit of swallowing their own hair to a great extent; and very large concretions have been thus formed, which have

Fig. 1.—Mass of hair and string from the stomach of a young girl.
Taken from the *Pathological Society's Report.*

Fig. 2.—Section of an alvine or intestinal concretion, formed in successive layers upon a piece of bone.
Taken from Munro's *Anatomy.*

proved fatal, by obstructing the passage of food. The annexed cut (fig. 1) shows such a C.; retaining exactly the form of the stomach within which it was found. The use of oatmeal in large amount has also been found to lead to concretions, especially when eaten coarsely ground and unboiled; such concretions have commonly been found in the intestines (See fig. 2).

The excessive domestic use of magnesia in the solid form as a laxative, has been known to have a similar effect. In certain animals, intestinal concretions are not uncommon, and grow to an immense size; they used to be greatly prized as antidotes, and were used in medicine under the name of Bezoars (q. v.). In certain forms of morbid deposits, such as fibrous tumors (see TUMOR), and in Tubercle (q. v.), concretions not unfrequently form; they are for the most part composed of phosphate of lime.

CONCRE'TIONARY STRU'CTURE is a condition in rocks produced by molecular aggregation subsequent to the deposition of the strata, whereby the material of the rock is formed into spherules or balls, as in the grains of oolitic limestone, or the larger concretions of magnesian limestone.

CONCU'BINAGE. The earliest Roman laws were distinguished for the strictness with which they treated marriage. They not only upheld thoroughly the principle of monogamy, but they fettered marriage itself with many burdensome forms. Hence arose the practice of a free unmarried man entering into a less strict relation with a single woman—a sort of permanent cohabitation. The offspring of such a connection, called natural children, had not the rights of legitimate children, but they were recognized by the father. Augustus, with a view to promote regular marriages, and check the growing licentiousness, enacted a comprehensive marriage-law (*Lex Julia et Papia Poppæa*), which still allowed C., but only with women of low rank or who had lost their station. Christianity required the complete sanctity of marriage, although the civil law long continued to tolerate separation at pleasure. In the Eastern empire, C. was entirely prohibited by the Emperor Leo. The ancient laws of the Germans recognized, along with regular marriage, an informal connection of the sexes. In the middle ages, a similar connection became customary, called a 'left-handed,' or Morganatic Marriage (q. v.). The Code Napoleon does not allow of C., but the wife can sue for separation only when the husband maintains a mistress in the common dwelling.

CONCU'RRENT JURISDI'CTION. Jurisdiction is said to be concurrent, or cumulative, when it may be exercised in the same cause by any one of two or more courts. To prevent the collision which might arise from each of the courts claiming to exercise the right, it has been established as a rule, that the judge who first exercises jurisdiction in the cause acquires a right, *jure præventionis*, to judge in it exclusive of the others. The judge by whose authority an offender is first cited or first apprehended, prevents, and so excludes the other from his right of cognizance. 'This right of prevention plainly appears to be peculiar to criminal jurisdiction. In civil, it is the private pursuer who has the only right of choosing before which of the courts he shall sue.' —Erskine's *Institutes*, b. i. tit. ii. s. 9. Opposed to *concurrent* or *cumulative*, is *privative* jurisdiction. In England, in some cases, there is C. J. between the superior and county courts.

'Where the plaintiff dwells more than 20 miles from the defendant; or where the cause of action did not arise wholly, or in some material point, within the jurisdiction of the court, within which the defendant dwells or carries on his business at the time of the action being commenced; or in general where any officer of the county court is a party; in any of these cases, the superior courts have a concurrent jurisdiction'—Stephen's *Com.*, v. iii. p. 383. By 19 and 20 Vict. c. 108, s. 39, it is provided, that if, in an action or contract, the plaintiff claims more than £20, or, in an action of *tort* (that is, for wrong independent of contract), more than £5, and the defendant gives notice that he objects to the action being tried in the county courts, and gives security for the amount sued for with costs—all proceedings shall be stayed in the county court.—*Ib.* note.

CONCU'SSION, in Medicine, a sudden impression or shock communicated to the brain or to the whole nervous system, as the result of a severe injury, or collision of the body with some external object, as in a fall, or in the crash of a railway accident. It is usual to distinguish C. from the more mechanical results of injury, by observing its effect upon the circulation and on the general sensibility; and there can be no doubt that the distinction is well founded, for in the first place death may follow from C. alone, without any appreciable destruction of texture; and 2dly, C. may be followed by recovery within a few hours, leaving the local injury entirely unattended by constitutional disturbance; or recovery may be complete, there having been no local injury at all. Under the immediate shock of injury, the patient is usually unconscious and insensible, pale, cold, sometimes shivering, pulseless, or nearly so, the pupils inclining to contraction rather than dilatation, or in some cases natural; the breathing is irregular, slow, feeble, and sighing; the secretions are suspended; the stomach often yields up its contents; and the bowels and bladder may also be evacuated. This state ends either in death, or in gradual re-action, which may pass over into a state of inflammatory fever, with violently excited circulation, and greatly increased heat of the surface. In the treatment of C., it is sometimes necessary to have recourse to stimulants; but in general, moderate heat applied to the surface, abundant supplies of fresh air, and careful adjustment of the injured parts, are all that is necessary till consciousness is somewhat restored, and the power of swallowing regained; some warm soup should then be given, with a small allowance of wine or other stimulant, proportioned to the age and habits of the individual; and the effect being carefully watched, this treatment may be continued until restoration is complete.

If there be danger of failure of the breathing or heart's action, artificial respiration (see RESPIRATION) should be employed without delay; and the patient should be transferred as soon as possible from the place of the accident to a warm and comfortable bed, where the necessary restoratives may be more conveniently used. The connection of the nervous system with the heart, in cases of C., is a very curious subject in physiology, and has been the subject of minute investigations by Bichat, Legallois, Wilson Philip, Marshall Hall, and many others.

CONCUSSION FUSE. See FUSE.

CONCUSSION SHELL. See SHELLS.

CONDÉ, the name of several places in France, the following being the most important:

CONDÉ, in the department of Nord, situated at the confluence of the Haine and Scheldt, about seven miles north-north-east of Valenciennes. It has an arsenal and strong fortifications, constructed by Vauban, and was the scene of severe contests in the Napoleonic wars. Here are coal-pits and a great coal depot; and the manufactures of starch, chicory, leather and soap. Pop. (1876) 3382.—CONDÉ-SUR-NOIREAU, a town in the department of Calvados, at the union of the Durance and the Noireau, 25 miles south-south-west of Caen. It is an old place, with dark heavy houses. Its manufactures are cottons, cutlery, and leather; and it has a pretty extensive trade in cattle, honey, &c. Pop. (1876) 6835.

CONDÉ, a family celebrated in French history, and which takes its name from the town of Condé (q. v.), in the department of Nord. One Godfrey de C., about the year 1200, was in possession of a part of the barony of Condé. His great-granddaughter, Jeanne of C., married in 1335 Jacques de Bourbon, Comte de la Marche, and the barony of C. went to their second son, Louis de Bourbon, Comte de Vendôme; whose great-grandson, Louis de Bourbon, Prince of C., in virtue of his blood-relationship to the royal family, assumed the title of Prince, and is regarded as the founder of the new house of this name.

CONDÉ, LOUIS DE BOURBON, PRINCE DE, was born 7th May 1530, and first distinguished himself under Marshal Brissac. In the dissensions between the Houses of Guise and Bourbon, C. was the soul of his party, which was for the most part Calvanistic or Huguenot. It was he who directed the conspiracy of Amboise, which had for its aim the banishment of the Guises, and the capture of Francis II. On its discovery, he fled to his brother at Nérac, and there projected a plan for securing possession of all the large towns of France, which, however, miscarried, and C. himself was taken prisoner, and condemned to be executed; from which fate he was luckily saved by the opportune death of the king.

On the accession of Charles IX. to the throne, C. obtained his liberty and the governorship of Picardy; but the harsh treatment which the Huguenots in general received, drove him into rebellion; and on the 11th of April, 1562, he commenced a civil war by the capture of Orleans, Rouen, and other places. Defeated and taken prisoner at the battle of Dreux, in the same year, he was employed by the victors in concluding a treaty of peace, which lasted only a short time. C. recommenced hostilities by a daring but unsuccessful attempt to possess himself of the person of his sovereign (28th September, 1567). After the battle of St. Denis, 10th November, 1567, a second peace was concluded; but having reason to believe that Catharine de' Medici was plotting against his liberty, he once more renewed the war against the Catholic party, in the beginning of 1569, but was again defeated and taken prisoner at the battle of Jarnac, 13th March of the same year. While his wounds were being dressed on the field, a captain of the Swiss guard, named Montesquieu, approached, and shot him through the head. C. was of a joyous and amorous disposition. His gallantries were far from being in accordance with the austere character of the religion he professed, and it cannot be doubted that the feeling of political rivalry to the House of Lorraine, which animated the Bourbon family, explains the career of C. quite as much as his religious convictions.

CONDÉ, LOUIS II. OF BOURBON, PRINCE OF, commonly termed 'the Great Condé,' was the great-grandson of the preceding, and was born September 8, 1621. In youth (1640—1642), he took part in the sieges of Arras and Perpignan, and commanded

the army against the Spaniards in the Netherlands, where he almost extirpated the foe in the battle of Rocroi, May 19, 1643. In the autumn of the same year, he was sent to Alsace to support Turenne; and in the engagements of August 3 and 5, 1644, he defeated the Bavarian general Mercy near Freiburg, and so won for France a considerable portion of Germany. By the death of his father, 1646, C. became the head of his family, and, next to the Duke of Orleans was the highest personage in the state. This pre-eminence excited the envy of Cardinal Mazarin, who, however, in 1648, intrusted C. with the command of the army in the Netherlands. Here the prince captured Ypres, and gained the battle at Lens, but was called back to Paris by the war of the Fronde (q. v.), which had just broken out. In this contest, C. at first sided with the court, while his brother, Prince of Conti, and his sister, the celebrated Duchess of Longueville, took the part of the *Frondeurs*. After the court had secretly escaped from Paris (January 6, 1649), C. concluded a treaty which insured the return of the court to Paris in August of the same year. But as this service met with no adequate thanks, C., who was the haughtiest Frenchman of his age, soon became more violently rebellious than the Frondeurs themselves, at least in his language and deportment.

Cardinal Mazarin consequently arrested C., with his brother and the Duke of Longueville; but was soon compelled to release him, on account of the threatened operations of Turenne and the Fronde. Though C. now enjoyed the favor of the people, his relations with the court were unfriendly even after Mazarin had been banished, and when Louis XIV assumed the government, 1651. He therefore renewed the war, with, as some suppose, the ambitious view of obtaining the supreme power. At the head of troops collected in the Netherlands, he gained the battle of Bleneau, in April 1652, and immediately marched upon Paris, while Turenne, who had remained steady in his loyalty, advanced to defend the court. A bloody but indecisive struggle took place in the streets of Paris. Many of C.'s ablest adherents, however, were killed, and the Frondeurs began to give in. A treaty was drawn up, to which most of them agreed, but the proud impracticable C. would have nothing to do with it; furious at the defection of so many of his friends, he went into Champagne to gather troops, and after a fruitless effort to seize Paris, he left the country, and, on the formal outbreak of war between France and Spain, became generalissimo of the Spanish forces, but was unable to gain the advantage over Turenne. When the peace of the Pyrenees was concluded between France and Spain, it was thought advisable to enter into friendly relations with the brilliant traitor. C. was therefore pardoned, and reinstated in his former honors. The war having been renewed by Spain, 1673, he again commanded the French in the Netherlands. After Turenne's decease, he held the command in Germany, but was ultimately so disabled by gout, that he had to resign his post. He now retired to his estate of Chantilly, where he devoted his remaining years to literature (for which, in his early years, he had exhibited a strong predilection), the society of friends, and religious exercises. He died at Fontainbleau, December 11, 1686. The Prince of C. had a superior intellect and great strength of character, associated with pride. Though an able commander, he was disliked by the soldiers, on account of his severity.—Mahon, *Life of the Great Condé* (1840).

Condenser.

CONDE'NSER, the apparatus used in conjunction with an electrometer to increase its sensibility, and render it available for indicating the presence of very feeble electricity. A C. of the simplest form is shown in the accompanying figure. A is a gold-leaf electrometer. The condensing apparatus consists of the two brass plates, B and C, which are placed horizontally, the lower one being connected with the metal rod to which the gold leaves are attached, and the upper one being provided with an insulating glass handle. These plates are accurately ground, the one to the other, so that when placed upon each other, they touch in every part.

Their inner surfaces are covered with a very thin and equable layer of shell-lac. When an observation is made, the excited body is brought into contact with the lower plate, and the finger of the observer is laid upon the upper. This being done for a sufficient time, the finger is first removed, and then the excited body, after which the plate C. is lifted by its handle parallel to the other plate, the gold leaves at the same time diverging under the influence of the electricity left in the lower plate. The same observation might have been made with the positions of the finger and the excited body reversed, but the leaves would then be charged with the opposite electricity to that of the excited body. Reverting to the first case, the electricity to be tested is communicated to the lower plate in small successive charges, which, acting through the thin layer of shell-lac, induce, as in the Leyden jar, a corresponding charge of the opposite electricity on the lower surface of the upper plate, and send the similar electricity of the upper plate through the finger into the ground. Each weak charge of electricity given to the lower plate is not allowed to dissipate, but is kept fixed or bound by the corresponding charge of the opposite electricity which it has induced on the upper plate, so that an accumulation of such charges takes place. As yet, however, there is no excitement visible in the gold leaves, the electricity so condensed in the plate B being capable of acting only in one direction—viz., towards the charge of the upper plate. When, however, the plate C. is removed, the collected electricity of the lower plate being no longer restrained to act towards it, immediately extends to the leaves below, and causes a marked divergence. In this manner, electricity of too low a tension to affect immediately the gold leaves can be condensed, so as to possess the power of doing so.

It is found that the efficiency of the C. depends upon the accurate grinding of the plates, the thinness and evenness of the layer of shell-lac with which their inner surfaces are varnished, the size of the plates, and their parallelism on removal. This last is of the utmost importance; and it is found, where numerical results are wanted, that little dependence can be placed on the parallelism attained by the hand. For more accurate observations, the C. is made quite separate from the electrometer. The plates in this case attached vertically to two wooden pillars, on which they are insulated, and which slide in a horizontal groove made in the sole of the instrument. The plates, thus guided by the grooves, are made to approach and to retire from each other with their faces parallel. In a C. of this description, no shell-lac varnish is used, the air between the plates acting as the dielectric in its place. When one of the plates is connected with the knob of the electrometer, the observation proceeds as already detailed.

CONDENSING STEAM-ENGINE. See STEAM-ENGINE.

CONDESCE'NDENCE. In the judicial procedure of Scotland, a C. is an articulate statement of the facts, accompanied with a note of the grounds in law on which the pursuer of an action rests. Formerly, the C. was a separate pleading from the Summons, or judicial writ by which the defender is called into court. By the passing of 13 and 14 Vict. c. 36 (31st October 1850), and several subsequent statutes, the forms in Scotland were very much simplified. The summons, in place of containing a rambling statement of the grounds of action, which was afterwards to be rendered articulate and explicit by the C., is now a merely formal writ, setting forth the name and designation of the pursuer and defender, and the conclusions of the action. To the summons, however, is appended a C. setting forth the grounds of action in articulate statements, and to this again is subjoined a note of pleas in law, so that the whole case of the pursuer is contained in the very first pleading in the cause. The papers on both sides may be revised if necessary; and the record, as the written pleadings and productions are called, is then adjusted by the judge. The cause is then ready for Debate (q. v.).

CONDESCENDENCE AND CLAIM. See MULTIPLEPOINDING.

CONDILLAC, ETIENNE BONNOT DE MABLY DE, a French philosopher of the 18th c., was born at Grenoble, 1715. In early youth, his delicate health delayed his progress in education. In 1746, he published his *Essai sur l'Origine des Connaissances Humaines*, a work which derives all thought and knowledge from the exercise of the senses. It was intended to carry out the principles of Locke, which were misunderstood and misrepresented by C. as entirely based on sensationalism. To refute various metaphysical theories, C. wrote a *Traité des Systèmes* (1749). In 1754, appeared his *Traité des Sensations*—a work supplying the details of the sensational theory. C. supposes a statue organized within like a man, but its body—so to speak—being composed of marble, hinders it from possessing any sensibility. C. further supposes himself to have the power of endowing the statue with one sense after another, until it becomes perfectly a human being, and so endeavors to show that as it would then possess exactly the same kind of ideas as ourselves—and yet while destitute of sensations, possessed none—it logically follows that ideas spring exclusively from sensations. In all his writings, C. displayed acuteness in analysis, and as consistently as was possible, adhered to the extreme theory of sensationalism. C. passed his life mostly in quiet retirement, and died at his estate near Beaugenci, August 3, 1780.

CO'NDIMENTS, or seasoning agents, are those substances which are employed at table for the purpose of imparting a flavor or seasoning to the ordinary solid or liquid food. The greater part of C. are necessary to sustain the proper functions of the alimentary system, and besides gratifying the appetite, minister, more or less, to the wants of the structure. The principal C, are saline substances, such as common salt; acidulous bodies, such as acetic acid or vinegar; oily C., such as butter and olive-oil; saccharine substances, such as sugar and honey; and aromatic and

pungent C., such as mustard, ginger, pepper, and pickles. The members of the last class owe their characteristic properties to the presence of a volatile oil or resin.

CONDI'TION, in Logic, denotes that which must precede the operation of a cause. It is not regarded as that which produces an effect, but as that which renders the production of one possible. For instance, when an impression is made on wax by a seal, the seal is said to be the cause; the softness or fluidity of the wax, a condition. Some logicians, however, are of opinion, that the distinction usually made between C. and cause is arbitrary.

CONDITION. See TRAINING.

CONDITION, in Law. This word is of peculiar importance in the real property law of England, as forming the foundation upon which the right of alienation of land, as well as the system of entails and that of mortgages was raised. Originally, a gift of an estate to a tenant (or vassal) by the lord of the fee did not convey more than a life-estate; and when a gift was made to a man and the heirs of his body, it was held that it was a gift upon C. that he had heirs of his body. But if the C. was performed by his having children, although they might all die before his own death, the judges held that his estate became absolute, to the effect that he might aliene the land, and so bar not merely the succession of his issue, but the right of the lord in default of issue, although, if he did not aliene, the lord would recover in the event of the tenant's death without issue. But it came afterwards to be held that a gift to a man and the heirs of his body conferred what is called an estate tail, which might at once, by certain forms, be converted into an absolute estate, independent of the birth of issue. See ENTAIL.

A mortgage is an estate given to the mortgagee upon C. that he restores it upon payment of a fixed sum borrowed by the mortgager. This is an example of an estate upon C. *expressed*. An estate attached to an office is an estate in the holder of the office upon C. *implied*, that he shall perform its duties. A C. may also be either *precedent* or *subsequent*.

In the former case, the gift does not take effect until the C. is performed; in the latter, it becomes void when the C. occurs. The right to take advantage of a C. subsequent cannot be bestowed on a stranger, but can only be reserved to the grantor and his heirs, though after such reservation it may be assigned to a stranger. Conditions which are incapable of performance, or contrary to law, are void; and if such a C. is precedent, it makes the gift void; if subsequent, the estate becomes absolute in the tenant. But if a C. become illegal, or impossible, subsequently to the making of the grant, it has a different effect, according as the effect is produced by statute or by other circumstances. If by statute, the party bound to perform the C. is relieved from it; if by other circumstances, he loses his right, as being unable to perform the condition.

In contracts, conditions which are *mala in se* render the contract void; but it is otherwise if the C. is merely opposed to an arbitrary rule of law, in which case the C. only is void, and the contract subsists. In legacies, a similar rule prevails. But in the case of legacies, a C. impossible of performance is generally taken *pro non scripto*—whereas in contracts, it commonly annuls the claim of the party who has bound himself to its performance.

CONDI'TIONED, THE PHILOSOPHY OF THE. This phrase has been brought into use by Sir W. Hamilton, to express the inability of the human mind to conceive or reason respecting the Absolute and the Infinite. Our thought, according to him, can only be of the *relative* and the *finite*, of which these terms are but the negations; relativity and finitude are the conditions under which the human intelligence operates. In a dissertation on this subject (*Discussions in Philosophy*, p. 1), he criticises, and endeavors to refute the opposite position as maintained by Cousin—a modification of the previous doctrine of Schelling—that 'the Unconditioned, the Absolute, the Infinite, is immediately known in consciousness, and this by difference, plurality, and relation.'

As this doctrine of Sir W. Hamilton has been raised into an especial importance by Mr. Mansel in his *Bampton Lectures*, some account of the reasonings adduced in its favor may here be given. We shall first quote the author's own statement:

'In our opinion, the mind can conceive, and consequently can know, only the *limited, and the conditionally limited*. The unconditionally unlimited, or the *Infinite*, the unconditionally limited, or the *Absolute*, cannot positively be construed to the mind; they can be conceived only by thinking away from, or abstraction of, those very conditions under which thought itself is realized; consequently, the notion of the Unconditioned is only *negative*—negative of the conceivable itself. For example:

On the one hand, we can positively conceive neither an obsolute whole, that is, a whole so great that we cannot also conceive it as a relative part of a still greater whole; nor an absolute part, that is, a part so small that we connot also conceive it as a relative whole; divisible into smaller parts. On the other hand, we cannot positively represent, or realize, or construe to the mind (as here Understanding and Imagination coincide) an infinite whole, for this could only be done by the infinite synthesis (union) in thought of finite wholes, which would of itself require an infinite time for its accomplishment; nor, for the same reason, can we follow out in thought an infinite divisibility of parts. The result is the same, whether we apply the process to limitation in *space*, in *time*, or in degree. The unconditional negation, and the unconditional affirmation of limitation; in other words, the *Infinite* and the *Absolute, properly so called*, are thus equally inconceivable to us.'—*Discussions*, p. 13, 2d edition.

The fundamental ideas involved in this view are certain observed facts with reference to the human mind, or the human consciousness; which facts, although very much overlooked in former times, are now beginning to be pretty generally recognized. It is a general law of our mental constitution, that change of impression is essential to consciousness in every form. The remark was made by Hobbes, that it is 'almost all one for a man to be always sensible of one and the same thing, and not to be sensible at all of anything.' There are notable examples to show that an unvarying action on the senses fails to give any perception whatever. Take the pressure of the air on the surface of the body. Here we have an exceedingly powerful effect upon one of the special senses. The skin is under an influence exactly of that nature that wakens the feeling of touch, but no feeling comes. Withdraw any portion of the pressure, as with a cupping-glass, and sensibility is developed. A constant impression is thus, to the mind, the same as a blank. Our partial unconsciousness of our clothing is connected with the constancy of the object. Remission or change is, therefore, absolutely requisite in order to sensibility.

The necessity of change in order to produce feeling or consciousness of any sort, must apply to the special kind of consciousness that we call knowledge. To know light, is to pass from its presence to its absence, or the opposite; everlasting, unvarying luminosity, in an eye always awake, would not be known to the human mind. It is transition that develops knowledge, whence flows the important consequence, that knowledge *never can be of one property alone;* there must always be at least two properties in every act of knowing. We may say that we know light; but in so doing we also know darkness, and we could not know either by itself. When we touch clay and marble, we know hard and soft; but if we had never touched a soft body, we should have no conception of a hard one. Living in one constant temperature, like the fish in the tropical seas, we should know neither heat nor cold; passing from a high temperature to a low, or from a low to a high, we know both; and such is the alternative presented in every case to the human understanding. This great fundamental law of the human mind is now commonly designated by the phrase, *the relativity of knowledge or of cognition*.

Mr. Mansel, accordingly, disputes the possibility of our conceiving the infinite, by showing that such a conception passes the limits of human consciousness. The following extracts will show his mode of reasoning: 'Now, in the first place, the very conception of consciousness, in whatever mode it may be manifested, necessarily implies *distinction between one object and another*. To be conscious, we must be conscious of something; and that something can only be known as that which it is, by being distinguished from that which it is not. But distinction is necessarily limitation; for, if one object is to be distinguished from another, it must possess some form of existence which the other has not, or it must possess some form which the other has. But it is obvious that the infinite cannot be distinguished, as such, from the finite, by the absence of any quality which the finite possesses; for such absence would be a limitation. Nor yet can it be distinguished by the presence of an attribute which the finite has not; for, as no finite part can be a constituent of an infinite whole, this differential characteristic must itself be infinite, and must at the same time have nothing in common with the finite. We are thus thrown back upon our former impossibility.'—Lecture 3d.

'A second characteristic of consciousness,' according to Mr. Mansel, 'is, that it is only possible in the form of a *relation*. There must be a Subject, or person conscious, and an Object, or thing of which he is conscious. There can be no consciousness without the union of these two factors; and, in that union, each exists only as it is related to the other. The subject is a subject, only in so far as it is conscious of an object; the object is an object, only in so far as it is apprehended by a subject; and the destruction of either is the destruction of consciousness itself. It is thus manifest that a consciousness of the absolute is equally self-contradictory with that of the infinite. To be conscious of the absolute as such, we must know that an object which is given in relation to our consciousness, is identical with one which exists in its own nature, out of all relation to consciousness. But to know this identity, we must be able to compare the two together; and such a comparison is itself a contradiction. We are, in fact, required to compare that of which we are conscious, with that of

which we are not conscious, the comparison itself being an act of consciousness, and only possible through the consciousness of both objects.

The author then lays down a third condition of consciousness—namely, relation to *time*. Everything conceived by us is conceived as under the two manifestations of *succession* and *duration*, from which he endeavors to show 'that an act of *creation*, in the highest sense of the term—that is to say, an absolutely first link in the chain of phenomena, preceded by no temporal antecedent—is to human thought inconceivable. To represent in thought the first act of the first cause of all things, I must conceive myself as placed in imagination at the point at which temporal succession commences, and as thus conscious of the relation between a phenomenon in time and a phenomenon out of time. But the consciousness of such a relation implies a consciousness of both the related members; to realize which, the mind must be in and out of time at the same moment.

And, further: 'Subordinate to the general law of time, to which all consciousness is subject, there are two inferior conditions, to which two great divisions of consciousness are severally subject. Our knowledge of body is governed by the condition of *space*, our knowledge of mind by that of *personality*. I can conceive no qualities of body save as having a definite local position; and I can conceive no qualities of mind save as modes of a conscious self.'—Lecture 3d.

By the application of those four conditions or limitations of the human consciousness—distinction, relation, succession, and duration in time, and personality as regards the conception of mind—it is Mr. Mansel's purpose to demolish the foundations of the metaphysical theology of former ages, which was largely conversant with proofs *à priori* of the infinity and the absolute existence of a Deity. According to him, a rational theology is impossible to be attained. 'Our whole consciousness manifests itself as subject to certain limits, which we are unable, in any act of thought, to transgress. That which falls within these limits, as an object of thought, is known to us as *relative* and *finite*. The *absolute* and the *infinite* are thus, like the *inconceivable* and the *imperceptible*, names indicating, not an object of thought or of consciousness at all, but the mere absence of the conditions under which consciousness is possible. The attempt to construct in thought an object answering to such names, necessarily results in contradiction—a contradiction, however, which we have ourselves produced by the attempt to think—which exists in the act of thought, but not beyond it—which destroys the conception as such, but indicates nothing concerning the existence or non-existence of that which we try to conceive. It proves our own impotence, and it proves nothing more.'

CONDOM, a town of France, in the dep. of Gers, pleasantly situated on a height on the river Baise, here crossed by two bridges, 25 miles north-north-west of Auch. The town is very old, having been founded in 721, is irregularly built, but has handsome suburbs. It has a handsome Gothic Church, an exchange, and two hospitals. There is a very considerable trade in grain, flour, wine, and brandy, and manufactures of cotton and mixed fabrics, cotton yarn, and earthenware. C. was formerly the capital of an extensive district, now comprised in the departments of Gers, Landes, and Lot-et-Garonne. Bossuet was at one time Bishop of Condom. Pop. (1876) 4933.

CONDONA'TION, in the legal phraseology both in England and Scotland, means forgiveness, or *remissio injuriarum*, when urged as a defence against an action of divorce on the ground of adultery.

CO'NDOR (*Sarcoramphus gryphus*), the great vulture of the Andes, and the largest of known flying birds. Its dimensions, however, were for a long time greatly exaggerated. It is not always much larger than the *lämmergeyer* of the Alps, being sometimes not scarcely more than four feet long, and its expanse of wings about nine feet, although these dimensions are often considerably exceeded, and the expanse of wings reaches fully fourteen feet. The wings are long, and extremely powerful; the tail short, and wedge-shaped; the general color black, which is brightest in old males, the young being of a brownish color, which has given rise to a notion that there are two species; the males are also distinguished by having great part of the wings white. Around the lower part of the neck of both sexes there is a broad white ruff of downy feathers, above which the skin is bare, and exhibits many folds. The head of the male is crowned with a large cartilaginous comb, and the neck is furnished with a dilatable wattle. The beak is thick and strong, straight at the base, but the upper mandible strongly curved at the extremity. The C. feeds mostly on carrion. Its voracity is enormous. Tschudi mentions one in confinement at Valparaiso which ate 18 lbs. of meat in a single day, and seemed next day to have as good an appetite as usual. Condors often gorge themselves so that they cannot fly, and if attacked, must disgorge in order to escape. They inhabit regions 10,000 or 15,000 feet above the level of the sea, where they breed, making no nest, but laying their eggs on the bare rocks, and

Head of Condor.

Condor.

where they are usually seen in small groups. To these haunts they return, after their descents into the plains for food.

The height to which the C. soars in the air exceeds that of any other bird, and is said to be almost six perpendicular miles above the level of the sea, or nearly six times the ordinary height of the clouds.—To the same genus with the C., distinguished by the cartilaginous comb, bare neck, and peculiar shape of bill, belong the King Vulture, or King of the Vultures (*S. papa*), of the warm parts of America, and the Californian Vulture (*S. Californianus*). The king of the vultures is about the size of a goose, and derives its name from its driving away other vultures from prey at its pleasure. Its plumage is finely colored, reddish above, white beneath, with bluish-gray ruff, and black quills and tail. The birds of this genus have no voice, and make only a sort of weak snorting.

CONDORCET, Jean Antoine Nicolas de Caritat, Marquis de, an eminent French author, was born September 17, 1743, at Ribemont, near St. Quentin, in the department of Aisne; studied at the college of Navarre; and by his *Essai sur le Calcul Integral* (afterwards given in an extended form in his *Essais d'Analyze*), gained for himself, at an early age, a seat in the Academy of Sciences. With ease and remarkable ingenuity, C. treated the most difficult problems of mathematics; but though deserving high praise, his powers lay rather in suggestion than in rigorous demonstration. After the appearance of his *Eloges des Académiciens Morts avant* 1699 (Paris, 1773), he was made secretary of the Academy, 1777. His theory of comets gained, in the same year, a prize in the Berlin Academy. In concert with Turgot, he was induced to subject the system of the economists to a close examination, and was led by D'Alembert to take an active part in the *Encyclopédie*. In all his works—as, for example, in the *Eloges et Pensées de Pascal*—we find noble views of human destiny, and evidences of a truly benevolent disposition. At the Revolution, he was elected member for Paris in the Legislative Assembly, of which he was president in 1792. In the National Convention, as deputy for the department of Aisne, he mostly voted with the Girondists, and shared in the downfall of that party. Accused, in October 1793, he concealed himself, and consequently was outlawed.

A generous lady, Madame Verney, had the courage to provide for him a hiding-place, where he remained for some months, and in very miserable circumstances wrote his most remarkable work, the *Esquisse des Progrès de l'Esprit Humain*. Having afterwards quitted his concealment, he was arrested at Clamart, sent to Bourg-la-Reine, and cast into prison. The next morning, March 28, 1794, he was found lying dead on the floor. He had, it is believed, poisoned himself. His collective works (exclusive of his mathematical essays) were edited by Garat and Cabanis (21 vols., Paris, 1804).—His wife, Sophie de C. (sister of Marshal Grouchy), born 1765, assisted in the literary labors of C., and also translated into French, Adam Smith's *Theory of Moral Sentiments*. She died September 6, 1822.

CONDOTTIE'RI, the name given in the 14th c. to the leaders of certain bands of military adventurers who, for booty, offered their services to any party in any contest, and often practised warfare on their own account purely for the sake of plunder. These mercenaries were called into action by the endless feuds of the Italian states during the middle ages. Among the most celebrated

of their leaders were Guarnieri, Lando, Francis of Carmagnola (about 1412), and Francis Sforza (about 1450). The last-mentioned made himself Duke of Milan. The *Compagnies Grandes* in France, during the 14th c., resembled the bands led by the Italian condottieri. They originated in the long bloody wars between France and England. The mischief done by them became so intolerable, that in several parts of the country the peasantry armed themselves, and under the name of *paciféres*, formed associations against the plunderers. Nevertheless, these French C. were so powerful that, in 1361, they routed the king's forces which had been sent against them, at Brignais, near Lyon, and slew the Constable of France, Jacques de Bourbon; but the Constable du Guesclin persuaded them to seek their fortune in the Spanish service.

CONDUCTION. See HEAT.

CONDU'CTOR, in Music, is the person placed at the head of a band of musicians to lead the performance and beat the time. In Germany, the term Dirigent is used, which is more expressive.

CONDUCTORS, in the Royal Artillery, are those artillerymen who have charge of the ammunition-wagons in the field; they are, to some extent, under the control of the commissariat officers, who have to provide means of transport; but since the recent changes in the commissariat department, they have been more exclusively under the control of their own proper artillery officers.

CONDUCTORS AND NON-CONDUCTORS OF ELECTRICITY. If a rod of metal be made to touch the prime conductor of an electrical machine immediately after the plate has ceased to rotate, every trace of electricity immediately disappears. But if the rod were of shell-lac, little or no diminution would be perceptible in the electrical excitement of the conductor. The metal in this case leads away the electricity into the body of the experimenter, and thence into the ground, where it becomes lost, and it receives in consequence the name of a conductor. The shell-lac, for the opposite reason, is called a non-conductor. Different substances are found to possess the power of conducting electricity in very different degrees. The following series classifies the more common substances according to their conducting powers, beginning with the best, and ending with the worst conductors. Conductors—The metals, graphite, sea-water, spring-water, rain-water. Semi-conductors—Alcohol and ether, dry wood, marble, paper, straw, ice at 32° F. Non-conductors—Dry metallic oxides, fatty oils, ice at — 13° F., phosphorus, lime, chalk, caoutchouc, camphor, porcelain, leather, dry paper, feathers, hair, wool, silk, gems, glass, agate, wax, sulphur, resin, amber, shell-lac.

The arrangement into conductors, semi-conductors, and non-conductors, is made with reference to frictional electricity, or electricity of a high tension. The substances which are semi-conductors for frictional electricity are found to be almost, if not altogether, non-conducting for the electricity of the galvanic battery, which is too feeble to force a passage through them. The metals, which appear to be all nearly alike conducting for frictional electricity, offer widely differing resistances to the transmission of the galvanic current. By experiments made with galvanic electricity, it is found that the more ordinary metals stand thus, as regards their powers of conduction, beginning as before with the best conductor: Silver, gold, copper, brass, zinc, iron, platinum, tin, nickel, lead, German-silver, mercury. An increase of temperature has in the metals the effect of lessening the conducting power, whilst in almost all other substances it has an opposite effect. Glass becomes conducting at a red heat, and so do wax, sulphur, amber, and shell-lac, when fused.

When a conductor is placed on non-conducting supports, so as to prevent the electricity communicated to it from passing into the ground, it is said to be insulated. The usual insulating material employed in the construction of electrical apparatus is glass, which, though not so perfect a non-conductor as the others lower in the scale, far exceeds them in hardness and durability. In a damp atmosphere, glass becomes coated with a thin layer of moisture, which very considerably diminishes its insulating power. Hence arises the necessity in certain states of weather of heating so as to dry all electrical apparatus previous to use. This imperfection is very much lessened by covering the glass with shell-lac varnish.

The very fact that a conductor may be insulated, indicates that the air is a non-conductor. Dry air possesses this property in a high degree, while moist air renders insulation for any length of time impossible.

CONDY'S FLUID. See MANGANESE.

CONE (*strobilus*), in Botany, a fruit-bearing spike covered with scales, each of which has two seeds at its base. Such are the fruits of the *Coniferæ* (fir-cones or fir-tops), from the usual shape of which the name C. is derived, also the fruits of the *Casuarineæ*. The name C. is applied also to the female spike, even when in flower. The scales of true cones, until they separate to allow the dispersion of the seeds, are closely compacted together; in the hop, to the fruit of which the name C. is not applied, although *strobilus* is, they are loose. Some true cones, as those of the *Araucaria*, are very far from being conical in shape. The fruit of the juniper (a *galbulus*) is a C. of which the scales have become fleshy, so as to form a false berry.

CONE. There are various kinds of cones, but the term is usually applied only to those having circular bases. The most common kind of circular C. is the *right* C., which may be conceived as being generated by the revolution of a right-angled triangle round one of its legs. The line from the apex of a C. to the center of the base is called the axis, and, in the right C., it is perpendicular to the base. In the *oblique* C., the axis is inclined to the plane of the base at an angle other than a right angle. A *truncated* C. is the lower part of a C. cut by a plane parallel to the base.—Four curves, called the CONIC SECTIONS, may be formed by cutting the right C. in different directions. If the C. be cut by a plane parallel to the base, the section is a circle; if the plane cut the C. across, making any angle other than a right angle with its axis, the section is an ellipse; if the cutting plane be parallel to the side of the C., the section will be a parabola. In every other case than those stated, the section will be an hyperbola. If two cones were set one above the other, the one being just a continuation of the other through the apex, the plane producing the hyperbolic section would cut the second as well as the first, though none of the other planes would. There are thus two equal branches of the hyperbola belonging to the two cones respectively. See CIRCLE, PARABOLA, &c.

CONEGLIA'NO, a town of Northern Italy, 28 miles north-east of Venice. It is situated on a hill-slope, crowned by an extensive castle, and has a very picturesque appearance. Half-obliterated frescoes adorn the outside of several houses in the town. C. has manufactures of woollens and silks, and a population of 6500.

CONE-SHELL (*Conus* and *Conidæ*), a genus and family of gasteropodous mulluscs, of the order *Pectinibranchiata*, having a shell of remarkably regular conical form; the spire on the base of the cone, and sometimes rising from it to a sharp point; sometimes almost flat; the aperture narrow and straight, without protuberance or fold, extending from the base of the cone to its apex. The head of the animal has a proboscis capable of much extension; the mantle is scanty and narrow, forming an elongated siphon in front; the shell covered with an epidermis. These molluscs are carnivorous, they inhabit shores and banks of sandy mud, chiefly within the tropics, a few only occurring in the Mediterranean. The shells of many species are very beautiful, and much prized by collectors.—Cone-shells first appear in the chalk, and become more abundant in the more recent formations.

Cone-shell.

CONFARREA'TION was a peculiar mode of marriage in use among the Romans, and supposed to have been originally that practised by the patricians. Its specialty consisted in the employment of certain words in the presence of ten witnesses, and in the performance of a religious ceremony in which *panis farreus* (bread made of spelt) was used. Various priestly offices, such as that of the *Flamen Dialis*, were open only to those who were born of parents thus married.

CONFEDERA'TION, GERMANIC. See GERMANY.

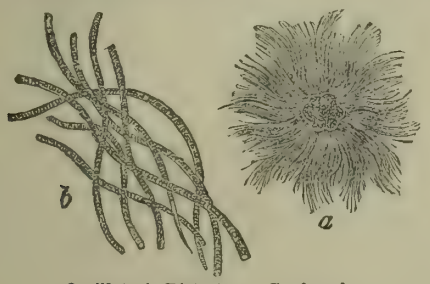
CONFEDERATION OF THE RHINE. During the war of 1805, so disastrous for Austria, several German princes, too weak to remain neutral, were forced to ally themselves with France. The first to do so were the Electors of Bavaria and Würtemberg, who, in recompense for their services, were elevated to the dignity of kings by the peace of Presburg, 26th December 1805. Some months after (28th May 1806), the arch-chancellor of the empire announced at the diet that he had chosen as his coadjutor and successor Cardinal Fesch, the uncle of Napoleon, a thing entirely contrary to the constitution of the Germanic empire. Finally, at Paris, on the 12th July 1806, 16 German princes formally signed an act of confederation, dissolving their connection with the Germanic empire, and allying themselves with France. These 16 princes were—the kings of Bavaria and Würtemberg, the arch-chancellor, the Elector of Baden, the new Duke of Cleves and Berg (Joachim Murat), the Landgraf of Hesse-Darmstadt, the Princes of Nassau-Usingen, Nassau-Weilburg, Hohenzollern-Hechingen, Hohenzollern-Sigmaringen, Salm-Salm, Salm-Kryburg, the Duke of Arenberg, the Princes of Isenburg-Birstein and Lichtenstein, and the Count of Leyen. These individuals justified (or were forced to justify) their conduct by enumerating the vices of the constitution of the Germanic empire, and invited the remaining princes of Germany to imitate their example. At the same time, Bacher, the French ambassador, declared that his master no

longer recognized the Germanic empire; while the territories and titles of the confederate princes (who were now under the protectorate of Napoleon) underwent considerable changes. In addition to these changes, a number of other princes and nobles of the empire were made dependent (see MEDIATISATION) on the confederation. During the years 1806—1808, several other petty German sovereigns, alarmed at the triumphs of Napoleon, hastened to enrol themselves members of this unpatriotic league; and at the close of 1808, it embraced a territory of 122,236 square miles, contained a population of 14,608,877 souls, and kept up an army of 119,180 men. The utter ruin which overtook the French army in the Russian campaign acted like a solvent on the confederation, and the year 1813 saw it vanish like mist in the sudden outburst of German patriotism, when a whole people leaped up as one man, and delivered themselves from a cruel and insulting bondage.

CO'NFERENCE, in English Law, signifies the interview of an attorney or solicitor with a counsel, when consulting him. Consultation properly means the meeting of barristers with each other.

CONFERENCE, WESLEYAN. See METHODISTS.

CONFE'RVA, a genus of plants of the natural order *Algæ*, suborder *Confervaceæ* (or order *Confervaceæ*). The plants of this genus consist of simple or branching jointed filaments, which are filled with green—seldom purple or red—matter, and are found in abundance in water—some of them in fresh, and some in salt water—and on moist earth. *C. rivularis*, a species common in brooks, is sometimes 2—4 yards in length, and was formerly used as an application to wounds and slight burns. This and other species are sometimes called *Crow Silk*, and are used in some places for stuffing mattresses. *C. rupestris* often covers whole rocks on the sea-coast.



Oscillatoria Distorta; a Conferval:
a, natural size; *b*, magnified.

C. crispa sometimes forms a close entangled layer on inundated land, and has received the name of *Water Flannel*. *C. ægagropila*, sometimes called *Moor Ball*, is found in lakes and ponds, where it floats about freely in the water, its filaments forming an entangled ball, capable of being employed as a pen-wiper.—The name C. is not always strictly limited to the genus, but is extended to many of its near allies. Among the *Confervaceæ*—or Confervals—however, are included many plants, as the different kinds of Laver, which have a flat, and not a thread-like frond. Many also consist of cells immersed in a slimy matter. The *Confervaceæ* grow by the division, and sometimes by the branching of cells; reproduction takes place by *spores*, formed in the interior of the cells, and which at last are discharged through the walls of the mother-cell. The very interesting phenomenon of the Conjugation (q. v.) of cells has been observed in them. The spores assume the character of Zoospores (q. v.), exhibiting movements which resemble those of animals, before leaving the mother-cell, and retain this character for some time after escaping from it. *Confervaceæ* are found plentifully even in mineral waters. Their great abundance often gives a color to the whole water of tanks, marshes, &c. The Red Sea is said to derive its name from the color sometimes given to the surface of its waters, for distances as great as the eye can reach, by small *Confervaceæ*. The yeast-plant has been ranked among *Confervaceæ*, but is more generally regarded as one of the *Fungi*. Other vegetable organisms which appear in liquids of the most various kinds, and which have also been ranked among *Confervaceæ*, are more probably the *mycelium* of imperfectly developed *Fungi*. The plants noticed in the article ALGÆ as appearing in diseased conditions of animals, are regarded as *Confervaceæ*.—The Lavers are almost the only *Confervaceæ* ever used for human food.

CONFE'SSION, in Roman Catholic theology, means a declaration of sins to a priest in order to obtain absolution. The practice of C. is believed by Roman Catholics to be of divine institution, being founded on the power of binding and loosing from sin conferred on the apostles by Christ (Matt. xvi. 19, xviii. 18, and John xv. 22, 23). The power of binding *or* loosing, being in the view of its advocates judicial and discretionary, presupposes a confession of sins in order to its being judicially exercised. Although some allusions to C. are found in the New Testament, Catholics do not allege any formal scriptural precept for it, but they contend that the above passages contain an implied precept, which they further support by testimonies of the Fathers. Though the apostle James recommends that Christians should confess their 'faults one to another,' yet formal and open C. appears to have been first required in cases where persons guilty of gross apostasy desired to be again received into the church. Motives of piety, and a wish to avoid the scandal of open C., led gradually to the institution of private C. in the hearing of a priest. In and after the 5th c., such C. was made an indispensable preparation for receiving the sacrament of the Lord's Supper. Open or public C., which was part of the discipline of public penance, ceased when that discipline went into disuse. Private C. has been retained, and though its defenders hold it to have been at all times in use, a general law was enacted by the fourth Council of the Lateran (can. xxi., *Omnis utriusque sexus*), requiring that every Christian who has attained the years of discretion should confess to a priest approved for the purpose, at least once in the year; and they insist that this law was by no means the origin of the precept of C., but merely defined the time of its fulfilment. C. is one of the three 'acts of the penitent'—contrition, confession, and satisfaction—which the Council of Trent declares to be parts of the sacrament of penance. The sinner is required to confess each and every mortal sin, in thought, word, and deed, which, after diligent examination of his conscience, has occurred to his memory. He is exhorted, but not required, also to confess Venial Sins (q. v.), especially if they be habitual. C., in order to be fruitful, must be accompanied by contrition and a purpose of amendment. It commonly embraces the sins committed since the last C.; but may include a longer period, and even the entire life. In the latter case, the C. is called general. It is called 'auricular,' as being made to the private 'ear' of the priest; and is ordinarily spoken, but in cases of necessity may be made in writing, by signs, or even by an interpreter. Priests cannot validly receive confessions in any place without the 'approbation' of the bishop of the place, which may be given either absolutely or with restrictions. C. is prescribed in the ritual of the Greek, the Russo-Greek, the Coptic, the Syrian, and the other oriental churches. In most of these churches the practice is obligatory, but in some it has gone into disuse.

The Lutheran Church professes (according to the 11th art. of the *Augsburg Confession*) 'that private confession must be retained in the church; but that full and particular statement of *all* sins is not necessary, because, according to Psalm xix. 12, it is impossible.' In the Apology of the Augsburg Confession, it is said to be 'impious' to abolish the practice of private C. to the priest; but in practice, the Lutheran Church has widely departed from these rules. The Reformed Church (in Germany) has always been more inclined to general C.; and the United Church also substitutes for private C. certain devotional exercises previous to communion. The Church of England employs a general form of C. and absolution in its morning and evening services, but retains private C. in the rubric for visitation of the sick. The Scotch churches do not recognize it at all.—The *Sigillum Confessionis* ('seal of confession'), both in the Roman Catholic and in the German Protestant Church, means the obligation of a confessor or priest not to divulge the secrets of the confessional. This custom of secrecy is traceable in the 4th and 5th centuries, but was made binding by Innocent III. in the 12th, and its violation by a priest makes him subject to the severest penalties that can be inflicted by the church. See CONFIDENTIALITY.

CONFESSION, in Law, is the admission of his guilt by an accused person. In England, proof of C. is sufficient to warrant a jury in convicting without more evidence; in Scotland, some corroborating circumstance must be proved. In both countries, however, the C., to be admissible, must have been made without any promise or threat held out to induce it. As to C. on trial, see PLEA OF GUILTY; and as to C. before the examining magistrate, see DECLARATION.

CONFESSION AND AVOIDANCE, in pleading at common law, in England, is the admission of the allegation of the opposite party, but with the addition of some circumstance which deprives it of legal effect, as, for instance, the admitting that an assault was committed as alleged, but with the assertion that it was committed in self-defence. See PLEADING.

CONFESSION, JUDGMENT BY, in England, is judgment against a defendant on his confessing both the facts and law alleged by the plaintiff. An agreement to confess judgment is a common mode of securing money, but is subject to strict technical regulations.

CONFESSION OF FAITH. See CREEDS AND CONFESSIONS.

CONFE'SSIONAL, the seat or recess in which the priest sits to hear confession in a Roman Catholic church. It is probable that the confessionals in English churches, previous to the Reformation, like those still found in Catholic use, were slight wooden

erections, because they have so entirely disappeared that their form is a matter of dispute among ecclesiologists. It would seem that confessionals were not always used, as in an old painting on the walls of St. Mary's Chapel, Winchester, a woman is represented kneeling to a priest, who is seated in his stall. The confessional commonly has a door in front for the priest to enter by, and an opening on one or both sides, like a small window, with a grating of wire or zinc, for the penitents to speak through.

CO'NFIDENT PERSON. See INSOLVENCY.

CONFIDENTIALITY, in Law. The most common instance of C. is in the case of those communications between a client and his legal adviser, which neither of them can be called on to produce in a suit, and upon which no action of damages can be founded. The privilege extends to letters written by the lawyer to his client, relating to a suit which is either pending or contemplated; but to what extent it covers other business communications, is a question on which there are conflicting authorities in Scotland. In England, the rule has received a liberal interpretation (Dickson on *Evidence*, p. 930). The same privilege is extended to the communications of several parties, or of their counsel and agents engaged on the same side of a cause, and made with a view to their joint prosecution or defence. Where a party, placed in such circumstances, is examined as a witness, he will be entitled to decline answering questions as to such communings, and even bound to do so, unless the privilege is waived by the other party interested (Dickson, p. 924). The principle on which this privilege rests, as stated by Stephen (*Com.* iii. 466), is that these communications are made 'on such lawful occasions as tend to rebut the *primâ facie* inference of malice, which otherwise arises from a statement derogatory to private character.' It is on the same principle that a master is protected who, when called upon for the character of a servant, charges him with a theft. In such cases, in order to support an action, there must be proof of malice beyond the uttering of the words. With a view to preserving the freedom of domestic intercourse, and from a belief that the testimony of near relatives in favor of each other was worthless, and that the only effect of examining them against each other was to tempt them to commit perjury, it was formerly the habit to reject them as witnesses. The practice in England, for a long time, however, has been to admit, and even to exact their evidence, making allowance, in appreciating its value, for the circumstances in which they are placed. The same principle has latterly been followed in Scotland; and the only exceptions which have been retained by the law of Evidence Acts, 15 and 16 Vict. c. 27, 16 and 17 Vict. c. 20, to the now almost universal admissibility of witnesses, are, that neither the parties themselves, nor their husbands or wives, shall be competent or compellable to give evidence in criminal proceedings in which they are accused, nor to answer questions in a civil suit tending to criminate themselves or each other, or to reveal matters which they have communicated to each other during marriage. The C. of such communications remains although the marriage has been dissolved by death or divorce (Dickson, p. 924).

From very early times, so early, it is said, as the 4th and 5th centuries, the 'Seal of Confession' (*sigillum confessionis*) was held to be inviolable, and no priest could be called upon, under any circumstances, to reveal facts which had been confided to him under its sanction. To this the case of treason was an exception, in England, even in Roman Catholic times (Best's *Law of Evidence*, p. 737). In Roman Catholic countries, the privileges of the confessional remain unaltered; and several of the Protestant churches of Germany having sanctioned the practice of confession, the privilege of secrecy has been extended to it, as a necessary consequence, by the civil power. In these states, however, in addition to imposing far lighter penalties upon those clergymen who shall break the seal, the duty of doing so is enforced in all cases in which the confession has reference to a future crime. In England, no special privilege whatever is extended to the Roman Catholic confessional; and the question as to how far a confession made to a clergyman for the purpose of obtaining spiritual comfort and consolation is protected, was long considered doubtful. The rule has, however, been settled for some time that no clergymen of any religious persuasion are entitled to the same privilege as legal advisers; though it has often been advocated as advisable to extend the rule to clergymen, including Roman Catholic priests. In Scotland, however, the point has never been directly or solemnly decided, evidence of the kind in question, when not indispensable for the ends of justice, being generally either withheld or withdrawn (Dickson, ii. p. 938). By a statute of the state of New York, United States ministers of the Gospel and priests of every denomination, are forbidden to disclose confessions made to them in their professional character; and a similar statute exists in Missouri. It has been decided in England, that communications to a medical man, even in the strictest professional confidence, are not protected from disclosure (Best, 734); and the same is the case in Scotland (Dickson, ii. p. 940); but a contrary rule has been adopted in several of the states of America (1 Greenl., § 248, note).

CONFIRMA'TION, in English Law, is where the party having right to land, grants to the party having possession that which is in him. Confirmation, in Scots law, is the form in which a title to administer is conferred on the executor of a person deceased. It must be gone through, or 'expede,' before the commissary of the district.

CONFIRMATION, a Latin word which signifies *strengthening*. In the ancient church, the rite so named was administered immediately after baptism, if the bishop happened to be present at the solemnity, which is still the custom in the Greek and African Churches. In the Roman Catholic Church, for the last 300 or 400 years, the bishops have interposed a delay of seven years after infant baptism; in the Lutheran Church, the rite is usually delayed for from 13 to 16 years; and in the English Church, from 14 to 18 years. There is, however, in the latter church no limit to the period. C. may be administered at an earlier period, if a family is about to emigrate; and persons are confirmed up to 60 or 70, if they choose. The ceremony consists in the imposition of hands by the bishop, accompanied by an invocation of the Holy Ghost as the comforter and strengthener. But both in the Lutheran and English Churches, the ceremony is made the occasion of requiring from those who have been baptized in infancy, a renewal in their own persons of the baptismal vow made for them by their godfathers and godmothers, who are thereby released from their responsibility. None can partake of the Lord's Supper, in these churches, unless they have been confirmed. In the Roman Catholic Church, C. is held to be one of the seven sacraments, and in its administration, unction and the sign of the cross are used; and instead of the imposition of hands, the person confirmed receives a little blow on the cheek, to remind him that he must in future suffer affronts for the name of Christ. In the English Thirty-nine Articles, C. is declared not to be one of the sacraments, and the above ceremonies have been discontinued since the Reformation.

CONFISCA'TION, forfeiture of lands or goods to the crown, as part of the punishment for certain crimes. See ESCHEAT.

CO'NFLICT OF LAWS. On the breaking up of the Roman Empire into separate kingdoms, as many systems of jurisprudence, more or less dissimilar, arose, and were administered side by side. But owing to commercial intercourse and intermarriage, many persons held property in more countries than one; many possessed two nationalities by birth, and more than two—if nationality could be acquired by residence and interest in a foreign state. In such circumstances, it often became an object of the utmost importance to individuals to ascertain, and of greatest difficulty to lawyers to determine, whether the laws of one state or of another were to govern questions of sale, succession, status, and the like. As no state could vindicate its jurisdiction beyond its own boundaries, without being guilty of an act of aggression, it became absolutely indispensable that certain general rules should be fixed upon in order to prevent the danger of national hostilities on trifling occasions.

The elaboration of these rules constituted a new branch of jurisprudence, to which the title of the C. of L. has been given, but which would be more accurately described as the rules for the solution of that conflict. From the partially independent character which belongs to the different states which constitute the American Union, the labors of the continental jurists in international jurisprudence have been carefully adapted to the requirements of that country; and it is consequently to America and to continental Europe, rather than to the writers of our own country, that we must look for works of importance on this subject. By American writers, the term C. of L. has usually been confined to that branch of the law of nations which treats of the rights and duties of private individuals, and it is consequently synonymous with what elsewhere is called private international law, under which head its various rules will be enumerated in this work. See INTERNATIONAL LAW, PRIVATE; COMITY OF NATIONS. See Story's *Conflict of Laws*.

CONFO'RMABLE STRA'TA are beds which lie parallel to each other.

CONFRONTÉ, in Heraldry, means facing or fronting one another. It is the same as combatant.

CONFU'CIUS, a celebrated Chinese sage, was born 19th June 551 B.C., at Shang-ping, near the town of Tséuse, in the petty kingdom of Lu. His own name was Kong, but his disciples called him Kong-fu-tse (i. e., 'Kong, the Master or Teacher'), which the Jesuit missionaries Latinized into Confucius. His mother used to call him Kiéu ('little hillock'), because he had an unusual elevation on the top of his forehead, with which he is often represented. Various prodigies, as in other instances, were, we are told, the forerunners of his birth. An illustrious pedigree has also been invented for him by his fond disciples, who derive his origin from Hoang-ti, a mythological monarch of China who flourished more

than 2000 years B.C. His father, Shuh-leang-ho, died when C. was only three years of age, but he was very carefully brought up by his mother, Yan-she, and from his earliest years, displayed an extraordinary love of learning and veneration for the ancient laws of his country. The prudence, rectitude, and philosophic gravity of his conduct while a boy, are also highly extolled by Chinese writers. At the age of 17, he was made an inspector of the corn-marts, and distinguished himself by his industry and energy in repressing fraud, and introducing order and integrity into the whole business. When only 19, C. married, but divorced his wife four years after marriage, that he might have more time for study and the performance of his public duties. C. was next appointed inspector-general of pastures and flocks, and the result of his judicious measures, we are told, was a general improvement in the cultivation of the country and the condition of the people.

The death of his mother, which happened in his 23d year, interrupted for a time his administrative functions, and gave occasion to the first solemn and important act of C. as a moral reformer. According to the ancient, but then almost forgotten laws of China, children were obliged to resign all public employments on the death of either of their parents; and C., desirous of renewing the observance in his native land of all the practices of venerable antiquity, did not fail to conform to this long neglected enactment. The solemnity and splendor of the burial ceremony with which he honored the remains of his mother (another old custom which had fallen into disuse), struck his fellow-citizens with astonishment, and they determined, for the future, to bury their dead with the ancient honors. Their example was followed by the neighboring states, and the whole nation, except the poorest class, has continued the practice to the present day. C. now came to be looked upon as an authority in regard to the past, and ventured to speak as such. He inculcated the necessity of stated acts of homage and respect towards the dead, either at the grave, or in a part of the dwelling-house consecrated for the purpose. Hence, 'the hall of ancestors,' and anniversary feasts of the dead, which now distinguish China as a nation. C. did not end here. He shut himself up in his house to pass in solitude the three years of mourning for his mother, the whole of which time he dedicated to philosophical study. We are told that he reflected deeply on the eternal laws of morality, traced them to their source, imbued his mind with a sense of the duties which they impose indiscriminately on all men, and determined to make them the immutable rules of all his actions. Henceforth, his career is only an illustration of his ethical system. He commenced to instruct his countrymen in the precepts of morality, exhibiting in his own person all the virtues he inculcated on others. Gradually his disciples increased, as the practical character of his philosophy became more apparent. After his 'years of mourning' and meditation were over, C. traveled through various states, in some of which he was employed as a public reformer. On his return to Lu, his reputation was very great, not less than 500 mandarins being among his followers. In fact, it is to be observed, that generally C.'s disciples were not the young and enthusiastic, but men of middle age, sober, grave, respectable, and occupying important public situations. This fact throws light both on the character and design of his philosophy. It was *ethical*, not *religious*, and aimed exclusively at fitting men for conducting themselves honorably and prudently in this life. C. now divided his scholars into four classes: to the first, he taught morals; to the second, rhetoric; to the third, politics; and to the fourth, the perfection of their style in written compositions. While residing at Lu, C. worked industriously in the revision and abridgment of those works which constituted the principal monuments of that ancient literature about which he was always speaking in the language of unbounded reverence.

An unworthy change of magistrates, however, in the kingdom of Lu induced C. to recommence his travels. He first proceeded to Chen, where he was not much appreciated; and afterwards to Tze, where he became one of the king's ministers, but was dismissed after a short time through the intrigues of cunning courtiers. On his return to Lu, he was appointed 'governor of the people.' For a time, his inflexible virtue awed them into morality, and the delighted monarch conferred the highest dignities on the philosopher; but the arrival of a bevy of beautiful syrens from a neighboring state, which hated the increasing purity of Lu, suddenly overturned the edifice of morality which C. was constructing; and in despair, he again went abroad in search of less vacillating disciples. His later wanderings were very unpropitious; state after state refused to be improved. He was in some instances persecuted, once he was imprisoned and nearly starved; and finally, seeing no hope of securing the favorable attention of the mass of his countrymen while alive, he returned in extreme poverty to his native state, and spent his last years in the composition of literary works by which posterity at least might be instructed. He died 479 B.C., in the 70th year of his age. Immediately after his death, and notwithstanding the general demoralization of his contemporaries, C. began to be venerated, and succeeding ages adorned his name with golden epithets. His family, which has continued to the present day, through more than 70 generations, in the very place where their ancestor lived, is distinguished by various honors and privileges, being the only example of hereditary aristocracy in China, while in every city down to those of the third order there is a temple to his honor. The 18th day of the second moon is kept sacred by the Chinese as the anniversary of his death.

The system of C. is rightly considered, the most faithful expression of the Chinese mind, although it is neither the oldest of the extant Chinese religions, nor that which can claim the greatest number of adherents. We have termed it a *religion*, but it ought rather to be regarded as a system of social and political life built upon a slight foundation of philosophy. It contains no trace of a personal God. There are, indeed, a number of allusions to a certain heavenly agency or power, *Shang-te*, whose outward emblem is *Tien*, or the visible firmament; but this Shang-te in the opinion of the most enlightened Chinese scholars, is nothing more than a verbal personification of 'the ever-present Law and Order and Intelligence, which seem to breathe amid the wonderful activities of physical creation, in the measured circuit of the seasons, in the alternation of light and darkness, in the ebb and flow of tides, and in the harmonious and majestic revolutions of the heavenly bodies.' Sometimes, indeed, C. uses language that might seem to imply more than this. In one of the sacred books, Shang-te is depicted as possessing a high measure of intelligence, and exercising some degree of moral government; he punishes the evil, rewards the good, and is honored with sacrifice.

Immediately after, however, we are informed that his retinue consists of the six Tsong, the mountains, the rivers, and the spirits generally. Elsewhere, the people are enjoined 'to contribute with all their power to the worship of Shang-te, of celebrated mountains, of great rivers, and of the "shin" (spirits) of the four quarters.' Hence we are forced to the conclusion, that C. no more believed Shang-te to be a personal being, than he believed the mountains to be such; and that in describing this Power as possessed of intelligence, and as exercising a moral government, he simply spoke in a pictorial and symbolic way of the laws that govern all things. Perhaps, too, a dim consciousness of a mysterious inexplicable *life* pervading the phenomena and operating through the laws of nature—a feeling probably absent from no human soul—influenced C. to use words which his understanding would not have interpreted in a very literal manner. His highest conception of God, therefore, only reminds one of the *anima mundi* of the classical philosophy; and even this conception is not always present. More than once, his language indicates doubt as to the existence of this great abstraction, and he occasionally 'reprimanded his disciples for prying into matters unconnected with their duties and lying far beyond their depth.' In fact, from metaphysics and theology he equally shrunk. The idea of a creation out of nothing by an infinite and eternal Person, to the end that the glory of his perfections might be seen and felt through the magnificence of material symbols by those intelligences whom in his beneficent condescension he had deigned to create, is utterly unknown to Confucius. He looked on the universe rather as a stupendous self-sustaining mechanism. He thought that all things existed from eternity, and were subject to a flux and reflux, in obedience to initial laws impressed upon them, how and why, we know not, by some stern necessity. Thus, chaining to the earth, as it were, 'those thoughts that wander through eternity;' crushing, in fact, every spiritual tendency of human nature, by repudiating all speculation, and well-nigh all philosophic investigation of every kind, C. strove to direct the attention of men to the duties of social and political life. 'I teach you nothing,' he says, 'but what you might learn yourselves—viz., the observance of the three fundamental laws of relation between sovereign and subject, father and child, husband and wife; and the five capital virtues—universal charity, impartial justice, conformity to ceremonies and established usages, rectitude of heart and mind, and pure sincerity.' This, in fact, contains the whole doctrine of C.; and it was unquestionably well suited to the prosaic, practical, and conservative mind of the Chinese.

It was by the strict and faithful performance of appointed duties, and by the cultivation of proper feelings and sentiments, that C. believed wisdom or knowledge could alone be obtained. He seems to have entertained no doubt that the great virtues of charity, justice, and sincerity might be developed without the help of any spiritual or religious faith, by a species of mechanical discipline. They were natural to the mind, he thought, just as their opposites were unnatural. Here, again, we find a striking example of that easily satisfied unphilosophic *materialism* which characterized C., and has since leavened the Chinese nation so thoroughly. He virtually says: 'Just as I am forced to accept the phenomena of the universe as *facts*, though I can give no explanation of their origin, so am I forced to accept the phenomena of the human mind as *facts*, though I can give no explanation of *their* origin.' C. finds evil and good, wisdom and folly, in the

hearts of men. He cannot help making this distinction; some things are bad, others good; such is the oracular utterance of his conscience, which he terms 'the light of intelligence.' He does not, however, advance a step further, and he makes this moral conviction the basis of a religion. His 'good' has no connection with any God. It exists; we are forced to recognize it as such; that is all we can know. Cultivate it. Those great laws of nature about which we know nothing except that they are realities, are on its side. Do not foster what you know to be mean and unworthy, for 'he who offends against Heaven has no one to whom he can pray.' 'Imperial Heaven will only assist virtue.' From this stand-point, C. taught a simple and comprehensive rule of life, both private and public. First, let every man govern himself according to the sacred maxims; then his family according to the same; and finally, let him render to the emperor, who is the father of his people, such filial obedience as he demands of his own children, and worship him with the same veneration as he does his own ancestors; for thus will domestic peace, social order, and the safety of the commonwealth be preserved. To further this end (and in accordance with his belief that by instruction in the sacred precepts everything desirable could be accomplished), C. inculcated the necessity of universal education, and, in consequence, schools are diffused throughout the length and breadth of the empire, penetrating even to the remotest villages, where the maxims of the philosopher are taught, whose influence is thus perpetuated from generation to generation.

Confucianism appeals to 'practical' men. It lauds the present world; rather doubts, than otherwise, the existence of a future one; and calls upon all to cultivate such virtues as are seemly in citizens—industry, modesty, sobriety, gravity, decorum, and thoughtfulness. It also counsels men to take part in whatever religious services have been established from of old. 'There may be some meaning in them, and they may affect your welfare in a way you do not know of.'

As for the genii and spirits, sacrifice to them: I have nothing to tell regarding them, whether they exist or not; but their worship is part of an august and awful ceremonial, which a wise man will not neglect or despise.' Confucianism, in consequence, almost immediately after the death of its author, became the religion of the state, to which it has proved an admirable ally; its theory of government being nothing less than a paternal despotism. The entire literary class in China are also followers of C., and, in fact, for many ages the literature of China has consisted exclusively of commentaries on the five canonical books which C. professed to merely abridge, and of four others, which were composed partly by himself and partly by his disciples, and which, together with the former, constitute the nine Chinese classics.

The five canonical books are the *Yih-king*—originally a cosmological essay, now, curiously enough, regarded as a treatise on ethics; the *Shu-king*—a history of the deliberations between the emperors Yaou and Shun, and other personages called by C. the *Ancient Kings*, and for whose maxims and actions he had the highest veneration; the *Shi-king*—a book of sacred songs, consisting of 311 poems, the best of which every well-educated Chinaman gets by heart; the *Le-king*—the Book of Rites, the foundation of Chinese manners, prescribing, as it does, the ceremonies to be observed in all the relationships of life, and the great cause of the unchangeableness and artificiality of Chinese habits; and the *Chun-tsien*—a history by C. of his own times, and those which immediately preceded him. The first of the 'Four Books' is the *Ta-hëo*, or 'Great Study,' a political work, in which every kind of government, from the domestic to the imperial, is shown to be essentially the same—viz., parental; the second is *Chung-yung*, or 'the Invariable in the Mean,' a book devoted to teaching men what is 'the due medium,' or the golden mean, to observe in their conduct; the third is the *Tung-yu*, or 'Philosophical Dialogues,' containing the recorded conversations of C., and the best book for obtaining a correct knowledge of his character; and the fourth is the *Hi-tse*, written by Meng-tse, or Mencius, who died 317 B.C., and who was by far the greatest of the early Confucians. The main object of this work is to inculcate philanthropic government.

It is proper to observe, in conclusion, that in the course of centuries the defects of the system of C. made themselves felt even to the unspiritual Chinese mind; and the necessity of 'speaking out far more plainly, not on matters of finance, economy, and etiquette, but on the nature of the world and its inhabitants, and the true relation of the seen and temporal to the absolute and the all-embracing, was recognized.

The philosopher who guided this great movement to a prosperous close was Tehu-he (died 1200 A.D.), is termed by European scholars the Chinese Aristotle, and regarded by all the governing class in China as 'the prince of science.' His innumerable works are laboriously studied by the higher literary class, and are considered the standard of metaphysical or religious orthodoxy, but the mass of ordinary Confucians never pass beyond the ceremonial ethics of their master.

See CHINESE EMPIRE; Legge's *Life and Teachings of C.* (1867), and *Religions of China* (1880); Douglas's *Confucianism and Taouism* (1880).

CONGÉ D'ÉLIRE (Norman-French), the name given in England to the king's warrant or permission to a dean and chapter to proceed to the election of a bishop to a vacant see. Since the passing of the statute 25 Henry VIII. c. 20, the C. d'É. has always been accompanied by a letter-missive from the king, mentioning the person to be elected by name, so that in reality it is a nomination by the crown. If the dean and chapter delay the election beyond twelve days, the nomination is effected by letters-patent from the crown; if they delay beyond twenty days, or elect another than the person named, they incur the penalties of a *præmunire*, i. e., loss of civil rights, forfeiture of their goods, and imprisonment during the royal pleasure.—Stephen's *Commentaries*, vol. iii. p. 8.

CO'NGER, or CO'NGER-EEL (*Conger*), a genus of marine fishes of the eel family (*Murænidæ*), having the tail more elongated and pointed than the fresh-water eels, the dorsal fin commencing much nearer the head, and the teeth of the upper jaw, although slender, placed so close together as to form a cutting edge. The species are not numerous. One only (*C. vulgaris*) is a native of the British seas. It is common on all parts of the coast, and is found both among rocks and on banks. Its form much resembles

Conger-Eel.

that of a fresh-water eel; its color is brown above, passing into dull white beneath; the fins whitish, edged with black; and the lateral line almost white. It attains a large size, often five or six feet long; sometimes ten feet, and eighteen inches in circumference, weighing more than one hundred pounds. It possesses great strength, and is a formidable antagonist when hauled into a boat by the fisherman's line, or found among the rocks, where it is sometimes left by the retiring tide. Great numbers are, however, taken in order to be used as food, although not highly esteemed, and chiefly consumed by the poorer classes. The principal C. fishery of Britain is on the Cornish Coast, and it is not uncommon for a boat with three men to bring on shore from a ton to two tons as the produce of a night's fishing, the C. being caught most readily during the night; but there are banks off the French coast still more productive. Sand-launces, pilchards, &c., are used for bait. The C. is extremely voracious.

CONGE'STION may be defined to be 'excess of blood in the vessels of a part, with diminished motion of that blood.' The chief causes of congestion may be classed under the two heads of (1) congestion from venous obstruction, and (2) congestion from want of tone in the vessels.

1. *Congestion from venous obstruction* is easily illustrated by tying up the arm, as is done before opening a vein, when the veins are compressed more than the arteries. If the ligature is kept on for a sufficient time, the veins swell, the fingers become red, and then livid, and the whole limb is swollen. Cold applied to the surface of the body acts similarly on it, and contracts the veins more rapidly than the arteries, which lie deeper; and the purple color of the hands and face after exposure to cold shows the congested state of the capillaries. 'Congestions,' says Dr. C. J. B. Williams, 'are caused in external organs by an obstruction of the veins leading from them. Thus, congestion of the brain may be produced by a tight cravat or by a tumor pressing on the jugular veins, efforts of straining, coughing, holding the breath, and asthmatic paroxysms which impede the flow of blood through the lungs cause congestion in various parts. Tubercles in the lungs cause congestion of that organ. Obstruction to the transit of blood through the liver causes congestion in the abdomen, hemorrhoids, &c.'—*Principles of Medicine*, 2d ed., p. 180.

2. *Congestion from want of tone in the vessels* includes a numerous class of cases. In atony of the vessels generally, as in extreme debility, certain fevers, &c., there is general congestion of the parenchymatous organs—the lungs, liver, &c.—and the blood gravitates to the lowest parts, giving rise to what is termed *hypostatic* congestion of the posterior parts of the lungs, the skin of the back, &c. In other cases, the weakness is local, as when the feet swell after long standing, in consequence of over-distension of

the veins. Similarly, a continued stooping posture may occasion headache, giddiness, and the other symptoms of congestion of the brain. Congestive affections of this kind are often mistaken for inflammation, and instead of being treated by tonics, are treated by depletion, which, although affording temporary relief, increases the evil.

Another cause of congestion is over-excitement of the vessels, and this often occurs at an early stage of inflammation, or as a result of that process.

We must pass over the symptoms and effects of congestion, because they vary very much according to the organ affected, and shall conclude with a few words on the general remedies for congestion. First in order, we must notice such as remove the cause, as the loosening of a ligature, or the removal of a tumor compressing veins, elevation of the head in affected brain, and the recumbent position in congestion of the hæmorrhoidal or uterine vessels.

Pressure, by supporting the weak vessels, and friction, by increasing the onward movement of the blood in the veins, are often of great use. Astringents, such as solutions of alums, sulphate of zinc, tannin, oak-bark, &c., may be applied with advantage locally to certain parts, as the eye, throat, rectum, &c.; and stimulants may be similarly used, as a capsicum gargle to a relaxed sore throat. Medicines of these classes may also be given internally. Thus, the principal action of bark, quinine, and arsenic in the cure of ague is supposed to lie in their reducing the great visceral congestion that is always present. A glass of strong hot brandy and water will often remove a congestive headache, and a stimulant draught will often relieve the pulmonary congestion which follows a fit of asthma. Various remedies are supposed to have a special power of removing the congestion of certain organs; thus mercurials are recommended for congestion of the liver; digitalis and cantharides for congestion of the kidneys; and squills, benzoin, and the balsams for bronchial congestion.—For further details, the reader is referred to the excellent work of Dr. Williams, from which we have quoted.

CO'NGLETON, a market-town in Cheshire, picturesquely situated in a deep valley, on the Dane, 33 m. E. of Chester. It is a mile long, with many houses built of wood and plaster, and has silk spinning and throwing, with manufactures of silk ribbons, &c. There are coal-mines near. Pop. (1871) 11,344.

CONGL'OMERATE, or PLUMPU'DDING-STONE, a rock consisting of round, water-worn pebbles, compacted together into stone. These pebbles consist of portions of hard rock, frequently of quartz. They can sometimes be traced to their parent rock. Their rubbing and polishing must have been a work of considerable time, but their deposition in the beds in which they occur has been performed speedily, the materials having been brought together by a strong current. They are united together by a silicious, calcareous, or ferruginous cement, sometimes so loosely, that they are easily separated by a slight blow from a hammer; at other times, the matrix is as hard as the pebbles which it contains, and clasps them so firmly, that the rock breaks, as if it were a homogeneous mass. The pebbles vary in size, occasionally being several feet in diameter; but they are generally about the size of, or smaller than a walnut.

CO'NGO, in the widest sense of the name, includes all the countries on the west coast of Africa lying between the equator and lat. 18° S.; but more definitely the name is given to the territory lying between the rivers Dando and Congo, or Zaire.—The great central African river, the Congo, which Stanley has proposed to call the *Livingstone*, has of late usurped much of the interest formerly reserved for the Nile and its exploration. At its mouth on the Atlantic seaboard the Congo is an immense body of water, near ten miles wide and over 160 fathoms in depth. Its upper course remained unknown till Mr. Stanley identified the Congo with the Lualaba, and so connected it immediately with the great system of lakes south and west of Lake Tanganyika, and less directly with Tanganyika (q. v.) itself.

The former chain of lakes, examined by Livingstone in the hope that here he might finally fix the sources of the Nile, were long suspected to drain towards the Congo—a suspicion confirmed by Cameron. But Mr. Stanley and his followers, striking the Lualaba (known higher up as Chambezi and Luapula) at Nyangwe in Nov. 1876, followed its course persistently in the face of enormous difficulties, fighting no less than thirty-two battles; till in August 1877 he found it, after 'changing its name scores of times,' reach the Atlantic as Congo, Kwango, and Zaire. The Lualaba-Congo, interrupted to the north of Nyangwe by cataracts and rapids, flows northward from the lake region to about 2° N. of the equator (where it is already 'a broad stream, from two to ten miles wide, studded with islands'); then its course changes to N.W., W., and finally to S.W. 'As the river runs through the great basin which lies between E. long. 26° and E. long. 17°, it has an uninterrupted course of 1400 miles, with magnificent affluents, especially on the southern side. Thence, cleaving the broad belt of mountains between the great basin and the Atlantic Ocean, it descends by about thirty falls and furious rapids to the great river between the falls of Yellala and the Atlantic.'—By means of its great and numerous tributaries (such as the Alima, Kwango, Kasai, Ruru), it is supposd to drain an area of 860,000 square miles. Off Vivi, 115 miles from its mouth, vessels of 5000 tons can anchor; at its mouth the river is 6 miles wide, and in mid-channel is 150 fathoms deep. There is a good deal of trade on the Congo, and numerous European trading-stations exist. The gross exports and imports are said to be worth £2,000,000, the imports of English manufactures being stated at £600,000. After 1878 Mr. Stanley, as representative of the International African Association, under the presidency of the king of the Belgians, proceeded to open up the Congo to commerce and civilization; and by 1883 had established seven stations on the river, one being 700 miles above the mouth. He had made a road 100 miles long, past the 66 cataracts at Yellala Falls; and launched four steamers on the Upper Congo. From the great lake-like expanse of Stanley Pool (in 15° 47′ W. long.), these vessels can steam 800 miles up into the heart of Africa. In 1882, M. de Brazza persuaded certain native chiefs on the Congo about Stanley Pool to cede their territory to France; and the French government sanctioning this proceeding, sent out a military expedition in 1883 to support the scheme. M. de Brazza proposed making a road from Ponte Negra, a long way above the mouth of the river, to Brazzaville near Stanley Pool.

Portugal has long claimed sovereignty on both sides of the mouth of the Congo, and has of late insisted on its claim. The complication of interests thus brought about provoked a good deal of diplomatic correspondence. The territory recognizedly Portuguese on the west coast of Africa extends from Cape Frio to Ambriz northwards, and contains the provinces of Mossamedes, Benguela, and Angola. The Portuguese claim to sovereignty along the coast from Ambriz to Kakongo (in 5° 12′ S.), north of the Congo, has been much disputed between Portugal and Britain since 1845; in 1883, Britain was disposed to make some concession.—When the whole country from the Congo River to Loanda was subject to the king of Congo, the Jesuits worked far and wide from their base in his capital, San Salvador, where they had a cathedral and monasteries.

CONGOO'N, or KONGUN, a town of Persia, on the Persian Gulf, 130 miles south of Shiraz. It has an excellent and safe roadstead; and both wood and water, which are generally scarce in the gulf, may be obtained here. Pop. 6000.

CONGREGA'TION (Lat. *con*, together; *grex*, a flock), an assembly, generally a religious assembly; in its most ordinary use, an assembly of Christians met in one place for worship. See CHURCH.—In the Roman Catholic Church, it often designates a sort of board of cardinals, prelates, and divines, to which is intrusted the management of some important branch of the affairs of the church. Thus the *C. of the index* examines books and decides on their fitness for general perusal. See INDEX. The *C. de Propaganda Fide* consults as to the advancement of the Roman Catholic religion throughout the world. See PROPAGANDA. The *C. of Relics* inquires into the genuineness of supposed relics. The *C. of the Holy Office* takes cognizance of heresies, &c. See INQUISITION. The *C. of rites* regulates the festivals and offices of new saints. There are numerous other congregations.

CONGREGA'TIONALISTS. See INDEPENDENTS.

CO'NGRESS, an assembly either of sovereign princes, or of the delegated representatives of sovereign states, for the purpose of considering matters of international interest. Even in America, though the term has now a different meaning (See UNITED STATES), it had a similar origin, the first C. being that of the delegates from the various British colonies, who met on the 7th October 1765, for the purpose of considering their grievances. Previous to signing a treaty of peace, a meeting of plenipotentiaries usually takes place, to which the name of a C. is sometimes applied, though it seems more properly to be reserved for those more important meetings at which extensive schemes of future policy are determined on, and the balance of power amongst the various European states readjusted.

To this class belonged the famous C. of Vienna in 1815; the C. of Carlsbad in 1819, for regulating the affairs of Germany; the Paris C. at the termination of the Russian war of 1854–56; the memorable C. at Berlin after the Russo-Turkish war of 1877–78; and many others. There is scarcely any difference between a C. and a diplomatic conference.

CONGREVE, WILLIAM, the second son of Richard Congreve, Esq., of Congreve and Stretton, was born about 1672, at Bardsey, Yorkshire. Educated at Kilkenny, and at Trinity College, Dublin, he in 1688 returned to England, and was entered at the Middle Temple, but he does not seem to have taken kindly to law. His first publication was a novel, entitled *Incognita, or Love and Duty Reconciled*, a performance which Dr. Johnson said he would rather praise than read, but which has been neither read nor

praised by succeeding critics. His first play, *The Old Bachelor*, was produced at Drury Lane when C. was in his 19th year, and its success was remarkable. Next year he came out with *The Double Dealer*, which was a comparative failure; but his comedy *Love for Love*, published in 1695, was a great success, and brought to its author money and fame. *The Mourning Bride*, a blank-verse tragedy, written after the manner of the old passionate masters, came out in 1697. Its success was enormous, far exceeding that of his comedies, but it has long since fallen from its high estate. Two years after, he produced his comedy, entitled *The Way of the World*, which failed completely, and disgusted him with the theater; although, according to some critics (as Swinburne), it is not merely the crowning work of C.'s genius, but 'the unequalled and unapproached masterpiece of English comedy,' equal or nearly equal to Molière's best. In other respects C. was a fortunate man. He held various offices, which together yielded him an income of £1200. C. affected to despise his theatrical triumphs, and cultivated the modish airs of a fine gentleman, an eccentricity which laid him open to rebuke when he was visited by Voltaire. In his later days, he was afflicted by gout and blindness. He died in London on the 19th of January 1729, and was buried in Westminster Abbey, nobles supporting the pall.

As a writer of comedies, C. takes a high place; he has been called 'the greatest English master of pure comedy.' His plays abound in brilliantly witty dialogue and lively incident, and the style is fine and clear-cut. But his plots are intricate; his dialogue is defiled by all the grossness of his age; and he has but few of those touches of nature that make the whole world kin.

CONGREVE ROCKET. See ROCKET.

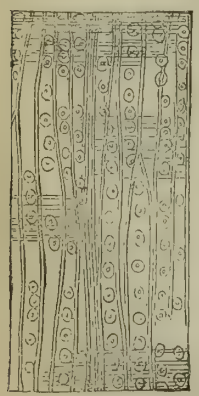
CO'NGRUOUS. In Geometry, the term congruity is applied to lines and figures which exactly correspond when laid over one another. See COINCIDENCE.

In Arithmetic, two numbers are said to be C., with respect to a third, when their difference is exactly divisible by it. Thus, 12 and 7 are C. with respect to 5, as $\frac{12-7}{5}=1$, and so are 27 and 12, as $\frac{27-12}{5}=3$. The numbers considered must be whole numbers. When two numbers are C. to a third, either is called a *residual* of the other with respect to the third.

CO'NI, or CUNE'O, capital of an Italian province, stands in a fruitful district, 48 miles southwest of Turin. Pop. (1881) 12,413. Its chief manufactures are silk and woollen cloth.

CO'NIC SECTIONS. See CONE, CIRCLE, ELLIPSE, PARABOLA, and HYPERBOLA.

CONI'FERÆ (Lat. cone-bearers), an important natural order of exogenous plants, containing the pines, firs, juniper, yew, &c.; agreeing with the other exogenous orders generally in the structure of the stem and in the mode of vegetation, but differing remarkably from most of them in having naked ovules—i. e., ovules which are not enclosed in an ovary, but are fertilized by the direct application of the pollen to the *foramen*, without the intervention of style or stigma—and upon this account separated from them, along with *Cycadaceæ* (q. v.), by Lindley, Endlicher, and others, as a distinct class, under the name *Gymnogens* or *Gymnospermæ*. The flowers are unisexual, the male and female sometimes on the same, sometimes on separate plants; the male flowers have either one stamen or one bundle of stamens, the anthers often crested; the female flowers are in cones or solitary; the place of ovaries is supplied by the flat scales of the cones, the ovules are usually in pairs on the face of the scales, either inverted or erect. The fruit is either a cone—the scales of which sometimes become fleshy, and are incorporated into a berry-like fruit—or a solitary naked seed. The seed has a hard crustaceous integument; the embryo is in the midst of fleshy oily albumen; the cotyledons are either two, or numerous and whorled. The mode of branching is peculiar, numerous buds proceeding from the side of the main stem, so as generally to form whorls of branches, which are generally almost horizontal in their direction, whilst the central vertical shoot runs up often with admirable straightness, and some of the C. attain a height unrivalled among other forest-trees, of which the *Wellingtonia* (q. v.) of California affords the most noble example. The wood consists of *punctated* cells; the sides of the tubes or elongated cells which form it, and which are nearly of equal diameter, being marked by circular discs, which, when highly magnified, exhibit a small internal circle surrounded by a larger external one. The annexed cut represents a longitudinal section of part of the stem of a fir, highly magnified, showing the discs. This peculiarity of the wood of the C. is important, as enabling us to recognize it in a fossil state, and to refer many fossils, particularly of the coal formation, to this order. The leaves of the C. differ very widely from those of the closely allied order *Cycadaceæ*.



Most of the C. have very narrow veinless leaves, so that the Germans call them *Needle-woods* (Nadelhölzer) in contradistinction to the other European forest-trees, which they call *Leaf-woods* (Laubhölzer). By far the greater number of them belong to the northern hemisphere. The C. are very long lived; some of them are supposed to be capable of attaining an age of 2000 or 3000 years. When the stem of a coniferous-tree is cut across, it does not sprout again from the root. The C., besides the great usefulness of the timber of many, are remarkably productive of Turpentines (q. v.) and Resins (q. v.). Astringent substances are also found in their bark, and fixed oil in their seeds. The seeds of some species of *Pine* and *Araucaria* are used as food.

The C. are divided into—1. *Abietineæ*, having inverted ovules and woody cones, as the pines, firs, larch, cedar, araucaria, &c. 2. *Cupressineæ*, with erect ovules, and either woody or fleshy cones, as the juniper, arbor-vitæ, cypress, &c. 3. *Taxineæ*, with solitary seeds, as the yew, gingko, &c. 4. *Gnetaceæ*, plants of comparatively humble growth, with jointed stems, often regarded as forming a distinct order. See SEA-GRAPE. Lindley and others also make the *Taxineæ* a distinct order. See YEW.

CONIRO'STRES, a tribe or section of the order of birds called *Insessores*, and characterized by a strong conical bill, without notches. The feet are, in general, adapted for walking on the ground, as well as for perching. The bill varies much in its thickness, and those species in which it is thickest, in general feed most exclusively on seeds. The number of birds belonging to this tribe is very great; and the families differ much in many respects. Among them are finches, sparrows, buntings, linnets, larks, plantain-eaters, colies, crows, birds-of-paradise, starlings, and even hornbills.

CO'NIUM. See HEMLOCK.

CO'NJUGAL RIGHTS. See MARRIAGE.

CONJUGA'TION (Lat. a connecting or yoking together), a term in Grammar applied to a connected view or statement of the changes of form that a verb (q. v.) undergoes in its various relations. See INFLECTION. The forms usually included under this term are those that serve to mark: 1. *Person*, or the distinction between the speaker, the spoken-to, and the spoken-about; as (I) *write*, (thou) *writest*, (he) *writes*. 2. *Number;* as (John) *writes*, (they) *write*. 3. *Tense*, or time; as (I) *write*, *wrote*, *have written*, *will write*. 4. *Mood*, or the manner in which the action is presented. When the action is simply asserted, it is the Indicative mood, as (he) *wrote;* when put as a supposition or condition, it is the Conditional mood, as, *if he wrote*. The Potential mood expresses the power of doing the action, as *he can write;* and the Imperative commands the doing of it—*write*. The Infinitive mood expresses the action without limitation of any kind—*to write;* as it makes no affirmation, it is, strictly speaking, not a verb, but a kind of abstract noun.

The two participles, the one expressing the action as in progress (*writing*), the other as completed (*written*), may be classed with the infinitive, as not affirming anything. In opposition to the infinitive and the participles, the other parts of the verb are called Finite. 5. *Voice*, or the distinction between Active and Passive (see VERB); as (he) *wrote* (the letter), (the letter) *was written* (by him).

In English, and in most modern European languages, the greater part of those distinctions are indicated by separate words; in Sanscrit, Greek, and Latin, they were nearly all indicated by prefixes and affixes, or other modifications of the word itself. The nature and origin of these modifications are considered under the head INFLECTION. All verbs do not take the same changes even in the same language. Although the affixes, e. g., may have originally been the same, yet they underwent, in course of time, different kinds of corruption or obliteration, depending upon the nature of the letters in the root verb. This leads to the verbs of a language being arranged in different classes or conjugations. In Latin, for instance, grammarians recognize four conjugations, and verbs that cannot be brought into any class are called Irregular Verbs.

In English, there are two distinct types of the inflection of verbs; thus, *I love*, becomes in the past tense, *I loved*, and in the passive voice, *I am loved;* while *he shakes* becomes *he shook*, and *he was shaken*. Verbs that, like *love*, take *d* (or *ed*—sometimes *t*) in their past tense and past participle, form one class or C.; and those resembling *shake* in their changes form another. The former class is by far the most numerous; but the latter includes the most commonly used and oldest verbs in the language. The mode of change seen in *shake*, *shook*, *shaken*, is believed to be more ancient than the other, and is therefore called the Old C.; and sometimes, the Strong C., the other being the New or Weak. The verbs belong-

ing to the old C. are all of Saxon origin, and are primitive or root verbs; while derivative verbs belong to the other class. Verbs of the weak C. are pretty uniform in taking *d* or *ed*, although after certain letters the *d* is of necessity pronounced as *t*, and is sometimes replaced by that letter in writing—*dipt*. With regard to verbs of the strong C., no rule can be given as to the change of vowel by which the past tense is formed. It was made at first, no doubt, according to felt laws of euphony; and even yet a certain 'method' may be discerned 'in their madness.' Thus:

1. Rise, rose; smite, smote; ride, rode; drive, drove, &c.
2. Cleave, clove; steal, stole; speak, spoke; tear, tore, &c.
3. Swim, swam or swum; sing, sang or sung; ring, rang or rung, &c.

For further information on the C. of English verbs, see Latham's *English Language*, or Chambers's *Information for the People* (ed. 1874), vol. ii., art. 'English Grammar.'

CONJUGATION OF CELLS, a union of two distinct cells of a plant, in order to reproduction. It has been observed only in the *Confervaceæ* and *Diatomaceæ*. Two cells come into contact, as by two filaments of a *Conferva* being brought together, and little projections are formed from each, the points of which are absorbed, and thus a tube is formed, through which one of the cells empties itself into the other. The latter then becomes a *mother-cell*, and produces spores.

CO'NJUNCT AND CO'NFIDENT. See INSOLVENCY.

CONJU'NCTION, in Astronomy, is one of the Aspects (q. v.) of the planets. Two heavenly bodies are in C. when they have the same longitude—that is, when the same perpendicular to the ecliptic passes through both. If they have, at the same time, the the same latitude—that is, if they are both equally far north or south of the ecliptic—they appear from the earth to be in the same spot of the heavens, and to cover one another. The sun and moon are in C. at the period of new moon. In the case of the inferior planets, Mercury and Venus, there is an inferior C. when the planet is between the earth and the sun, and a superior, when the sun is between the earth and the planet. In general, a heavenly body is in C. with the sun, when it is on the same side of the earth and in a line with him; and it is in *opposition* to the sun, when it is on the opposite side of the earth, the earth being in a line between it and the sun. Planets are invisible when in C. with the sun, except in rare cases when an inferior planet passes over the sun's disk, and may be seen as a speck on his surface. Conjunctions are either *geocentric* or *heliocentric*, according as they are actually witnessed from the earth, or as they would be witnessed if observed from the sun. In observing a C. from the earth's surface, it is usual to reduce the observation to what it would be if made from the earth's center; by this means, the exact times of C. are more accurately fixed, and the observations of one astronomer made available to every other, wherever he may be on the earth's surface. *Grand conjunctions* are those where several stars or planets are found together. The Chinese history records one in the reign of the Emperor Tehuen-hiu (2514—2436 B.C.), which astronomers calculate to have actually taken place.

CONJUNCTIONS, one of the 'parts of speech,' or classes, into which grammarians divide words. C. serve the purpose of connecting sentences, parts of sentences, and single words; as, 'Day ends, *and* night begins. William *and* John learn Latin. Charles *and* James carried the basket between them.' In the first sentence, *and* connects two separate affirmations into one compound sentence.

The same is true in the second—the separate affirmations being 'William learns Latin,' and 'John learns Latin.' In the third sentence, *and* connects only the two words, 'Charles' and 'James,' as it cannot be affirmed of either of them alone that he 'carried the basket.' In most cases, however, it can be shown that, logically at least, two affirmations are involved, and that the conjunction really connects the affirmations. It is not easy to distinguish C. from adverbs. In fact, C. were all originally other parts of speech; and the greater part of them are still really adverbs, and owe their conjunctive effect to their signification as adverbs. In *and* and *but*, whatever may have been the original meaning, we now attend only to the conjunctive effect; *or* is a shortened form of the pronominal adjective *other;* and *nor* is *or* with the negative prefixed. In such a sentence as, 'I believe that you are wrong,' *that* is the demonstrative pronoun, equivalent to—I believe *this*, viz., 'you are wrong.' This is clearly seen in the corresponding words in other languages: Ger. *dass*, Fr. *que*, Lat. *quod* (for the relatives were originally demonstrative pronouns). All the rest might be called Adverbial C. or Conjunctive Adverbs. Ex., 'He is industrious; *therefore* he is happy'—That is, 'he is happy *for that*.' This adverb, or adverbial phrase, expressive of the cause of the happiness, by referring us back for its meaning to the former assertion, has the effect of connecting the two assertions in the mind. Again, 'The messenger arrived *while* he was speaking.' Here *while* is equivalent to, *at the time at which* (he was speaking). As an adverbial phrase, this simply indicates the time of the act of 'arriving;' but as it also expresses that the speaking was going on at the same time, it thus conjoins the two assertions.

The most important distinction among C. will be seen in the following pair of sentences:

The sun went down, *and* the moon rose.
The moon rose, *as* the sun went down.

The first (compound) sentence contains two simple sentences or assertions, linked together, yet each standing on an independent footing; the two are joined on terms of equality, and are therefore said to be *co-ordinate*, and the conjunction is called a Co-ordinating Conjunction. In the second sentence, the last clause, though a grammatical sentence, contains no logical proposition, no assertion made for its own sake, but merely states a fact as a modifying circumstance with regard to the assertion contained in the first clause. The sentence of the second clause is therefore *subordinate* to that of the first, and the conjunction that marks the relation, a Subordinating Conjunction. The chief Co-ordinating C. are:

1. *And, also, likewise, not only—but, partly—partly, first—then, further.* All these are used to tack on sentences whose sense accords with, or adds to, the effect of what goes before. Hence they might be called *cumulative* conjunctions. The following (2) mark various degrees of opposition in the sense or effect of the sentences, and might be called *adversative* conjunctions. These terms seem preferable to *conjunctive* and *disjunctive*, generally used.

2. (*a.*) *Not—but, else, otherwise* (Exclusive).
   (*b.*) *Either—or, neither—nor* (Alternative).
   (*c.*) *But, only, yet, still, at the same time, nevertheless.*

3. *Therefore, wherefore, for, thus, consequently, hence, accordingly, so, so that.* (Cause and effect.)

All other C. may be classed as Subordinating, such being their usual function. Those in most common use are: *Although, as, as well as, so—as, as—as, because, if, lest, since, than, that, in order that, though, unless, whether, when, before, after, while.*

CONJU'NCTLY AND SE'VERALLY, in the law of Scotland, corresponds to jointly and severally in England, and denotes a form of obligation by which each of several obligants becomes bound for the whole. The creditor in such circumstances has his option either to exact the obligation proportionately from each of the co-obligants, or to select one of them, and exact the whole from him, leaving him to seek his relief against the others.

CONJURING. See MAGIC INCANTATION.

CONN, LOUGH, a lake in the north of Mayo county, Ireland, and with Lough Cullin (from which it is separated by a narrow neck of land), 13 miles long, and 1 to 3 broad. It lies in a wild romantic region of hills, glens, rocky slopes, precipices, broken ground, and bogs. It contains isles, has bold shores, and is 40 feet above the sea.

CONNARA'CEÆ, a natural order of dicotyledonous or exogenous plants, consisting of trees and shrubs, sometimes climbing, with compound alternate leaves, destitute of stipules; the flowers in racemes or panicles. Resinous juices do not occur in this order. Forty or fifty species are known, all tropical. The best known product of this order is the beautiful wood called ZEBRA WOOD, the wood of a large tree which grows in Guiana, *Omphalobium Lamberti*. The fruit of some species of *Omphalobium* is eaten; the eatable part is the fleshy aril.

CO'NNAUGHT, the westmost and smallest of the four provinces of Ireland. It is bounded N. and W. by the Atlantic; E. by Ulster and Leinster, from the latter of which it is separated by the Shannon; and S. by Munster. It contains the counties of Galway, Leitrim, Mayo, Roscommon, and Sligo. Greatest length from N. to S., 105 miles; greatest breadth, not including Achil Island, 92 miles. Area, 6863 square miles. Along the west coast are many fine bays and harbors. The country, especially in the west, is mountainous and rugged, remarkably grand and picturesque. (For detailed information, see the respective counties.)

The people are still almost purely Celtic. In the times of the Irish pentarchy, the O'Connors were kings of Connaught. In 1590, the province was divided into six counties, the five above mentioned with Clare (which was afterwards joined to Munster). It then lost its independence, and came under English administration. From famine and emigration, the population of C. have been diminished by more than 600,000 since 1841. It was, in 1841, 1,420,705; in 1851, 1,012,479; in 1861, 919,135; in 1871, only 846,213; in 1881, 817,197.

CONNE'CTICUT, the largest river to the east of the Hudson in the United States, rises on the south border of Lower Canada, near Lat. 45° N., and after a fall of 1600 feet and a south-south-west course of at least 400 miles, enters Long Island Sound, in lat. 41° 16′ N. With the exception of the state of Maine, it may be said to be the chief artery of the whole of New England, separating New Hampshire on the east from Vermont on the west,

and afterwards crossing successively Massachusetts and the state of its own name. It is navigable up to Hartford, a distance of 50 miles, for a draught of eight feet; and up to Middletown, which is 16 miles nearer the sea, for a draught of ten feet; while, with a few subsidiary canals, it carries barges of eight or ten tons fully 200 miles above the former city. The C. has many alluvial intervals on its banks, which, being generally inundated in the spring, are remarkable for their fertility. The stream is famous both for the quantity and the quality of its shad; and its valley, about forty miles wide, presents a considerable variety of romantic scenery.

CONNECTICUT, the most south-westerly state of New England in the United States, and one of the original members of the great confederacy, is situated in lat. 41°—42° 3′ N., and long. 71° 55′—73° 50′ W. Area, 4750 square miles. Pop. (1880) 622,683; between 1790 and 1870, it had increased from 238,141 to 537,454—being an advance of barely 1⅛ per cent. per annum. A result so anomalous, where the general population doubles itself in a quarter of a century, is creditably explained by the fact, that to all the new states of the Union C. has uniformly been a nursery of educated men of every class—of merchants and agriculturists, of lawyers and statesmen. The state sends two senators to the upper house of Congress, and four representatives to the lower house. Under the existing constitution, which superseded the charter of Charles II. only in 1818, the local authorities are a governor, a lieutenant-governor, a senate of 18 to 24 members, an assembly of 237 representatives, and a supreme court. In 1850 the value of property was 120,000,000 dollars; in 1878, 344,400,000 dollars. In the latter year the public income was 1,653,570 dollars; and the expenditure, 1,542,612 dollars.

Respectively to the west and east of Connecticut River are the Housatonic and the Thames, of which the former is navigable 12 miles upwards, and the latter 14. Many smaller streams afford valuable water-power. Besides the New Haven and Farmington Canal, 16 miles in length, C. is traversed in almost every direction by railways. The chief towns are Hartford, New Haven, Bridgeport, New London, and Norwich—the second and fourth being the principal ports, and all of them being accessible from the sea. The colleges are three in number; and the schools of every grade may stand a comparison with any in the Union. The soil is better fitted for pasturage than for tillage. The minerals are iron, plumbago, marble, and freestone. The staple productions are butter, cheese, wool, maize, oats, barley, wheat, flax, hemp, tobacco, and cider. In 1880, there were 4488 manufactories in C. employing 113,000 hands (annual produce worth $185,680,000); the cotton manufactories alone employed 15,500 persons (only three states employ more).

CONNOISSEUR (Fr.), the French term by which we commonly designate persons who, without being themselves artists, are supposed to possess a discriminating knowledge of the merits of works of art. They are called by the Italians Cognoscenti. See DILETTANTI.

CO′NOID, a solid formed by the revolution of a conic section round its axis; such are the sphere, paroboloid, ellipsoid, and hyperboloid.

CO′NQUEST. In the law of succession in Scotland, heritable property acquired during the lifetime of the deceased, by purchase, donation, or excambion, is called C., in opposition to that to which he has succeeded, which is called Heritage. In the event of one dying intestate leaving only brothers, but brothers both older and younger than himself, or of his leaving uncles both older and younger than his father, or the issue of such brothers or uncles, these two kinds of property took different lines of succession, the heritage descending to the younger brothers or uncles, the C. ascending to the elder brothers or uncles. This was abolished in 1874. C., in a marriage-contract, merely means the difference between the possessions of the husband before and after marriage, allowance being made for the increased expenditure; or that by which he has been made richer (locupletior). Such property is frequently settled either on the heir or on the issue of the marriage.

CO′NRAD. See KONRAD.

CONSA′LVI, ERCOLE, CARDINAL, a distinguished reformer of abuses in the Papal States, was born at Rome, June 8, 1757. He was made cardinal and secretary of state by Pope Pius VII., and in this capacity concluded the concordat with Napoleon in 1801. His stanch maintenance of the rights of his own sovereign against the insidious encroachments of France offended Napoleon, who in 1806 demanded his removal from office; and the pope at last unwillingly consented, on the desire of C. himself, who was anxious that peace should continue. He was, however, again employed in 1815 in all the transactions between Rome and Paris, and also in settling the internal affairs of the Papal States. In the latter capacity, he reformed numerous abuses; and the measure known as the *Motu Proprio*, introduced by him in 1816, suppressed all monopolies, feudal taxes, and exclusive rights. He was a liberal patron of science, but especially of the fine arts, and employed his leisure in the study of literature and music. In diplomacy, he displayed great address, and was generally successful. He died in Rome, January 24, 1824.

CONSANGUI′NITY (Lat. *con*, together, and *sanguis*, blood), the relationship which subsists between persons who are of the same blood. It is either *direct*—which is the relationship between ascendants and descendants—or *collateral*, between persons sprung from a common ancestor. In the direct line, a son is said to stand in the first degree to his father; a grandson, in the second degree to his grandfather; and so on. In the collateral or oblique line, two different modes of numbering the degrees of consanguinity have been in use, the one that of the civil, the other of the canon law. By the civil law, the degrees are separately numbered downwards to each party from the common ancestor, the common ancestor not being counted. Thus, brothers are in the second degree of consanguinity; uncle and nephew in the third; cousins-german in the fourth; and second cousins, or the children of cousins-german, in the sixth degree. By the canon law, consanguinity in the equal oblique line, i. e., where the parties are equally removed from the common ancestor, is computed by the number of degrees between one of them only and the common ancestor; brothers being said to stand in the first, and cousins-german in the second, degree to each other. In the unequal oblique line, i. e., which the parties stand in different degrees of relationship to the common ancestor, the degree is determined by the number of steps between the common ancestor and the party further removed from him: thus, uncle and nephew are computed as in the second degree to each other, because the nephew, the further removed of the two, stands in the second degree to the common ancestor, his grandfather. The canon law computation is more generally used by English lawyers, though statute 22 and 23 Car. I. c. 10 adopts that of the civil law. Scotch lawyers, since the Reformation, have generally used the civil law mode of computation.

Affinity is the relationship brought about by marriage between a husband and the blood-relations of his wife, or between a wife and the blood-relations of her husband. The relations of one spouse in any particular degree of consanguinity stand in the same degree of affinity to the other spouse. There is no relationship by affinity between the blood-relations of the husband and those of the wife.

Consanguinity and affinity have been at different times and in different parts of the world more or less looked on as impediments to marriage between the parties related. Among the ancient Persians and Egyptians, marriages are said to have been sometimes sanctioned between brother and sister, and even father and daughter. The Athenians, while permitting marriages between brothers and sisters uterine, prohibited them between the same relations by the father's side or the full blood. In the book of Genesis, we read of Abraham marrying his half-sister. The Levitical law prohibited marriage between relations in the direct line, between brother and sister, nephew and aunt, and apparently by implication, uncle and niece. A son was prohibited from marrying his father's wife.

The Roman law prohibited marriage between ascendants and descendants, a prohibition extended to relations by adoption, and even after the dissolution of that tie. In the collateral line, the prohibited degrees included brother and sister (extending to persons so related by adoption where the tie continued to exist), and all cases where one party stood *in loco parentis* to the other, as uncle and niece. Marriage between cousins-german, at one time prohibited, was declared lawful by Arcadius and Honorius. The degrees prohibited in consanguinity were by Constantine also prohibited in affinity.

By the old canon law and early decretals, marriages were prohibited between persons as far removed as the seventh degree of consanguinity or affinity—i. e., between persons who might, by the civil law computation, be within the twelfth degree to one another. The fourth council of Lateran, 1215 A.D., narrowed the prohibition from the seventh to the fourth degree; i. e., the grandchildren of cousins-german. Affinity was held to be constituted not merely by marriage, but by the spiritual relationship of standing sponsor at baptism, and by illicit intercourse; marriage being prohibited between persons one of whom had had carnal connection with a relation in the fourth degree of the other.

A marriage between persons related in any of these ways was accounted incestuous, and the children bastards. The pope assumed the right of granting dispensations from impediments to marriage arising from consanguinity and affinity, a power which seems to have been first exercised in the 12th century. In no instances have dispensations been granted to relations in the direct line, but one or two dispensations are said to have been granted between brother and sister; and between uncle and niece, they are still occasionally granted in countries where the canon law continues to be binding. Between remoter relations, they have

been common. The extent to which these prohibitions were carried, and the possibility of their being dispensed with, naturally tended to encourage profligacy and lax ideas of the marriage tie, it being hardly possible to say of any marriage that it might not one day be proved invalid. The Council of Trent restricted the impediment of affinity from illicit intercourse to the second degree.

In the countries which embraced the Reformation, a general relaxation took place in the prohibitions to marriage from consanguinity and affinity. In England, 32 Hen. VIII. c. 38 allowed all persons to marry who were not prohibited by the Levitical law; and according to the interpretation put on this statute, the prohibitions included all relations in the direct line, brother and sister, and collaterals, when one party is brother or sister to the direct ascendant or descendant of the other; the degrees prohibited in consanguinity being equally prohibited in affinity. The prohibitions from consanguinity have been held to extend to bastard relations. But down to 1835, marriages within the prohibited degrees were valid and the issue legitimate, unless the marriage had been annulled by a declaratory sentence of the Ecclesiastical Court, which could only be obtained while both spouses were alive. By act 5 and 6 Will. IV. c. 54, all marriages within the prohibited degrees of consanguinity and affinity were made absolutely void.

In Scotland, for a very short time after the Reformation, the papal power of dispensation was exercised by the crown. Acts 1567, c. 14, and 1567, c. 15, professing to take the Levitical law as the standard, assimilated the prohibitions from consanguinity and affinity to those of England. Incest, or sexual intercourse with persons within the prohibited degrees, was, by the former statute, made a capital crime. As to marriages between bastard relations, the law of Scotland is in a doubtful state; but there is no prohibition against marriage with a relation however near of a person with whom one has had sexual intercourse.

In France, the Code Napoléon prohibits marriage between ascendants and descendants lawful or natural, and persons similarly connected by affinity; and in the collateral line between brothers and sisters lawful or natural, and persons similarly connected by affinity. Marriage between uncle and niece and aunt and nephew, is also prohibited. In Spain and Portugal, the canon-law restrictions are in full force, with the corresponding system of permissive dispensations. In various countries of Europe, as Denmark, no prohibitions from affinity, except in the direct line, are recognized. In most of the United States of America, marriage is allowed between uncle and niece.

CO'NSCIENCE. See ETHICS.

CONSCIENCE, COURTS OF, IN ENGLAND. These were courts for the recovery of small debts, constituted by special local acts of parliament in London, Westminster, and other trading districts. These courts were also called *Courts of Requests*. On the establishment of county courts, the courts of C. with a few exceptions, were abolished. See COUNTY COURTS.

CONSCIENCE, HENDRICK, the most fertile and original writer of fiction in Belgium, was born December 3, 1812, at Antwerp, where his father was inspector of the dockyards, until he became a dealer in waste-paper, old books, &c. C. educated himself by the aid of his father's miscellaneous store of books until his 15th year, when he entered a school, where he was engaged to assist the master in teaching. On the breaking out of the revolution in 1830, C. joined the ranks under General Niellon, and served till 1834, when he left the service, being disgusted with the stricter discipline that was being introduced. Having failed in all his attempts to obtain employment, he tried his hand at writing, and composed in Flemish the novel, *In het Wonderjaer* 1566 (Ghent, 1837), which, notwithstanding its unprecedented success, left him in debt with his printer. His father refused to do anything for him until he took up some regular employment; and he was thus driven from home in an almost penniless state. At this time, the painter Wappers interested himself for him, and procured him some slight assistance from the king. C. now wrote his *Phantasia*, a collection of fantastic tales, and his celebrated historical novel, *De Leeuw van Vlanderen* (Antw. 1838); but being soon dissatisfied with the small pay and irksome work of the post he had obtained in a government office, he threw up all his avocations, and for a year worked as a gardener. Wappers again befriended him, by inducing the king to give him the place of Registrar at the Royal Academy of Painting at Antwerp. In 1845, he obtained the honorary title of Agrégé of the university of Ghent, and was appointed to instruct the royal children in Flemish. C. has written numerous tales and novels, most of which have been translated into French and German, and some into English—as, for instance, his *Sketches of Flemish Life*, of which several English translations have been made; *Demon of Gold*, *Lion of Flanders*, &c. C. has written two historical novels, *Geschiedenis van Græf Hugo van Craenhove* (1845), and *Jakob van Artevelde* (1849), which are esteemed among his best; but his *forte* lies rather in the delineation of simple village life. His *Illustrated History of Belgium* (1845) is interesting as a national work, but of little value as an authority. In 1870 he published *Bavo en Lieveken;* in 1871, *De Kerels van Vlanderen* (1871); in 1874, *De Keus des Harten* and *Eene Verwarde Zaak;* in 1875, *Schandevrees ;* in 1876, *Gerechtigheid van Hertog Karel*. C. has contributed largely to the revival of Flemish literature.

CO'NSCIOUSNESS. This is perhaps the most comprehensive term employed in designating the mind. If it had been used only in its widest signification, there would have been little difficulty in defining it; but unfortunately there are some exceedingly important meanings of a narrower range that are commonly expressed by it, rendering it an ambiguous or equivocal term, and like all such terms, a source of fallacy and misapprehension.

In the widest meaning, C. is almost identical with mind in action. When we are mentally alive, or performing any of the recognized functions of the mind, we are said to be conscious; while the total cessation of every mental energy is described by the term 'unconsciousness,' among other phrases. In dreamless sleep, in stupor, fainting, and under the influence of the anæsthetic drugs, we are unconscious; in waking, or rallying into renewed mental activity, we are said to become conscious.

As the mind in its waking or active condition may be more or less excited, or vary in the intensity of its manifestations, there are degrees of C.; and, in accordance with a very common usage, the name is apt to be applied to denote the higher degrees in opposition to the lower.

In first learning to write, to cast up sums, or to play on an instrument, our mind is put very much on the stretch; in other words, we are very much excited or highly conscious. When years of incessant practice have consummated the process into a full-formed habit, a very small amount of mental attention is involved; and we may then be said to perform the work all but unconsciously.

We must next avert to the special or restricted meanings of the term, which are those that play the most important part in philosophical discussion. In the first place, we find it applied to denote the mind's cognizance of itself, as opposed to the cognizance or examination of the outer world. Hence, in studying our own minds, we are said to be using C. as the instrument; but in studying minerals or plants, we resort to external observation by the senses. A contrast is thus instituted between C. and observation, which contrast gives to the former word a peculiarly contracted meaning; for in the wide sense above described, observation is truly an act of consciousness.

In the next place, C. is sometimes identified with Belief. We often express a strong affirmation by saying, that we are quite conscious that such a thing is so. It is the strong instinctive tendency of our nature to believe a number of things before we have gone through any large experience of matter of fact. The believing function is a prominent attribute of mental activity. We are scarcely able to feel or act without the operation of belief, or without making assumptions in anticipation of the reality. We believe first, and prove or disprove afterwards. The more intensely we are made conscious, the more strongly we pass into these intuitive convictions.

We unhesitatingly believe in the future persistence and universal prevalence of the order of things that we are born into, until such time as our experience gives us a check. Our emotions all produce beliefs in proportion to their strength. Fear makes us believe in coming evil; joy and elation give confidence in coming good. So that it is true to a certain extent, that the state of belief is engendered along with C., and is stronger as that is stronger; but it does not follow, as is frequently maintained, that to be conscious of every affirmation is to verify it, because our C. cannot be presumed to lie. See COMMON SENSE.

Correct usage, therefore, would dictate the employment of the term in question only in one sense, in which it is co-extensive with being mentally alive, as opposed to sleep, torpor, insensibility, &c. Anything that renders the mental activity more intense, that increases the whirl of the brain (such as strong pleasures and pains, great interest in anything that is going on, &c.) is designated by the positive term C.; the opposite condition, and also the feebler modes of excitement, are expressed by the negative —unconsciousness. All mere special and restricted applications should be forborne, as introducing confusion into thought, and error into philosophy. The study of our own mind may be expressed by such phrases as 'self-consciousness,' 'introspective attention,' and the like. As it is an entire fallacy to talk of C. in general as accrediting doctrines or matters of belief, any acceptation of the word implying this should be avoided.

Points of great importance are involved in the determination of the *conditions* of C., or the circumstances attendant on the manifestation of mental excitement; in other words, the stimulants of our emotional and intellectual wakefulness. The most general and fundamental condition of our becoming conscious, as regards

influences external to the mind, is *change*. The even continuance of one impression tends to unconsciousness; and there are a number of facts that show that if an influence were present in one unvarying degree from the first moment of life to the last, that influence would be to our feeling and knowledge as if it did not exist at all. This important point is more fully illustrated under CONDITIONED.

Immanuel Hermann Fichte (q. v.) made an attempt to establish the existence of a Preconscious Mind, distinct from our conscious life, and not dependent like that upon the bodily organization. He considers the power of germination and growth—or that energy, whatever it is, that unfolds the germ and conducts it to a completely formed organization—as a function of the mind or soul; and couples this power of germination with the following things—namely, the instincts; the process of intelligence that we seem to go through without being aware of the steps, as in the sudden inspirations of men of genius; with all the mysterious phenomena of second-sight, clairvoyance, &c.; and the aggregate of this he erects into a preconscious mind or soul, the contrast of C. as above defined. For the varieties or divisions of our conscious states, see MIND. See also DOUBLE CONSCIOUSNESS.

CONSCRIPTION is not properly synonymous with compulsory military service; Littré defines it, 'the call to military service by the drawing of lots.' The word therefore applies to the system which obtained in France, with intervals, from 1738 till the end of Napoleon III.'s reign. All citizens were liable to be called; but only a certain annual contingent of men for the army (sometimes greater, sometimes less) was demanded from the country; and in the several communes, the corresponding proportion of the youths of the district who had reached military age were selected by lot. With this system was practically bound up the possibility of buying one's self off, or of paying for a substitute. Conscription therefore differed widely from the systematic universal service now required in France, Germany, and some other countries. Since 1872, personal military service is demanded from every Frenchman not physically incapacitated. All are called to enter the army at the age of 20; but those who choose to enlist may enter at 18. The term is for five years in the regular army, 4 in the army reserve, 5 in the territorial army (militia), and 6 in the territorial reserve. This brings the conscript to 40 years of age, when his liability to service ceases. The law of 1872 reorganizing the French army, forbids the providing of substitutes by conscripts. An account is kept of the number of youths in France who reach the age of 20 in each year (about 280,000). All those are exempt from military service who are under 5 feet 2 inches in height; or have any natural infirmities unfitting them for active service; or are the eldest of a family of orphans; or are the only sons of widows, or of disabled fathers, or of fathers above 70 years of age; or are intended for the church; or are pupils at certain colleges. Moreover, if two brothers be called to serve, and the younger is efficient, the elder is declared exempt; and if of two only brothers one is already in the army, or has retired through wounds or infirmity, the other is exempt. Culprits and felons are not allowed to enlist. The law of 1872 making military service obligatory on all Frenchmen (save in the above cases) has assimilated the French army system to that enforced in Prussia since 1813.

CONSECRA'TION is the act of solemnly dedicating a person or thing to the service of God. It was one of the most widely spread religious ceremonies of the ancient world, being practiced in India, Egypt, Chaldæa, Judæa, Greece, Rome, Britain, and other countries. In the Old Testament, we read of the C. or dedication of the first-born, both man and beast, to the Lord; also the dedication of the Levites, of the tabernacle and altar, of fields, houses, walls, &c.

This custom, at least so far as regarded places and things, did not pass immediately from Judaism to Christianity, for the latter being more or less a persecuted religion until the time of Constantine, could not venture to indulge with safety in any public ceremonialism; but no sooner was the sword of persecution sheathed than, according to Eusebius, 'the sight was afforded us, so eagerly desired and prayed for by all—the festivals of dedications and consecrations of the newly erected houses of prayer throughout the cities.' Eusebius himself describes the C. of the church built at Jerusalem by Constantine, 335 A. D. The practice of consecrating religious edifices has continued to the present day in the Roman and Anglican churches. The forms were at first very simple, consisting chiefly of prayer, the celebration of the Lord's Supper, thanksgiving, and benediction; but they afterwards became more numerous and imposing, whilst, also, the bishops and higher dignitaries assumed the power of consecrating entirely to themselves. An important part of the C. of Roman Catholic churches consists in the deposition of relics for a time upon the altar. In the English Church, each bishop is left to his own discretion as to the form of C. to be adopted, but that most generally used is the form sent down by the bishops to the lower houses of convocation in 1712. The English Church also retains the C. of burying-grounds.

C. OF ARCHBISHOPS AND BISHOPS.—According to a canon of the first Nicene Council, there must be four, or at least three bishops present at the C. of an archbishop or bishop. The form used in the Church of England is that prepared in the reign of Edward VI. The Romanists deny the validity of English orders generally, as derived from heretical and improperly consecrated bishops. They had an old story, refuted by their own historian Lingard, which is known as that of the 'Nag's Head Consecration.' According to this story, Archbishop Parker was consecrated at the Nag's Head Tavern, Cheapside, by one of the Protestant bishops present laying a Bible on his head, and saying: 'Take thou authority,' &c. Lingard thus relates the facts: 'Barlow, the deprived Bishop of Bath, and Hodgkins, once Suffragan of Bedford, who had both been consecrated according to the Roman Catholic pontifical, in the reign of Henry VIII., and Scorey, the deprived Bishop of Chichester, and Coverdale, the deprived Bishop of Exeter, who had been both consecrated according to the Reformed ordinal, proceeded to confirm the election of Parker, and then to consecrate him after the form adopted in the reign of Edward VI. A few days later, Parker, as archbishop, confirmed the election of Barlow to the see of Chichester, and of Scorey to that of Hereford, and with these for his assistants consecrated all the other prelates elect.'

The C. took place in the chapel at Lambeth, as appears by the archbishop's register, and Lingard says that there is nothing to countenance the supposition of the entry being other than authentic. The story probably arose from a fact, mentioned by Fuller, that the commissioners who confirmed Parker's election dined at the Nag's Head, a tavern much frequented by the country clergy.

CONSECRATION OF THE ELEMENTS. See LORD'S SUPPER.

CONSE'CUTIVE, a term in Music, applied to octaves and fifths, which, according to the rules of harmony, are strictly forbidden.

CONSEGUIANA, a volcano of Nicaragua, occupies a promontory on the south side of Fonseca Gulf, about ten miles distant from the Pacific Ocean. The crater, at an elevation of about 4000 feet above the mean level of the surrounding country, is about half a mile across, while its interior descends perpendicularly to a depth of 200 feet. In 1835, a fearful eruption, the last on record, converted into a waste a large tract of grazing-land.

CONSE'NT. When we state that C. is the foundation of all contracts and legal obligations of every kind, we state a proposition often in the mouths of lawyers, but the vast magnitude and importance of which is by no means always apparent even to them. The doctrine that the free C. of the parties bound, and not the will of any earthly legislator, or the form in which that will is expressed, constitutes the binding element in contracts, flows as an inevitable logical consequence from the doctrines of personal and political freedom. And yet we continually forget it, and not only speak but act at variance with it. We talk of persons being married by the priest, and divorced by the proctor, whereas it is obvious that a valid marriage, like every other contract, can be made and unmade only by the contracting parties; and that all that either civil or ecclesiastical authority can do, is to ascertain, at the instance of one or other of them, whether it *has* been made or unmade. From overlooking this point of view, differences between legal systems, which are merely external, are often supposed to be fundamental. The law of Scotland, which admits several ways of proving matrimonial C. which the law of England rejects, is on this account supposed to differ from it *in principle*. The only question between them, in reality, is, as to whether the circumstances which the law of Scotland admits in proof of the existence of C. do or do not prove it in point of fact. If it be true that the only means by which it can be ascertained that two persons do agree to be man and wife, is by their declaring their agreement either before a clergyman or before a parliamentary registrar, then the law of England does right in rejecting all other evidence.

If, on the contrary, the fact can be established, as is believed in Scotland, by other means, such as a declaration before witnesses, or an exchange of writings, then the law of Scotland is right in admitting these means of proving it, and making the question of marriage or no-marriage, as it does, one of simple proof. The difference between the two systems is thus seen to be not one of principle, but one of expediency—a question, not in the law of marriage, or of contracts, which is the same in both countries, and in every country, but in the law of evidence.

Yet so strangly illogical are mankind, that in Scotland it is still asked whether or not a marriage can be constituted, in certain circumstances, without a declarator of the Court of Session; and in England, until very recently, no marriage could be dissolved without an act of parliament. The practical question as to how

C. shall be proved, is one surrounded at all times with the greatest difficulty. That its absence may be assumed in the case of all persons of imperfect understanding, and, consequently, that the power of contracting should be denied to idiots, madmen, and pupils, helps us but a very small way. The real difficulty consists in distinguishing, in the case of grown and sane men, between such *real* C. as may be safely assumed to be a deliberate act of the reason, taking that word in its widest sense, and such *apparent* C. as may have had its motive in caprice, passion, ignorance, or any temporary and accidental aberration of mind.

CONSERVA'TION OF FORCE. See FORCE.

CONSE'RVATIVE. See WHIG AND TORY.

CONSERVATOIRE, or CONSERVATO'RIUM (Ital. *conservatorio*), a name given by the Italians to schools instituted for the purpose of advancing the study of music and maintaining its purity. In the earliest times, these schools were partly attached to benevolent institutions and hospitals; others, again, were supported by opulent private individuals. They were originally intended for foudlings, orphans, and the children of poor parents. Some trace their origin to St. Ambrose, Bishop of Milan, in the 4th c., or St. Leo, who flourished in the 5th. The scholars, male and female, all received free board, lodging, clothing, and were taught to sing and play. Extra boarders were also admitted on paying a fee. In Naples, there were at one time three such schools, while in Venice there were four, expressly for females. In 1818, the Neapolitan conservatoires were reduced to one, under the name of Real Collegio di Musica. The Venetian conservatoires shared in the downfall of the Venetian republic. A new grand C. was founded at Milan in 1808, which still exists. In France, the necessity of a school for educating singers gave rise to the *Ecole Royale de Chant et de Déclamation*, in 1784.

During the French Revolution, in consequence of the scarcity of instrumental musicians for the army, the government decreed the erection of an Institut National de Musique, in 1793, which was changed into the present establishment in 1795 under the name of the C. de Musique. The yearly expenses of this C. were fixed at 240,000 francs, the number of masters was 115, and the pupils of both sexes amounted to 600. In 1802, the expense was reduced to 140,000 francs, with a corresponding reduction in the number of masters and pupils. The course of study is divided over 66 different classes, in which all appertaining to music and also declamation is taught by the best masters. The elementary works published by this C. for all instruments are known over the whole world. Other important conservatoires are those of Brussels (founded 1833), Prague, Vienna (1816), and the great conservatorium of Leipzig, established in 1842 under the auspices of Mendelssohn; also those of Cologne, Munich, Stuttgart, Berlin, &c. The Royal College of Music in London, which received a charter in 1882, is designed to rival the conservatoires of the Continent.

CONSERVA'TOR OF THE STAPLE. See CAMPVERE.

CONSERVATORS OF THE PEACE. The sovereign, by virtue of his office, is the principal conservator of the peace within these realms. The function which he thus possesses he may delegate, thus constituting a subject a conservator of the peace. The office, however, must always be exercised in the sovereign's name, and it is for this reason that we always speak of the king's or of the queen's peace. Several high officers of the crown, the Chancellor or Keeper, the Lord High Steward, the Lord Marshal, and the Lord High Constable, when there are such officers, all the justices of the Queen's Bench, the Master of the Rolls, are C. of the P. throughout the whole kingdom, and may commit breakers of the peace or bind them in cognizances anywhere. Other judges possess this power only within the limits of their own jurisdiction. The sheriff and coroner are C. of the P. within their respective counties, and constables, tithing-men, &c., within their jurisdictions. But in addition to these official conservators, others were appointed expressly for the purpose, previous to the appointment of justices of the peace, in the reign of Edward III. Their powers were far inferior to those of the justices, being confined exclusively to the function which the name indicates. The lords of manors frequently possessed the powers of conservators within their manors by prescription, and it was not unusual for lands to be held on the tenure of discharging the duties of a conservator of the peace within the county. Lastly, conservators were appointed by letters-patent from the crown in cases of emergency for the preservation of the peace in particular districts. All these different kinds of conservators, with the exception of these judges and others who are conservators *ex officio*, were superseded by the appointment of Justices of the Peace (q.v.).

CONSE'RVATORY, in Horticulture, a house for the cultivation of tender exotic plants, which, although requiring protection from frosts, and a little assistance of artificial heat, do not need the heat of the hothouse or stove. The only distinction between a C. and a green-house is, that in the former the plants grow in borders of earth; in the latter, they are in pots, and these two characters are often combined. The structure, management, &c., are much the same for the C. as for the green-house; but in the warmer parts of the country, the roof and even the sides are with advantage made capable of being removed in summer. In all situations, the most free and frequent ventilation is requisite. A C. is often attached to a mansion, so as to communicate directly with one or more of the apartments, instead of being placed in the garden.

CO'NSERVES are described by Cooley in his *Cyclopædia of Practical Receipts*, to be 'recent vegetable matter, as flowers, herbs, roots, fruit, and seed, beaten with powdered sugar to the consistence of a stiff paste, so as to preserve them as nearly as possible in their natural freshness.' C. are made by druggists as vehicles for more active medicines, and by confectioners as sweetmeats.

CONSIDÉRANT, VICTOR-PROSPER, a French Socialist, was born in 1805 at Salins, in the department of Jura. After being educated at the Polytechnic School of Paris, he entered the army, which, however, he soon left to promulgate the doctrines of Fourier (q. v.). After the death of his master, C. became the head of the Societarians, and undertook the management of *The Phalanx*, a review devoted to the maintenance and spread of their opinions. Having gained the support of a young Englishman, Mr. Young, who advanced the required sum of money, C. established, 1832, on a large estate in the department Eure et Loire, a Socialist colony or *Phalanstère;* but the experiment failed, and with it *The Phalanx* fell to the ground. However, a new organ of co-operative doctrine, the *Démocratie Pacifique*, was soon established, and was edited by C., who displayed great zeal, perseverance, and ability, in his hopeless battle with the laws of society as now constituted. Among his numerous writings, the chief is the *Destinée Sociale*, dedicated to Louis Philippe. In 1849, C. was accused of high treason, and compelled to escape into Belgium, whence he emigrated to Texas, returned to Brussels, and again went to Texas, where he founded a Societarian community, *La Réunion*, which flourished for a time, but has since come to nothing. C. returned to France in 1869. See COMMUNISM.

CONSIDERA'TION, in Law, the thing given, or done, or the forbearing or suffering something as recompense to another, for doing, giving, forbearing, or suffering. An obligation incurred without C. is, in England, termed voluntary, in Scotland gratuitous; if for C., it is so styled in England, but in Scotland it is called onerous. Considerations are divided in England into good and valuable, the former being affection for a near relative, the latter a pecuniary or other tangible benefit, or marriage. There is no corresponding division in Scotland. But in Scotland, on the other hand, there is, as a general rule, no need for the intervention of a C. to make a contract valid, while in England a contract without a C. is invalid, unless it be evidenced by formal deed (q. v.). In this respect, the law of England is founded upon the maxim of the civil law. *ex nudo pacto non ortur actio;* while the Scottish rule is founded on that of the canon law, *omne verbum de ore fideli cadit in debitum.* But the C. which in England is sufficient to support a contract, may be of the most illusory kind. Thus, an agreement to take less than the full sum in payment of a debt is without C. and because there is no C. to support the agreement to give up the residue; but if the agreement was to take a stick of sealing-wax instead of the money, it is an agreement for valuable C. and binding, and the transfer of the wax extinguishes the debt.

There are some circumstances which, in both countries, warrant the setting aside of obligations without C., whether made by deed or not. In England, they are void as against *bona fide* purchasers, by 27 Eliz. c. 4; and void as against creditors where the grantor is indebted to such creditors at the time to the extent of insolvency, by 13 Eliz. c. 5. A similar rule to the latter is established in Scotland by the act 1696, c. 5, and without proof of insolvency when the deed is granted to a near relation, or a person in a confidential situation, by 1621 c. 18. And all obligations for which the C. is illegal or immoral, are in both countries void.

CONSI'GNMENT, in Mercantile Law, is the term applied to goods which are placed in the hands of an agent or factor, for sale, or for some other specified purpose. Where either the consignor or the consignee becomes bankrupt, questions of nicety often arise regarding ownership, and the consequent rights of the parties and their creditors.

CONSI'STORY (Lat. *consistorium*), properly a place of assembly, but in the later Latinity the word came to signify the particular place where the privy-council or cabinet of the Roman emperor met, and after the time of Diocletian and Constantine, the council itself. The assessors of this council were partly the ordinary members (*comites consistoriani*), such as the imperial chancellor and seneschal, partly extraordinary; and their duty was to deliberate on all the important affairs of legislation, administration and justice.

The *form* of the imperial C. passed over into the early Christian

Church. The bishops established their consistories; and the highest ecclesiastical court, composed only of cardinals (the College of Cardinals), which meets in the Vatican, under the presidency of the pope, to determine all such matters as the appointment of cardinals, archbishops, bishops, &c., still bears this name, as do also the private councils which the pope can call at his pleasure. The Protestant Church of Germany was induced to perpetuate the consistorial courts principally because the episcopal authority passed into the hands of territorial princes (Ger. *Landesfürsten*) not familiar with ecclesiastical affairs. The first Lutheran C. was established at Wittenberg in 1542. After 1555, when the peace of Augsburg secured the recognition of the Protestant religion, similar consistories were gradually formed in other places. The Lutheran consistories exercise a supervision and discipline over religion and education, over the clergy and the schoolmasters, and examine the theological candidates on their trials for license and ordination. They have the regulation of divine worship, the administration of church property, and at an earlier period possessed a certain jurisdiction in regard to marriage.—In the French Protestant churches, the C. possesses a more restricted jurisdiction than in Germany. It exercises authority over a *circonscription*, i. e., a division of the church containing 6000 souls, and is composed of all the pastors of the *circonscription;* together with from 6 to 12 lay-elders elected by a certain number of the people. In that portion of the French Protestant Church which has adopted the Augsburg Confession, the authority of the French monarch is more recognized than in the Reformed Church, for it has a *consistoire général,* composed of delegates, lay and clerical, of the various *circonscriptions,* the president of which is a layman nominated by the emperor.—In England, the word is used to denote the court Christian or spiritual court. Every archbishop and bishop has a consistorial court, held either in his cathedral or other convenient place, before his chancellor or commissary, for ecclesiastical causes. In Scotland, the consistorial courts have lapsed into the commissary-courts. See COMMISSARY.

CONSOLA'TO DEL MA'RÉ. See MERCANTILE LAW.

CO'NSOLE (Fr.), in Architecture, a projection resembling a bracket, frequently in the form of the letter S, used to support cornices, or for placing busts, vases, or figures on. Consoles were often richly ornamented in the under part. The illustration, from Parker's *Glossary,* which is from the palace of Diocletian at Spalatro, belongs to the debased Roman style, and exhibits the zigzag or chevron decoration, which passed from that style into the Romanic architecture of the continent, and into the Saxon and Norman of England. See BRACKET, CANTALIVER.

Console.

CONSOLIDA'TION ACTS. In order to secure uniformity in acts of parliament having reference to public undertakings, and to avoid the necessity of repeating, in each special act, the clauses usually introduced into such acts, the device has been adopted of consolidating or combining all these provisions in one act having reference to the particular kind of undertaking. Of general acts of this nature the most important are, The Companies' Clauses Consolidation Act, 1845 (8 and 9 Vict. c. 16); The Lands' Clauses Consolidation Act, 1845 (8 and 9 Vict. c. 18), amended as to Ireland (14 and 15 Vict. c. 70); and The Railways' Clauses Consolidation Act, 1845 (8 and 9 Vict. c. 20.)

CO'NSOLS, a contraction of Consolidated annuities. In incurring the national debt, government borrowed money at different periods on special conditions, being generally the payment of an annuity of so much per cent. on the sum borrowed. Great confusion arose from the variety of stocks thus created, and it was thought expedient to strike an average of their value, and consolidate them into one fund, kept in one account at the Bank of England. The Consolidated Annuities' Act was passed in 1757. See DEBT, NATIONAL.

CO'NSONANCE, in Music, a term applied to combinations of sounds, whose vibrations when heard together so satisfy the ear that no other sound is wished for, or expected to follow. The more or less satisfying effect of C. depends on the greater or less simplicity of the interval formed by the combined sounds. Intervals whose relative vibrations can be expressed by numbers from 1 to 6, are considered consonant; while those which can only be expressed by the higher numbers, not a duplication of the lower, as 7, 9, 11, 13, &c., are called dissonant. Sounds vibrating as 1 : 1, are unison; as 1 : 2, produce the octave; as 2 : 3, the fifth, which inverted becomes 3 : 4, the fourth; as 4 : 5, the major third, which inverted becomes 5 : 8, the minor sixth; and 5 : 6, the minor third, which inverted becomes 6 : 10, or 3 : 5, the major sixth. Consonant intervals are therefore the third, fourth, fifth, sixth, and octave; from which it follows that there is only one consonant fundamental chord in music, viz., the common chord, or *trias harmonica perfecta,* being a base note with its third, fifth, and octave, which inverted produce the chords of the 6th and the $\frac{6}{4}$. See CHORD. The ancient Greeks admitted of still fewer consonances in their system of music, as they treated the third and sixth as dissonances; a proof that their system of harmony was not the same as ours. Their name for C. was Symphony, and for dissonance, Diaphony. Early in the middle ages, only the octave, fifth, and third were treated as consonances. Franco of Cologne was the first who divided C. into perfect, semi-perfect, and imperfect.

In the writings of Marchettus, and of Joannes de Muris, in the first half of the 14th c., we find already the important rule, that two perfect consonances following in similar progression are not allowable. The study of the C. was carried still further in the 16th c. by Zerlino, who ascertained the true mathematical proportions of the major and minor thirds. Notwithstanding this, Palestrina, up to the end of the same century, and long after him, all who wrote in the same style, carefully avoided the use of the third in the final chord, finishing always with the perfect consonances according to Franco. Of late years, the importance of the C. has attracted the attention of many eminent theorists in music, as well as philosophical writers of undoubted judgment, some of whom do not hesitate to consider the interval of the seventh a C., because it differs from other dissonances in not requiring preparation. There cannot be a doubt that the chord of the seventh, C, E, G, and B flat, considered individually, and not in connection with other chords, is as euphonious and satisfying as the common chord; and when these intervals are placed at the distance from the fundamental note they harmonically arise at, the consonant nature of the combination is still more obvious. A scientific organ-builder in Scotland has long been in the practice of introducing the seventh as an interval in his mixture stops, forming with the fundamental stops a union of sound decidedly consonant, and producing a remarkably brilliant effect. The exact limit of C., or the point where dissonance begins, seems not definitely fixed, if fixed it can be. To define C. to be agreeable sounds, and dissonance to be the reverse, as some do, is clearly absurd, because they both essentially belong to harmony or concord, or as the Germans more properly call it, *Die Kunst des Wohlklangs,* in which there can be nothing absolutely discordant.

A perfect C. causes a musical effect known as Tartini's Grave Harmonic, it having been first observed by the eminent violinist of that name. Along with any two musical notes sounded continuously, there may be heard (if the notes are in accord) a third deeper tone, caused by that number of vibrations which is the greatest common measure of the numbers producing the primary notes, and upon this Tartini founded his theory of harmony (now obsolete), by assuming that the grave note is the natural base of the chord producing it. The note thus sounded may be too deep to be appreciated by the uneducated ear, and these should not be confounded with the 'beats' resulting from the sound of a discordant interval, a species of jar or flutter known to tuners as the consequence of the *imperfection* of a consonance. The subject is treated at length by Professor de Morgan in a paper published in the Transactions of the Cambridge Philosophical Society, 1858.

CO'NSONANT. See LETTERS.

CO'NSORT, literally, one who throws in his lot with another. In English constitutional law, the term is applied to the husband or wife of the reigning sovereign, viewed not in a private but a public capacity, as participating to a certain limited extent in the prerogatives of sovereignty. The extent of these prerogatives in the case of a queen-C. are stated by Blackstone. She is, he says, a public person, exempt and distinct from the king, and 'not, like other married women, so closely connected, as to have lost all legal or separate existence so long as the marriage continues.' For this, Sir Edward Coke gives the curious reason, that 'the wisdom of the common law would not have the king (whose continual care and study is for the public, and *circa arduа regni*) to be troubled and disquieted on account of his wife's domestic affairs.' In addition to this peculiarity in her domestic position, the queen-C. enjoys several exemptions and minute prerogatives. She pays no toll and is not liable to amercement in any court. But where no such exemption is expressly recognized by law in favor of the royal C., she is on a footing of equality with other subjects, and the privileges which the title conveys are chiefly those of precedence, and belong to court etiquette. Up to the year 1857, the husband of Queen Victoria possessed no distinctive English title, and no place in court ceremonial except such as was conceded to him by courtesy. In that year, the title of Prince-C. was conferred upon him by letters-patent.

CONSPI'RACY, a combination between two or more persons to perpetrate an unlawful act. See COMBINATION.

CONSPIRACY BILL. In consequence of an attempt to assassinate the Emperor and Empress of the French whilst going to the opera on the evening of the 14th of January 1858, by the Italian

refugee Orsini and others, by means of explosive shells partly manufactured in England, a bill was introduced into parliament by Lord Palmerston, declaring conspiracy to murder, which the law of England had hitherto treated as a misdemeanor, to be a felony, punishable with penal servitude, and applying that provision to all persons whether English or foreign, and to all conspiracies to murder wherever intended. In place of being regarded merely as a piece of law reform, the C. B. obtained a political character, partly from a dispatch from the French minister, Count Walewski, demanding some such change in our law, and partly from expressions contained in certain addresses which were presented to the Emperor by the French army, and published in the Government organ, the *Moniteur*, which were regarded as insulting to England. The ministry were accused of truckling to France; and though on the motion for leave to bring in the bill they had a majority of 200 (299 against 99), an amendment by Mr. M. Gibson on the second reading, virtually amounting to a vote of censure, was carried by a majority of 19 against them (234 to 215).

CO'NSTABLE (Lat. *constabulus*). Whether this officer was called originally *comes stabuli*, the count of the stable or master of the horse (as alleged by Ducange), or the *koning-stapel*, staff and stay of the king (as Coke, Selden, and others, with less reason, have maintained), the C. both in France and England, was a military personage of the very highest rank. The C. of France rose gradually in importance from the comparatively modest position of an officer of the household, till at last he became, *ex officio*, the commander-in-chief of the army in the absence of the monarch, the highest judge in military offences and in all questions of chivalry and honor, and the supreme regulator and arbitrator in all matters connected with tilts, tournaments, and all martial displays. The office of C. is traced back by Anselme to Alberic, who held it in 1060; but the first C. of France who appeared at the head of an army was Matthew, the second Seigneur de Montmorency. The office was suppressed by Louis XIII. in 1626. Among the offices of the ancient monarchy which were restored by Napoleon for mere purposes of state, that of C. was one. His brother, Prince Louis Napoleon, afterwards king of Holland, was created Grand C., the Vice-C. being Marshal Berthier. The office was again abolished, on the restoration of the Bourbons, and has not since been re-established. But besides the C. of France, almost all the great vassals of the crown had constables who filled analogous offices at their minor courts. There were constables of Burgundy, of Champagne, and of Normandy; the latter of whom may be regarded as the progenitor of the C. of England.

Shortly after the Conquest, a Lord High C. of England appears with powers and privileges closely corresponding to those of the C. of France (13 Rich. II. st. 1. c. 2). His position as judge of the court of chivalry, in conjunction with the Earl Mareschal, and the limitation of his power, which followed on the statute 13 Rich. II. c. 2, are explained under CHIVALRY, COURT OF. The office was abolished by Henry VIII. on the attainder of Edward Stafford, Duke of Buckingham; and a Lord High C. is now appointed only on the occurrence of great state ceremonies, e. g., a coronation. The High C. of Scotland was an officer very similar to the C. of France and England. After the Rebellion, the offices of the inferior constables dependent on the High C., such as the C. of the Castle (q. v.), were abolished, but that of the High C. himself was expressly exempted, and still exists in the noble family of Errol. The privileges attaching to this office are now entirely honorary; but in virtue of it, the Earl of Errol is said to be the first subject in Scotland after the blood-royal; and on the occasion of the visit of King George IV. to Edinburgh, the then earl was allowed to take precedence of the possessors of all other hereditary honors. The present Earl of Errol is the 22d High C. of Scotland.

CONSTABLE OF A CASTLE was the keeper or governor of a castle belonging to the king or to a great baron. These offices were frequently hereditary; thus there were constables or hereditary keepers of the Tower, and of the castles of Dover, Windsor, &c.—CONSTABLE OF THE HUNDRED, and CONSTABLE OF THE VILL, were the predecessors of the high and petty constables of later times. The statute of Winchester (13 Ed. I. st. 2, c. 6), by which the office of high constable is usually, though probably not correctly, said to have been first introduced, ordains that in every hundred or franchise there shall be chosen two constables, to make the view of armor, and to see to the conservation of the peace. The petty constable exercised similar functions within the narrower limits of the township or parish, and was subordinate to the high constable of the hundred. The high constables are appointed by the courts leet of the franchise or hundred over which they preside; or, in default of such appointment (7 and 8 Vict. c. 33, s. 8), by the justices at their special sessions. The appointment of petty constables is by 5 and 6 Vict. c. 109, and 13 and 14 Vict. c. 20, given to justices, who are directed annually to require from the overseers of parishes a list of those within the parish qualified and liable to serve as constables. When not specially exempted, every able-bodied man, between 25 and 55 years of age, resident in the parish, and rated to the poor or a tenant to the value of £4 per annum, must be included in this list. These lists are to be revised by the justices, who shall choose therefrom such number of persons as they deem requisite. No person who has served shall be liable to serve again till all the others are exhausted. Certain penalties are imposed by the act on those who shall refuse to serve, and an oath of office is prescribed. This act entirely supersedes the ancient method of appointing petty constables.—SPECIAL CONSTABLES are persons sworn in by the justices to preserve the peace, or to execute warrants on special occasions. By 1 and 2 Will. IV. c. 41, and 5 and 6 Will. IV. c. 43, any two justices of the peace who shall learn, on the oath of a credible witness, that a tumult, riot, or felony has taken place, or is apprehended, may, if they are of opinion that the ordinary officers are insufficient, swear in as many householders or others as they may think fit (not belonging to the classes of persons exempted from the duties of ordinary petty constables) to act as special constables for a limited time or for a particular place. The lord-lieutenant may also, by direction of one of the principal secretaries of state, cause special constables to be appointed for the whole county, or any part of it, in which case exemptions may be disallowed. For county constabulary, see POLICE.

CO'NSTANCE, LAKE (called by the Germans *Bodensee* or *Bodmansee*, from the old castle of Bodman—*Lacus Brigantinus* of the Romans), lies on the north side of the Alps of Switzerland, and forms a meeting-point of the five territories—Baden, Würtemberg, Bavaria, the Tyrol, and Switzerland.

It has an elevation variously estimated at from 1250 feet to 1385 feet above the sea. Lake C. is traversed by the Rhine from east to west; its greatest length is about 44 miles, utmost breadth 9 miles, and depth 964 feet. It is divided into the upper and lower lakes, the latter of which extends from Constance to Stein. Anciently, the lake was more extensive toward the south than now. In the 4th c., it is said to have extended as far as Rheineck, now some miles distant from the shore. The shores are formed by hilly lands, with low tracts at the mouths of the Rhine and smaller rivers. Cornfields, vineyards, pastures, orchards, and wooded declivities, with here and there the ruins of old castles interspersed, surround the lake. The water, has a dark-green hue, often rises suddenly some ten or twelve feet during a thaw, and rolls in high waves during the prevalence of a strong south, north-west, or east wind. Without visible cause, it sometimes rises and falls to a considerable degree. In one hour, in 1770, it rose between 20 and 24 feet above the ordinary level. It is seldom frozen, except in very severe winters. The lake contains sixty kinds of aquatic fowl; twenty-five species of fish, including fine salmon, and salmon trout; and several species of shell-fish. Since 1824, steam-navigation has added to the facilities of commerce across the lake, and its commercial importance has been greatly increased by the connection of the chief towns on its shores with the railway systems of South Germany and Switzerland.

CONSTANCE, or KOSTNITZ (anciently *Constantia*), a city of Baden, once a free imperial city, is situated on the south shore of the Lake of Constance, at the place where the Rhine connects the upper and lower lakes together. C. is one of the most ancient towns in Germany, but it is very much decayed, its population, once 40,000, being now not more than (1880) 13,372. Its cathedral was erected in the 11th century. C. is notable in history for the ecclesiastical council held in 1414—1418. The object of the Council of C. was to put an end to the disorders in the popedom and in the election of popes, and also to prevent the spread of the doctrines of Huss. There assembled, with the Emperor Sigismund and Pope John XXIII., 26 princes, 140 counts, more than 20 cardinals, 7 patriarchs, 20 archbishops, 91 bishops, 600 prelates and doctors, and about 4000 priests. The three rival popes, John XXIII., Gregory XII., and Benedict XIII., were deposed, and Martin V. was elected. Huss and Jerome of Prague were condemned and burned. The emperor was disappointed in his hope of a thorough ecclesiastical reform, and the Council of Basel was afterwards called to carry on the work which the Council of C. had failed to accomplish. The hall in which the council met is now the market-hall of Constance. C. has manufactures of silk, cotton, and watches, active fisheries, and the cultivation of vineyards and gardens employs a considerable number of the inhabitants.

CO'NSTANT is the name, given in mathematical analysis, to a quantity which remains the same for all cases of the problem, in opposition to a variable. Thus, in questions about the fall of bodies in given times, the force of gravity is a constant quantity. In the integral calculus, the name of constants is given to those quantities which, after integration, are annexed to the integral.

CONSTANT DE REBEQUE, HENRI BENJAMIN, one of the most distinguished political writers and orators of France, was born at Lausanne on the 25th October 1767. Educated in a German college, he afterwards spent some time at Edinburgh Uni-

versity, and here he is supposed to have imbibed those ideas of political freedom which guided him through life. In 1796, he published in Paris a pamphlet on the government then existing, which brought him into note; and three years later, he was placed on the 'Tribunat' by Napoleon, who, however, two years after, dismissed and banished him for the spirit he displayed in resisting the First Consul's encroachments on liberty. During his banishment, he traveled for some time with Madame de Staël, and afterwards settled in Germany. In 1813, he published his celebrated pamphlet, *On the Spirit of Conquest and Usurpation*. In 1814 he returned to Paris, where he wrote several pamphlets in favor of constitutional liberty, which he maintained was enjoyed under Louis XVIII. Napoleon's government he described as a 'government of Mamelukes,' and the emperor himself as 'a Genghis Khan.' Yet during the Hundred Days he became a councillor of state, and assisted in framing the *Acte Additionnel*. In 1819, he was elected a deputy, became ultimately leader of the opposition, and in this capacity gained unbounded popularity. C. de R. was a true patriot. He loved liberty better than the despotic measures of the government of Charles X., he deplored the revolution of July 1830. He died December 1830. As a public speaker, C. de R. was in his day the clearest and most persuasive advocate of constitutional principles in France. As a political writer, he was even fully more effective than as a speaker. Among his works may be mentioned *Discours Prononcés à la Chambre des Députés* (2 vols., Par. 1828), the *Cours de Politique Constitutionnelle* (4 vols., Par. 1817—1820, 2d ed. 1833), in which are collected his minor works on representative government. Among his most ambitious works are *Mémoirs sur les Cent Jours* (Par. 1820), *De la Religion considérée dans sa Source, ses Formes, et ses Développements* (5 vols., Par. 1825—1831), to which posthumous work his *Du Polythéisme Romain, considéré dans ses Rapports avec la Philosophie Grecque et la Religion Chrétienne*, forms a kind of supplement.

CONSTA'NTIA, a district of Cape Colony, in South Africa, lying on the eastern and north-eastern slopes of Table Mountain range, and distant from Cape Town about 12 miles. C. consists of only two estates, Great Constantia and Little Constantia, which have long been famed for the quality of the wines produced upon them. Many attempts have been made in other parts of Cape Colony, as also in France and the south of Europe, to produce a wine similar in quality and flavor to the C., but all have failed; and it is now known that not only to the quality of the C. grape, but also to the character of the soil, as well as to the peculiarly genial exposure of the district, the characteristic excellence of the C. (proper) wines is traceable. The soil of the estates is rich in alkalies to an extent perceptible in the grape itself, and the vineyards have a very equable exposure, being sheltered from all sudden changes of temperature by spurs of the great granite mountain. The grapes under this shelter ripen very uniformly, so that the earthy taste, which spoils the character of other Cape wines, and which is produced by using unpicked grapes of different degrees of ripeness in the same bunch, does not attach to the C. wines.

Although the attempts made on other farms in the colony to produce wines similar to that of C., have failed in so far as the peculiar flavor as well as lusciousness of real C. are concerned, yet they have led of late to great improvements in the quality of several of the South African wines; and where care continues to be bestowed, and the habits of different vines in relation to soil and exposure are more studied, we have evidence in the quality of the improved 'Pontac,' and other wines of Wynberg, of what can be accomplished with increased labor by Cape Colony as a wine-producing country. Statistics of the wine trade of this settlement show, however, that only a small quantity of genuine wines finds its way into the market—much of that which passes under the name being similar but inferior Cape wines. The produce of the C. vineyards sells even in the colony at not less than 6s. per bottle.

CONSTANTI'NA, a town of Spain, in Andalusia, situated in a mountainous district, about 40 miles north-north-east of Seville, to which city it supplies much fruit and ice. It has manufactures of leather and soap, distilleries, flour-mills, &c. Pop. (1877) 10,988.

CONSTANTI'NE, the capital of a province of the same name (the easternmost province of the French colony of Algeria), is situated on a hill with flat summit, three sides of which are washed by the Rummel, flowing through a deep and narrow ravine, and the fourth is connected by a natural mound with the surrounding mountains. Lat. 36° 22′ N., long. 6° 37′ E.

It is 830 feet above the river, and 2162 feet above the sea. It is surrounded by walls constructed by the Arabs out of Roman sculptured stones, and a fine old Roman bridge spans the ravine on one side. The streets, as in the other towns of Barbary, are very narrow and dirty, and the houses mean. An old church in the Byzantine style is included in the citadel. C. was anciently one of the most important towns of Numidia, called *Carta* by the Carthaginians, *Cirta* by the Romans, and was long a royal residence. It was destroyed in the wars of Maxentius against Alexander about 311 A.D., but was soon rebuilt by Constantine the Great, from whom it derives its present name, and continued to subsist, and was a flourishing town in the 12th century. Subsequently, it shared in general the fortunes of Algeria (q. v.). C. has manufactures of woollen cloths, saddlery, and other articles of leather. Population (1876) 39,823, of whom some 7000 are Europeans.

CO'NSTANTINE I., Flavius Valerius Aurelius, surnamed 'the Great,' a Roman emperor, was born 272 or 274 A.D., at Naissus, in Mœsia. He was the eldest son of Constantius Chlorus, and first distinguished himself by his military talents under Diocletian, in that monarch's famous Egyptian expedition, 296; subsequently he served under Galerius in the Persian war. In 305, the two emperors, Diocletian and Maximian, abdicated, and were succeeded by Constantius Chlorus and Galerius. Galerius, who could not endure the brilliant and energetic genius of C., took every means of exposing him to danger, and it is believed that this was the period when he acquired that mixture of reserve, cunning, and wisdom, which was so conspicuous in his conduct in after-years. At last C. fled to his father, who ruled in the West, and joined him at Boulogne just as he was setting out on an expedition against the Picts in North Britain. Constantius died at York, July 25, 306, having proclaimed his son C. his successor. The latter now wrote a conciliatory letter to Galerius, and requested to be acknowledged as Augustus. Galerius did not dare to quarrel with C., yet he granted him the title of Cæsar only. Political complications now increased, and in a short time no less than six emperors were 'in the field'—viz., Galerius, Licinius, and Maximin in the East, and Maximian, Maxentius his son, and Constantine in the West, 308 A.D. Maxentius having quarrelled with his father, forced him to flee from Rome; he took refuge with C., but was ungrateful enough to plot the destruction of his benefactor. This being discovered, he fled to Marseille, the inhabitants of which city gave him up to C., who put him to death, 309 A.D. Maxentius professed great anger at the death of his father, and assembled a large army, with which he threatened Gaul. Crossing the Alps by Mont Cénis, C. thrice defeated Maxentius—first near Turin, then under the walls of Verona, and finally in the vicinity of Rome, 28th October, 312, Maxentius himself in the last of these engagements being drowned in an attempt to escape across the Tiber. C. now entered the capital, disbanded the Prætorians, and adopted other judicious measures for allaying the public excitement. He was also honored with the title of *Pontifex Maximus*, or Supreme Dignitary of the Pagan Hierarchy.

C. was now sole emperor of the West. Similarly, by the death of Galerius in 311, and of Maximin in 313, Licinius became sole emperor of the East. In 314, a war broke out between the two rulers, in which Licinius had the worst, and was fain to conclude a peace by the cession of Illyricum, Pannonia, and Greece. C. gave Licinius his sister Constantina in marriage, and for the next nine years devoted himself vigorously to the correction of abuses in the administration of the laws, to the strengthening of the frontiers of his empire, and to the chastising the barbarians, who learned to fear and respect his power. In 323, he renewed the war with Licinius, whom he defeated, and ultimately put to death. C. was now at the summit of his ambition, the sole governor of the Roman world. He chose Byzantium for his capital, and in 330 solemnly inaugurated it as the seat of government, under the name of Constantinople or City of Constantine. In 324, he committed a deed that has thrown a dark shade over his memory. He had a gallant and accomplished son, named Crispus, who was exceedingly popular, and him, along with Constantina and others, he put to death on a charge of treason. Niebuhr shows that it was not unlikely Crispus cherished ambitious designs. Next year occurred the great Council of Nice. C. sided with the orthodox fathers, probaby for very heterodox reasons. As yet he was a pagan, but his sense of justice, and his conviction of the growing importance of the Christians, both as a moral and political element in the life of the empire, had from the very first induced him to protect them. As early as 313 he had everywhere granted them toleration, and since then continued to favor them more and more decidedly. As president of the Nicene Council, he opposed the Arians, on political grounds, as the weaker party; but not being theologically interested in the dissensions, he refrained from active persecution. During the latter years of his life, Christianity became the state-religion, the pagan temples were closed, and sacrifices forbidden. Yet it was only a short time before his death, which occurred 22d July, 337, that he would allow himself to be baptized.

The question has been much discussed, whether or not C. was a Christian. The truth seems to be, that he looked upon religion as a *statesman*, who feels that his first duty is to rule the nation over which he is set in an orderly and peaceable manner. Had paganism been still in its prime, and possessed any real political

vitality, it is not likely that a man of C.'s secular temperament would have troubled himself in regard to the new faith; but when he found that the latter was making rapid progress in spite of the fiercest persecution, he must have felt it wisest, and probably also conceived it *right*, to protect and favor it. But he continued to the last addicted to many pagan superstitions. As an emperor, however, he ranks very high. He was beloved by his people, for whose welfare he seems to have honestly labored. Severe and even sanguinary towards individuals, he was just and moderate towards nations. He conquered every enemy, organized a new and better mode of government for his vast dominions, crushed all conspiracies and revolts, and passed the close of his life in peace.

CONSTANTINE, PAULOWITCH, a Russian grand-duke, born 8th May 1779, was the second son of the Emperor Paul I. He early distinguished himself by activity, intellectual ability, and a gallantry bordering on foolhardiness, of which he gave remarkable proof at the battle of Austerlitz. After the congress of Vienna, the government of Poland was intrusted to him by his brother, the Emperor Alexander. In January 1822, he executed a private deed by which he resigned his claims to the throne in the event of Alexander's death; and when that event took place in 1825, he adhered to this resignation, although he had meanwhile in his absence been proclaimed emperor in St. Petersburg. The succession thus fell to his younger brother Nicholas. The character of C.'s administration in Poland was not such as to conciliate any class of the people, and a widely ramified conspiracy was formed. The French Revolution of 1830 supplied the spark which set all in flame, and C. was obliged to flee for his life, but he returned in command of the army of reserve. He died, however, of cholera at Vitebsk, on 27th June 1831.

CONSTANTINE, NICOLAEWITCH, grand-duke of Russia, born 21st September 1827, is the second son of the late Emperor Nicholas, and the brother of Alexander II. He is grand-admiral of the Russian fleet, and holds besides innumerable military offices. During the Crimean war, he commanded the Russian fleet in the Baltic, and directed the defensive preparations which held the English and French armaments in check before Cronstadt. The leader of the old Russian party, he strenuously opposed the concessions made to the Western Powers. In 1857, however, he visited the courts of England and France, and in 1871 he paid a second visit to England. On the outbreak of the Polish insurrection in 1862, C. held the office of viceroy of Poland for three months. In January 1865 he was appointed president of the council of the empire.

CONSTANTINO'PLE, called by the Turks *Stamboul* or *Istamboul*, was originally called *Byzantium* (q. v.). In 330 A.D., the Emperor Constantine made it the capital of the Roman empire, and called it after his own name, Constantinople. From this period dates its importance. It continued thenceforth to be the residence of the Roman, and afterwards of the Byzantine emperors, till in 1453 it was taken by the Turks. Since that time it has been the capital of Turkey, and the principal residence of the sultans. It is situated in lat. 41° N., and long. 28° 59′ E., on the European side of the Channel of Constantinople or Thracian Bosporus, near to its opening into the Sea of Marmora. A narrow arm of the sea, called the Golden Horn, extends about five miles into the land, and forms a safe and most commodious harbor, with water of sufficient depth to float the largest men of war. C. proper, to which Europeans give the name of Stamboul to distinguish it from the northern and eastern suburbs of C., lies entirely on the southern side of the Golden Horn, and is protected by a wall built during the time of the Byzantine empire, and partially restored by the Turks.

The wall is about 12½ miles in circuit, and is pierced by 28 gates, amongst which that of Top-Kapussi, formerly that of St. Romanus, has a historic interest, as being the one through which the Turks entered when they stormed the city, and where the last of the Palæologi died in the fight. The suburbs of Galata, Pera, and Top-hanêh are situated on the northern side of the Golden Horn. On the Asiatic side of the Bosporus lie Scutari and Kadiköi (the ancient Chalcedon), and to the north-west of the city lies the town of Eyub. The city itself is built on hilly ground, and from this circumstance, and its numerous gardens, cypresses, mosques, palaces, minarets, and towers, it presents, especially as seen from the side of the Golden Horn, a very splendid appearance. The scenery of the Thracian Bosporus is of almost unrivalled beauty; and the panorama, of which C. forms the principal part, is such as is perhaps nowhere else to be seen in the world. But a nearer appproach reveals the characteristics of an eastern town—narrow, crooked, filthy streets, and miserable houses of wood and clay. Since the Crimean war, however, C. has been wonderfully improved. Great fires, which occurred on the 6th and 7th September 1865, the 3d May 1866, and on 5th June 1870, swept away square miles of old wooden houses on both sides of the Golden Horn. On these spaces handsome stone houses have been built in the modern European style; but this has not been done with much system, and there are in all directions great gaps filled with miserable wooden huts, or left as waste places. The formation of tramways has, however, tended to connect the improved districts by wider thoroughfares, and to form a general plan which is gradually giving to C. the appearance of a European city. C. contains many fine buildings, among which may bementioned the Seraglio, occupying the position of ancient Byzantium, and measuring about three miles in circumference; the former Church of St. Sophia, now a mosque, is a most magnificent structure, in the form of a Greek cross, 269 feet long by 243 broad, and has a flattened dome, greatly admired for its lightness, 180 feet above the ground. The other important mosques are those of Solyman, Achmed, Sultan Mohammed II., and Eyub. The two obelisks of the ancient Hippodrome, called by the Turks the *Atmeidan;* the Castle of the Seven Towers, now in a state of dilapidation; the aqueducts erected by the Emperor Valens; the cistern of Philoxenus, with 424 columns of marble; and the numerous fountains, are among the other most notable objects in Constantinople.

The covered bazaars of C. are very numerous, and the goods are displayed with wonderful attractiveness. One feature of C. is its vast number of lean and hungry dogs which haunt the streets. The dogs are the common property of the city, and they do a considerable portion of the scavenging. Galata, which was founded by the Genoese as a republic in the Byzantine times, is the residence of European merchants and the principal place of trade. It contains many great warehouses, shops, and dwelling-houses, but is, if possible, even more filthy than C. proper. Bridges of boats connect the opposite sides of the Golden Horn. Further eastward, on the Bosporus, lies Top-hanêh, with the imperial cannon foundry, a beautiful mosque, and an interesting fountain. On the hill behind Galata and Top-hanêh, is situated Pera, the residence of the foreign ambassadors. Two-thirds of Pera were burned to the ground by the fire of 5th June 1870. Three thousand houses were then entirely destroyed, including that of the English ambassador; and 40,000 persons were left without shelter. Before the fire, Pera had a European population of 70,000, which was reduced by the catastrophe to more than one-half. Pera is not being rebuilt on its old site, but new streets are spreading round it and Galata. In 1875, Pera was connected with C. by an underground railway 672 yards long, which is reckoned to convey 30,000 passengers daily.

The population of C. and its suburbs has been variously estimated. In 1880 it probably contained from 650,000 to 700,000 inhabitants, of whom about one-half were Mohammedans, one-fourth Greeks and Armenians, one-eighth Franks, and one-eighth Jews. The mosques are more than 300 in number. There are several Greek churches, under a patriarch with twelve synodal bishops. The patriarch is not only the spiritual, but in part also the temporal head of the Greek subjects of the Porte. C. is the residence also of an Armenian patriarch, and there are several Roman Catholic and Protestant places of worship. There are in connection with the mosques about 300 *medresses*, or schools for the ulemas; there are also some 400 *mekteb*, or Turkish elementary schools; and among the other educational institutions is a school of medicine conducted by Germans, which has been the means of much good. Among the benevolent institutions are numerous *imarets*, where food is provided for the poor, and hospitals for the sick of several European nations. There are public libraries, both Turkish and Greek, of which that of the Seraglio is particularly rich in the treasures of oriental literature; and there are several Turkish and European printing-presses.

The public baths and coffee-houses are exceedingly numerous. Some of the peculiar manufactures of the East are carried on in leather, carpets, weapons, &c. But all the manufactures of Western Europe abound in its markets. The trade of C. has, since the Crimean war, been steadily increasing, but is by no means so extensive as might be expected from its population and situation. The burden of the vessels entering and of those clearing the port is estimated at about four millions of tons. The trade is chiefly in the hands of Greeks, Italians, Austrians, British, French, and Germans.

The great strategical value of the site of C. has always lent it a peculiar military and political importance. Extensive fortifications at some distance on the landward side of C. were undertaken during the Russian war of 1877, and were carried out under the superintendence of an English officer in the Turkish service. These lines extend from Buyuk-Tchekmedgi on the Sea of Marmora to Lake Derkos on the Black Sea, a distance of about 20 miles. They run along a range of steep hills, from 200 to 500 feet in height, looking down on a long and wide bare valley. Eight miles distant across the valley runs the parallel range of the Tchataldja Hills, from 500 to 1500 feet high.

C. is now connected by railway with the interior of Northern Turkey, and the north-western part of Asia Minor. The Rumelian Railway from Stamboul to Bellova, was opened in 1873, and will ultimately be connected with the Schumla-Varna line, and

with that from Saloniki to Uskub. C. will thus soon have railway communication with a great part of Turkey.

CONSTELLA'TION (Lat. *con*, together, and *stella*, a star), a group of stars. The stars which stud the firmament have, from a time earlier than authentic records can trace, been formed into artificial groups, which have received names borrowed from fancy or fable. These groups are called constellations. Though quite devoid of anything like systematic arrangement, this traditional grouping is found a sufficiently convenient classification, and still remains the basis of nomenclature for the stars among astronomers. Before the invention of almanacs, the risings and settings of the constellations were looked to by husbandmen, shepherds, and seafaring men as the great landmarks of the seasons, and consequently of the weather which each season was expected to bring with it (see Job xxxviii. 31); and it is not surprising if the storms or calm weather that usually accompanied such seasons were connected in the popular imagination with the influence of the stars themselves, or the beings with whom superstition or fable identified them. Thus, the risings and settings of Bootes with the bright star Arcturus, which took place near the equinoxes, portended great tempests. See Virgil's *Georgics*, i. 204. The great heat in July was ascribed to the rising of Canis the Dog, with its bright star Sirius. See CANICULAR DAYS, and HELIACAL RISING. The appearance of the twins, Castor and Pollux, was hailed as the harbinger of fair summer weather.

Almost all nations have, from early times, arranged the stars into constellations, but it is chiefly from the nomenclature of the Greeks and Romans that our own is derived. Eudoxus, a contemporary of Plato, about 370 years B.C., gave a description of the face of the heavens, containing the names and characters of all the constellations recognized in his time. Though this production is lost, a poetical paraphrase of it, written about a century later by Aratus (q. v.), is still extant. This poem describes twelve zodiacal constellations (see ZODIAC), with twenty in the northern hemisphere, and thirteen in the southern. The next enumeration occurs in the *Almagest* of Ptolemy, which includes the preceding, with three additional, one northern and two southern constellations, making in all 48. These are the ancient stellar groups. Large accessions have been made to the nomenclature in modern times, in consequence of maritime discovery having made us acquainted with constellations in the southern hemisphere which never rose upon the world known to our ancient authors. In 1751, Lacaille went to the Cape for the purpose of making a catalogue of the southern stars, and forming them into constellations—an undertaking which he prosecuted with great ardor for nearly four years at the expense of the French government. Flattery has also contributed towards the stellar nomenclature. Upon the restoration of Charles II., the evening before his return to London, Sir Charles Scarborough, the court physician, was gazing upon a star in the northern heavens, which shone with greater luminosity than usual, as might be expected from a loyal star on such an occasion. This, in connection with a few others, was formed into Cor Caroli, the Heart of Charles II., by Halley, at the doctor's recommendation. The chief constellations will be noticed under their several names. See ARIES, URSA MAJOR, &c. The fanciful figures from which the constellations are named, are depicted on celestial globes and maps of the heavens. In the older writers, Constellation signifies the relative positions of the planets at a given moment. See ASPECT.

CONSTIPA'TION, a state of the system marked by an irregular and sluggish action of the bowels upon their contents, due either to defective secretion of the juices of the intestinal mucous membrane, or to an imperfection of the peristaltic movements (see DIGESTION). Sedentary habits predispose to C., as also does the use of animal food in too great a relative amount. The use of brown bread, or of lentils, oat-meal porridge, of green vegetables and salads, or of ripe fruits; the plentiful employment of salt, or of saline drinks, or of many natural mineral waters; and active exercise, especially by walking or riding on horseback in the open air, tend to avert this disease. A favorite remedy with some is the use of a cloth wrung out of cold water, and applied to the abdomen; this, as used at hydropathic establishments, is called an 'abdominal compress,' and is worn under a bandage of macintosh cloth, to keep the moisture from escaping, during the earlier part of the day.

But to many persons affected with C., and unable from circumstances to follow out the plan of life here indicated, and to many others in whom the disease does not yield to these means, the use of laxatives, or mild cathartics (q. v.), is almost a necessity; and it is satisfactory to know that these remedies, if judiciously selected, and not employed so as to produce over-action, may be taken during very many years without any of the bad effects often ascribed to them.

Constipation in the lower animals depends, as in man, on imperfect secretion from, or motion of, the intestinal walls. In the horse, it is usually accompanied by Colic (q. v.), and when long continued, leads to Enteritis (q. v.). The appropriate remedies are soap and water clysters given every two hours; smart friction and cloths wrung out of hot water applied to the abdomen, with three drachms of aloes, and one of calomel, given in gruel, and repeated in sixteen hours, if no effect is produced. Give, besides, walking exercise; restrict the amount of dry solid food, but allow plenty of thin gruel or other fluids, which may be rendered more laxative by admixture with treacle or a little salt. Similar treatment is called for in dogs, cats, and pigs. In cattle and sheep, digestion principally takes place in the large and quadrisected stomach; the bowels, accordingly, are little liable to derangement; and C., when occurring in these animals, generally depends upon impaction of dry hard food between the leaves of the maniplies, third stomach, or fardel-bag. The complaint is hence called *fardel-bound*. It results from the eating of tough and indigestible food, such as ripe vetches, rye-grass, or clover; it prevails in dry seasons, and on pastures where the herbage is coarse and the water scarce. It occurs amongst cattle partaking freely of hedge-cuttings or shoots of trees, hence its synonym of *wood-evil*. From continuous cramming and want of exercise, it is frequent in stall-feeding animals; whilst from the drying up of the natural secretions, it accompanies most febrile and inflammatory diseases. The milder cases constitute the ordinary form of indigestion in ruminants, are accompanied by what the cow-man terms *loss of cud*, and usually yield to a dose of salts given with an ounce or two of ginger. In more protracted cases, rumination is suspended, appetite gone, constipation and fever are present. There is a grunt noticeable, especially when the animal is moved, and different from that accompanying chest complaints, by its occurrence at the commencement of *ex*piration. By pressing the closed fist upwards and forwards beneath the short ribs on the right side, the round, hard, distended stomach may be felt.

This state of matters may continue for ten days or a fortnight, when the animal, if unrelieved, becomes nauseated, and sinks. Stupor sometimes precedes death, whilst in some seasons and localities, most of the bad cases are accompanied by excitement and frenzy. In this, as in other respects, the disease closely corresponds with stomach-staggers in the horse.

Treatment.—Give purgatives in large doses, combining several together, and exhibiting them with stimulants in plenty of fluid. For a medium sized ox or cow, use ½ lb. each of common and Epsom salts, ten croton beans, and a drachm of calomel, with three ounces of turpentine; and administer this in half a gallon of water. If no effect is produced in twenty hours, repeat the dose. Withhold all solid food; encourage the animal to drink gruel, sloppy mashes, treacle and water; and give exercise, clysters, and occasional hot fomentations to the belly.

CONSTI'TUENT ASSEMBLY. See ASSEMBLY, NATIONAL.

CONSTITU'TION, in Politics (*constitutio*, from Lat. *constituere*, to set up, or establish). In its modern acceptation, C. signifies a system of law established by the sovereign power of a state *for its own guidance*. Such being the ultimate object of a C., its proximate objects, generally stated, are, to fix the limits and define the relations of the legislative, the judicial, and the executive powers of the state, both amongst themselves and with reference to the citizens of the state, regarded as a governed body. Among the Romans, a C. was at first nearly synonymous with the edict of a prætor (see EDICT), and even under the empire signified only an imperial edict or decree. In continental countries, since the formation of the federal government of the United States of America, or, at all events, since the first French Revolution, the idea of a C. has been generally that of a body of written public law, promulgated at once by the sovereign power. See CODE and ASSEMBLY, NATIONAL. In Great Britain it is the whole body of the public law, consuetudinary as well as statutory, which has grown up during the course of ages, and is continually being modified by the action of the general will as interpreted and expressed by the parliamentary representatives of the nation. Much confusion is often introduced into our conceptions of the action of the English and other mixed governments by representing the three elements of which they are generally composed—the monarchical, aristocratic, and democratic (King, Lords, and Commons)—as the centers of three independent sovereignties, whereas they are only three organs through which the one sovereignty finds expression.

There is, and can be, in an independent state, but one sovereignty—one center of power—viz., the general will of the nation. Opposition to this will, from whencesoever it may come, within the state, is treason in the individual, and rebellion in the mass; whereas the vindication of this will by its own act may be revolution, but can never be rebellion. Another source of error consists in supposing this general will to be the numerical aggregate of all the individual wills in the community. It is, on the contrary, the sum of all the wills, not numerically but really, making allowance, that is to say, for the fact that one individual, from the greater clearness of his convictions and strength of his character, often contributes to

this sum, or mass of volition, ten times as much as another individual.

But though the idea of a mixed government is generally associated with that of a C., it does not seem to be inseparable from it. We are not entitled, for example, to deny the name of a C., to a system which is apparently the result of one single will, if to that will the general will has freely confided the task of determining the rules by which it shall be governed. Assuming that the late emperor of the French was invested with supreme power by this ultimate sovereign, the general will, the government which he established was, for the time being, the C. of France. But inasmuch as France had, under the imperial system of government, no parliamentary machinery for effecting desired or desirable changes in its C., the 'right of revolution,' as it is called, became a necessity on the part of those who conceived that they embodied and were in a condition to express the general will. Disorderly as it may seem to us, it was really within the limits of the C., as constitutional as the C. which at any moment it might have overthrown. In a parliamentary government like that of England, however, the right of revolution emerges only when the self-modifying powers of the C. are obstructed or opposed by the executive, as took place in 1688. Whilst in pure monarchies it hangs permanently over the head of the executive, even when acting in accordance with the C., in a free country resistance is rebellion in all cases in which the machinery which the C. possesses for its own modification is unimpeded in its action. Of resistance to this latter kind, the events that culminated in the late American civil war furnish an example.

For a historical account of the English C., see ENGLAND; see also PARLIAMENT, CONGRESS, CODE, CORTES, &c.

CONSTITUTIONS, APOSTOLICAL. See APOSTOLICAL CANONS AND CONSTITUTIONS.

CONSTITUTIONS OF CLARENDON. See CLARENDON, CONSTITUTIONS OF.

CO'NSUBSTANTIA'TION. See TRANSUBSTANTIATION.

CONSUETU'DINARY LAW, is that law which derives its binding character, not from the expressed, but from the tacit consent of the general will of the community. As it is generally transmitted from age to age by oral tradition and universal custom, and is rarely embodied in any positive enactment, C. L. is often spoken of as unwritten law (*lex non scripta*). The customary laws of Normandy, Brittany, and some other provinces of France, however, were reduced to writing; and with us much of the common law, both of England and Scotland, now rests on statute, as well as on custom and usage. Even in modern practice, usage is often resorted to as the best interpreter of law. Of this a familiar example is the important part assigned to mercantile usage in construing the law-merchant. In this case, the custom must generally be established by evidence, in place of being taken for granted, as are the laws of primogeniture, legitim, terce, courtesy, and the like. The effect of custom in repealing statutes will be considered under DESUETUDE. See also COMMON LAW.

CO'NSUL, the title of the two highest ordinary magistrates in the Roman republic. The etymology of the word cannot be precisely determined; thus much, however, seems clear, that it implies that there were more than one—that there were colleagues. The idea of two supreme magistrates, or joint-presidents of the state, seems to have been interwoven with the earliest conceptions of political organization in Rome. According to tradition, there were at first two kings; and the constitution of Servius is said to have provided for the sovereign power being again divided between two functionaries. But it was not till after the expulsion of Tarquin that Lucius Junius Brutus and Lucius Tarquinius Collatinus were chosen joint-heads of the state. These chief-magistrates seem to have been at first called *prætores* (leaders, i. e., of the armies), and the title of *consules* to have been introduced about 300 B.C. At first, the consuls seem to have differed from the kings in little else than their limited tenure of office, and the power which their fellow-citizens retained of calling them to account at its termination. They never assumed the golden crown, but their dress in almost every other respect was regal, and they had ivory scepters surmounted by eagles. In public assemblies, they occupied a sort of throne (*sella curulis*), and in the senate they presided and sat on elevated seats. They made peace and negotiated foreign alliances, had the supreme command of the army, and appointed the public treasurers. They likewise exercised the judicial functions of royalty. In their capacity of supreme judges they continued to be known as *prætores*, until ultimately separate magistrates with that title were appointed. The symbol of their authority was the bundle of rods (*fasces*), with the axe in the center, which was carried before them by twelve lictors.

For a considerable period, the consuls were chosen exclusively from the *populus* or patricians, as opposed to the *plebs;* and during the long struggle between the patricians and plebeians, they sided invariably with their own order. At length, however, two plebeian officers, called *tribuni plebis*, were appointed as a sort of democratic rivals to the aristocratic consuls. To them was assigned the duty of presiding in the assemblies of the plebeians, as the consuls did in the other assemblies; and though they could not dictate, they were entitled by their *veto* to arrest measures proceeding on consular or senatorial authority. The result of this rivalry was, that the consulship was opened to plebeians; and from 172 B.C. down to the period of the empire, the consuls were frequently plebeians. In accordance with the ordinary course of political development, the organization of the Roman state became more complicated, in proportion as it became impossible for the C. to discharge in person the various duties which in the beginning always center in the possessors of supreme power. In 442 B.C., censors (q. v.) were appointed. In 365, prætors had the chief judicial functions of the consuls assigned to them. In the government of the provinces, the aid of the former consuls was called in, the C. thus appointed having the title of *pro-consul*. In sudden and critical emergencies, the consuls were either superseded by a dictator (q. v.), or absolute power for the occasion was conferred on them by the decree of the senate, which ran in the famous formula: *Videant consules ne quid respublica detrimenti capiat*—'Let the consuls look to it, that the state take no harm.' The oath which the consuls took on entering the office they were obliged to repeat as a declaration, not of intention but of fact, on quitting it at the end of the year. The consuls were inaugurated by a great procession to the Capitol and a sacrifice to Jupiter Capitolinus. The shadow of the consulate survived the downfall of liberty; but the election of the consuls was taken from the people and conferred on the senate. Then their number was increased; they were divided into classes—*C. ordinarii, suffecti, honorarii*, &c.—till at last the office became a mere honorary appointment conferred by the emperor.

The title of C. was revived in the French republic. See CONSULATE.

CONSUL, MERCANTILE, the name given to those officers whom the state maintains in foreign countries for the protection of its trade, and vindication of the rights of its merchants, and to whom the further duty is assigned of keeping the home government informed of all facts bearing on the commercial interests of the country. The practice of appointing such officers originated among the trading communities of Italy about the middle of the 12th c., and gradually extended itself; and in the 16th c., had been adopted by all the countries of Europe. In addition to their commercial duties, others of a more strictly political kind were frequently confided to consuls in places in which there was no ambassador or political agent. In almost all the countries of Europe, consuls are divided into consuls-general, consuls, vice-consuls, and consular agents. The C.'s first duty on his arrival, is to exhibit his commission to the authorities of the country to which he is accredited, in order that he may obtain their sanction to his appointment. This sanction is communicated to him in a document called an *exequatur*, which secures to him the enjoyment of such 'privileges, immunities, and exemptions as have been enjoyed by his predecessors, and as are usually granted to consuls in the country in which he is to reside.' The general duties of English consuls are communicated to them in printed instructions. In these the C. is ordered to make himself conversant with the laws and general principles which relate to the trade of Great Britain with foreign parts, and with the language and municipal laws of the country wherein he resides. Further, it is his duty to protect his countrymen in the lawful exercise of their trade, to quiet their differences, to obtain the redress of injuries done them—failing which, to report the matter to the English ambassador at the court of that nation—and to forward to the Secretary of State for Foreign Affairs an annual return of the trade carried on at the different ports within his consulate, as well as a quarterly account of the market prices of agricultural produce during each week of the quarter, the course of exchange, &c. The C. must afford relief to British seamen or other subjects wrecked on the coast, and endeavor to procure them the means of returning to England. The commanders of Queen's ships touching on the coast are entitled to call on him for intelligence, and aid in procuring supplies of water, provisions, and the like; and it is his duty to endeavor to recover all wrecks and stores, &c., of Queen's ships, whether found at sea and brought into the port at which he resides, or thrown on the coast. As regards the 'privileges and immunities' of a C., it is doubtful whether he is in any case exempt from the civil jurisdiction of the state to which he is accredited; and in the case of a trading C., it is at anyrate plain that he is not. But a C. sent out from this country, and not engaging in trade, has always been exempted from the taxes of the country in which he resides. He is generally permitted to call in a guard when he requires it for his own safety, or the preservation of discipline; and in countries not inhabited by a European population, he has all the privileges of an ambassador.

A C. can perform all the acts of a notary-public; all deeds executed by him being acknowledged as valid by our courts of law. The fiction is, that the consulate is the territory of the country

from which the C. is sent, and, consequently, that deeds and acts done within it, or under the C.'s seal, are done in England. Hence the marriage of British subjects recorded in the books of a British C. is a valid ceremony.

In some cases, British consuls are allowed to trade ; in others, they are prohibited from so doing. The salary of consuls-general varies from £300 to £2000, the average being about £1000 : the salary of a consul varies from £100 to £1500, and of a vice-consul, from £50 to £800. A select committee of the House of Commons reported in 1872 that the consular service was still too varied in character and arrangements to be the subject of such organization and classification as other branches of the civil service, but in event of such regulation and revision of the posts as was then recommended, suggested that it would be desirable to introduce changes in that direction. Though of opinion that some posts were underpaid, the committee was opposed to an indiscriminate raising of salaries.

CO'NSULATE (Lat. *consulatus*, consulship), (in France). This supreme magistracy of the French republic was established after the revolution of the 18th Brumaire (q. v.), and lasted to the coronation of Napoleon. On the sudden overthrow of the Directory with the constitution of the year III., the members of the Council of the Ancients and the Five Hundred, or rather those of them who approved of, or submitted to, that act of violence on the part of Bonaparte's grenadiers, appointed three consuls—Sièyes, Bonaparte, and Roger Ducos. This approach to a monarchical government was confirmed, December 13, 1799, by the constitution of the year VIII., by which Bonaparte was made First Consul, with Cambacérès and Debrun as second and third; each was elected for 10 years, and was re-eligible. The powers of the First Consul were made almost absolute. He promulgated the laws, appointed or dismissed ministers, ambassadors, members of the Council of State, military and naval officers, and all civil and criminal judges, except justices of peace and members of the Court of Cassation. His income was fixed at 500,000 francs, and that of his inferior colleagues at 150,000 francs each. Bonaparte took up his residence at the Tuileries, and held a splendid court. By resolutions of the senate, in May 1802, Bonaparte was re-elected for 10 additional years, and in August of the same year was made First Consul for life. In the appeal made to the nation, out of 3,577,259 votes, 3,568,885 were in favor of Bonaparte. The adulation of the senate and people now knew no limit. Nothing but the imperial name and insignia were wanting to complete the picture of absolutism, and these were supplied, May 18, 1804, when Napoleon was made emperor.

CONSU'MPTION, in medical language Phthisis, Tabes, Marasmus (q. v.), and more particularly Phthisis Pulmonalis or pulmonary C., is a disease of great frequency and severity, which, in the civilized nations of Europe, produces from one-sixth to one-tenth of the total mortality in ordinary times. It is uncertain whether there is any part of the world, or any race of men, exempt from C.; this exemption having been at different times claimed for the inhabitants both of hot and cold climates, as for India, Australia, Canada, Iceland, &c., but in most instances in consequence of imperfect knowledge of the facts. On the whole, C. appears to be one of those diseases that have a tendency to increase, unless great care be taken to remove conditions unfavorable to the public health, with the increased aggregation of the human family, and with that extended intercourse which is one of the consequences of an advanced civilization. Hence it is most frequent and most fatal in towns, and most of all in those that are near the great centers of intercourse; while in remote mountain districts, in islands cut off by a wide ocean from the general stream of human communication, it is commonly stated to be, and probably is, comparatively rare. As a rule, however, the presence of this dreadful scourge has almost invariably been discovered to a greater or less extent, wherever the causes of mortality have been carefully examined under enlightened medical superintendence; and we are still very far from having acquired such an insight into its laws of diffusion, as to be able to deduce from them any exact doctrine as to its causation. C. affects peculiarly the young, especially those in the first period of adult life; though it is nearly certain that the seeds of the disease are commonly sown in the constitution in youth, and even in infancy. Its relation to sex is variable, being apparently determined in part by the predominating occupations, and the habits of living, of the population. It is often observed to be plainly inherited from one or the other parent, most frequently the mother; and it is one of the diseases which has been stated to be frequently developed as a consequence of the marriage of cousins or other near relatives, especially when the parental stock is itself tainted or not free from suspicion. In life-insurance, all thesecircumstances are usually carefully weighed by the medical officers of companies, as the grounds for admission or rejection of acandidate for insurance; and nothing is more certain to cause rejection, than a well-grounded suspicion of a consumptive tendency, either personal or derived from the parents, or shown in brothers and sisters. It is therefore a fair subject for consideration, on grounds of ordinary prudence, as well as on those of moral and religious obligation, whether those afflictedwith this malady, or strongly predisposed to it, ought to enter into the married state, and to incur the probable afflictions and responsibilities connected with the maintenance of an unhealthy family. It has even been proposed to legislate on this subject; but sober-minded political economists will probably always consider that it is in vain to constrain by laws the strongest instincts of humanity, especially when the application of the law must depend upon such refined distinctions as in the present instance.

The subject is clearly one for an appeal to the reason and conscience of individuals, rather than for an attempt to lay down theoretical rules of conduct; but those who would guide their lives by principle, and who would not rush into marriage from the inferior motives alone, would do well to take it into serious consideration.

Among the determining causes of C. in large populations, the best ascertained are those connected with overcrowding and bad ventilation, especially when connected with all the depressing influences inherent in poverty, or associated with a reckless and abandoned life. It is certain that much might be done to improve the public health in this respect, by more attention on the part of the employers of labor to the comfort and habits of those who are, in more senses than one, their 'hands,' and the sources of their prosperity. A certain amount of improvement has, indeed, already been effected by the improved living of the working-classes during the last twenty years. Still it is well known, and proved by careful inquiries, that the workshops of tailors, printers, bakers, and other businesses carried on in close, ill-ventilated apartments, by large numbers of workmen, are, in a very aggravated sense, nurseries of consumption. Cotton and linen factories have also been shown, when ill regulated, to be largely responsible for the death of their inmates from this disease. The finest regiments in the army were proved, some years ago, by evidence before a royal commission, to be decimated by this disease in time of peace to a frightful extent, in consequence, probably, of the bad ventilation and deficient comforts of the barracks. The cutlers and needle-grinders of Sheffield appear to owe their notoriously short lives to C., brought on by the inhalation of metallic particles in the close and stifling atmosphere of their workshops. The stone-hewers of Edinburgh and Glasgow, and the colliers of the Lothians, were some years ago in a similar predicament, from the inhalation, in the one case of stone-dust, in the other of lamp-smoke not sufficiently diluted with air. And even agricultural laborers, in many parts of the country, suffer from C. to an extent that is quite appalling, owing to the discomforts, and particularly the close and overcrowded condition of their dwellings. It is lamentable to think that such evils as these exist, and that they might be to a great extent avoided; but this conclusion appears to follow legitimately from the evidence that has been adduced of the intimate connection of C. with overcrowding and a diminished supply of fresh air in workshops and dwellings. Some years ago Dr. Guy published the details of an inquiry into the health of the journeymen printers of London, from which it appeared, in the clearest manner, that the liability of these workmen to spitting of blood, and other well-known symptoms of C., was in exact proportion to the degree to which they had been subject to the evil influences of ill-ventilated workshops; and the marked improvement in the health of our prisons in the present day, has likewise been shown to be to a considerable extent due to the diminished prevalence of C. among the inmates; which, again, is attributed, on good evidence, to the improved construction of the cells, and the increased facilities for wholesome exercise and occupation given to prisoners under confinement for lengthened periods.

It has even been plausibly maintained, that in some of our modern jails C. is less prevalent than it is among the general population of the classes from which prisoners are chiefly taken; so that the depressing influences of confinement and penal discipline are more than counterbalanced by the effect of a regular life, wholesome but plain food, and occupation. Even admitting, therefore, that the causes of C. may be in part irremovable, there is no reason to doubt that very much might be done to diminish its prevalence, as well as to arrest its course. [In 1881 it was confidently affirmed that tubercular consumption was due to the presence in the lungs of specific bacteria (see GERM-THEORY); and antiseptic treatment, such as the inhalation of carbolic acid vapor, has accordingly been recommended.]

The general symptoms of C. are patent to every eye; the more accurate appreciation of them, however, and the use of the more strictly medical means for detecting the disease, and judging of its progress and probable issue, are among the more difficult of the duties of the physician. The disease often escapes attention in its early stages; yet not so much from the absolute difficulty of its detection, as from the insidiousness of its invasion, and the small alarm which its early symptoms excite in the mind of the

sufferer, and even of his friends, when much occupied with the business of life, or when naturally not gifted with the faculty of refined observation. Whenever a young person appears to lose flesh and strength without known cause; when the color changes much from day to day, and from hour to hour; when shiverings are complained of, or even a sense of too great chilliness, alternated by flushings and an oppressive warmth, or too copious perspiration; when with these symptoms there is cough, however slight, or pains between the shoulders and about the shoulder-blades, or below the collar-bones; when there is an occasional tendency to spit up small quantities of blood from the chest, or when the patient is subject to repeated attacks of catarrh (q. v.), or when the bowels are habitually loose or very irregular, or when with any one of these symptoms in the female there is diminution or suppression of the usual periodic discharges, it is not too soon to apprehend the occurrence of C., and to place the patient under medical advice. In some instances the alarm may appear groundless, and health may rapidly return under appropriate treatment; but a far greater danger is that these symptoms, being overlooked or neglected, may prove only the precursors of a more apparently serious attack of disease, and that the first suspicion of C. may arise only after irreparable mischief has taken place. In general terms, it may be said that during the period of adolescence—i. e., before the body has assumed its full development in regard to strength and weight—no considerable check to its advance in these respects ought to pass unnoticed, more especially if attended with habitual feverishness, cough, or other symptoms of impaired health.

Attempts have been made to show, that a peculiar habit of body or physical conformation, apart from disordered health is to be regarded as predisposing to C.; and this has been called the phthisical diathesis (q. v.), but little or no dependence can be placed on any such indications, for this disease unquestionably occurs with nearly equal frequency in all the physiological varieties of the human race, when exposed to its exciting and predisposing causes. The experienced eye of the physician, however, will often discover the lurking germs of this insidious malady, even when active symptoms have been long absent, or have recurred after a long period of comparatively good health, by the effect of former disease upon the development of the frame in the period of childhood. For a similar reason the use of the stethoscope (q. v.), and other means of minutely examining into the state of the chest, will sometimes detect a wholly unexpected attack of pulmonary C. in persons who suppose their lungs to be quite sound, or who have forgotten that they were ever subject to disease. As a rule, however, the symptoms mentioned above are pretty safe guides as to the commencement of C., if care be taken that their gradual progress does not cause them to be overlooked. In a few cases the disease begins otherwise, the form being that of an acute attack, such as fever or inflammation of the chest; but such cases are of course at once detected, as being serious enough to require medical advice.

The further medical history of C. is very complicated, and can hardly be treated of with advantage in a work like the present. Generally speaking, the progress of the disease is marked by the following symptoms: progressive emaciation, with habitual fever and frequent sweating at night; cough and pains in the chest, with expectoration of mucus, and, in the end, of purulent matter in large quantities; diarrhœa (q. v.), and sometimes obstinate vomiting, oftener failure of the appetite, with occasional sickness; gradually increasing weakness and indisposition for active exertion, often with more or less difficulty of breathing on exertion, but rarely with extreme distress or pain of any kind. This remarkable freedom from acute suffering is probably one reason of the self-deception usually attributed to consumptive persons, by which they are led to believe in their curability up to a very advanced stage of the disorder.

The degree to which C. is curable has been a fruitful subject of discussion of late years. Properly speaking, there never has been any doubt that cases marked by all the symptoms of C. occasionally, and even pretty frequently in the early stages, get well; but it was argued that these were probably not genuine instances of what is now alone technically called C.—viz., tubercular disease. In France, where morbid anatomy was extensively cultivated in the beginning of the present century, the incurability of the tubercular form of C. was a general doctrine of the schools till the time of Laennec (q. v.), who, by multiplied instances, and careful observations on the dead body, showed beyond all question the occasional arrest even of advanced C., and the frequent cure of it in the early stages. The appearances in the lungs, and other organs of persons affected with C., will be discussed under TUBERCLE.

The treatment of C. is a very complicated subject, and one much misunderstood, partly owing to the misrepresentations of quacks, and partly from the great demand of palliative remedies on the part of patients and their friends, tending to obscure the true principles of treatment even to the mind of the physician. It is, however, now well ascertained that the greater part of the cure consists in hygienic measures—i. e., the regulation of the mode of living, the occupation, the diet, the clothing, the food, the hours of repose, &c., of the consumptive—and all treatment by drugs is usually regarded by well-informed physicians as subordinate to that just mentioned. A life in the open air to a considerable extent, and in a climate which admits of the enjoyment of such a life even in winter, is the best restorative in cases of incipient C.; yet too much may be sacrificed to the desire of obtaining these advantages, if a genial climate is sought at the expense of the comforts of an English home, or with the effect of producing anxiety of mind, or exhaustion of the body by a long and fatiguing journey. Moreover, to many men a regular occupation is really a necessity in more senses than one; and to break up all the associations of habit in a person debilitated by disease, and not capable of seeking new sources of excitement, is to poison the springs of enjoyment, and render the remainder of life a burden. Many consumptives have been sent abroad only to die, and in all probability to die more miserably, and at an earlier period, than if they had remained at home. On the other hand, the favoring influences of climate are by no means to be rejected, when they can be obtained in accordance with the patient's previously formed habits, and with due regard to his means of occupation and prospects of eventual cure.

A varied and wholesome, but light and unstimulating diet, including abundant dairy produce; flannel coverings next the skin, and clothing which is warm but not oppressive; a well-ventilated sleeping apartment, with a moderate fire in cold weather, bathing in tepid water; the use of a respirator or of a light woollen covering for the mouth and nose in excessively cold weather; avoidance of late hours, crowded rooms, and every kind of dissipation; avoidance also of draughts of cold air, and of sitting in damp clothes or with damp feet; these are the principal circumstances to be kept in view of the ordinary regulation of the life of a consumptive patient. The use of cod-liver oil has been very popular of late years in the treatment of C.; but it may be reasonably doubted whether the reputation of this remedy be due to its powers as a medicine or simply as a fattening food. Occasional small opiates, and other medicines to arrest irritating cough and subdue feverishness, and in special cases the treatment proper to the complications, such as diarrhœa (q. v.) and breathlessness, are generally admitted as useful adjuncts to the means above mentioned; but they can hardly be discussed in this place with advantage, and should be in general used only under medical advice. See Ancell on Tuberculosis —on Phthisis (translated for the Sydenham Society).

Consumption in the Lower Animals.—C. rarely occurs in horses, the health-depressing influences which produce it in man and other animals inducing in them Glanders (q. v.) and Farcy (q. v.). It is also rare among dogs, but is common in oxen and sheep, and still more so in pigs. It is one of the chief causes of death amongst the apes and other denizens of our zoological gardens. It is produced, as in man, by overcrowding, damp lodging, bad food, neglected colds, and the like debilitating causes. It is notoriously hereditary; is frequently developed by breeding from parents nearly related to each other, and mostly affects animals of faulty conformation, prevailing, for example, amongst cows with small thin necks, narrow carcasses, hollow flanks, and dirty unhealthy-looking skins. Such animals are, moreover, subject to dysentery; indeed, the two diseases depend, in cattle, on the same tuberculous or scrofulous state of system; they occur in the same stocks, and often replace each other in different generations. In all animals, the well-marked symptoms are very analogous. In cows, appetite and rumination become irregular; the coat stares, the skin is dry, and firmly adherent to the ribs; the animal is dull, loses flesh, is sometimes feverish, and if in milk, the secretion is diminished, blue, and poor; a tickling cough is easily excited; and diarrhœa is readily set up, and once established, is arrested with difficulty. As the disease advances, the lymphatic glands about the neck and elsewhere are enlarged; the fever, cough, and debility increase; the pulse is weak and quick; the excretions are fœtid; and purulent discharges trickle from the eyes and nostrils. C. in the lower animals is certainly curable, especially in the earlier stages.

The treatment consists mainly in attention to regimen and diet, with careful protection from damp, cold, and other causes inimical to health. The food should be good, easily digested, and nourishing, and the capricious appetite coaxed by frequent variety. For cows, linseed or other convenient oleaginous articles should be freely used. Irregularity of the bowels may be remedied by an occasional dose of treacle, or by a small quantity of linseed or of castor oil; but active purgatives, and, indeed, all powerful and irritating drugs, must be avoided. A few simple tonics may sometimes be advisable. C. might be greatly limited by rejecting, for breeding purposes, all animals having any tuberculous taint, and by greater attention to the feeding, shelter, and warmth of young stock. Neglect of these latter precautions is the cause of its unusual prevalence amongst the young cattle of the more exposed parts of our eastern coast. Its connection with

overcrowding and faulty sanitary arrangements, is evident from its frequent occurrence amongst the cows that have for several months been inmates of our badly managed town-dairies.

CONSUMPTION, in Political Economy, is the converse of Production (q. v.). The word is of very frequent use by political economists, but it has never had a definite meaning attached to it. It may be generally said, that everything which is produced or made by human labor is to be consumed, or to cease in its turn to exist. But there is not only a great difference in the rate at which things are consumed—some going rapidly, while others last for centuries—but there is a C. which is annihilation or loss, and a C. which is in reality gain, or an addition to the wealth of the world. Food is an article of production destined to be immediately consumed, but the food of the working-man sustains him while he is producing more than he consumes. A thousand pounds spent in improving a thousand acres of land, or in building a house, produce something which lasts for many years ere it is consumed or rendered valueless. The same sum spent in raising a wheat crop will seem to be immediately consumed, but it may have in reality been laid out more beneficially than the other, through the process of reproduction. If the thousand pounds laid out on land increases the value of that land so as to make it worth eleven hundred pounds, while the wheat raised by the expenditure of the other thousand is sold for fifteen hundred pounds, there is less C. in the latter expenditure than the former. If the thousand pounds on the other hand, be expended on squibs and sky-rockets, the C. is greater still. The makers of the squibs and sky-rockets no doubt live, but it would tend less to C. if they lived by making something that would last.

CO'NTACT. In Geometry, two lines, one of which at least is curved, are said to be in C. when they have a common point from which they recede, in such a way that the deflection of the one from the other will, if a sufficiently small departure be taken, become as small a fraction as we please of that departure. A complete discussion of the nature and order of C. can be obtained only by means of the differential calculus.

CONTA'GION, the communication of a disease from the sick to the healthy, either by direct contact of a part affected with the disease, or through the medium of the excretions and exhalations of the body. Some authorities have employed the term infection (q. v.) to designate this latter method of communication, and have correspondingly limited the meaning of the word C.; but no practical end is served by this refinement, and it has indeed led to great confusion by obscuring the fact of the communication, which is, when clearly proved by instances, the most important element in the inquiry. If of a given number of healthy persons exposed to association with the sick, a much larger proportion becomes ill than can be reasonably accounted for on general principles, or than is actually observed among persons of similar habits not exposed to this cause of disease, the disease is said to be propagated by C.; and if the characters of the disease are well marked, and nearly similar throughout the group of cases, it is said to be due to a specific C., which may be in some cases shown to be capable of reproducing the primary disease to an illimitable extent, being conveyed (as in the case of syphilis, q. v.), either through the liquid secretions of the affected part, or (as in the case of small-pox) in this way, and also through the aërial exhalations. Contagious diseases are generally epidemic (q. v.) in their mode of propagation, attacking large numbers of people at once, and traveling from place to place. But some epidemics are not contagious, as Influenza (q. v.)

CONTAGIOUS DISEASES (Women) ACTS were passed in 1865, 1867, and 1868 for the seaport and military towns, Aldershot, Canterbury, Chatham, Colchester, Dover, Gravesend, Maidstone, Plymouth and Devonport, Portsmouth, Sheerness, Shorncliffe, Southampton, Winchester, Windsor, and Woolwich; and in Ireland, the Curragh, Cork, and Queenstown. The policy of these Acts has since been keenly canvassed, one party denouncing them as demoralizing and degrading, the other party defending them on purely sanitary grounds. They authorize a justice of the peace, on the sworn information of a superintendent of police that a woman within the above area is a common prostitute suffering from venereal disease, to cause her to be examined, and if necessary detained in a hospital.

She is, however, first entitled to notice, so that she may submit voluntarily to examination. The limit of detention in hospital is three months to nine months. She may be convicted for refusing to attend for examination, and imprisoned for one month; and for a second offence, three months. If she considers herself cured, she can demand to be taken before a justice, who, on reasonable evidence, can discharge her. Occupiers of houses are liable to a penalty for permitting a woman uncured to resort to or be in their houses. The justice hears the case in private; but if the woman demands it, he must hear her in open court. These acts have always been strongly disapproved of by a large section of the public. A Select Committee of the House of Commons on the effect of the Acts issued an elaborate report in 1882. In the debate on supply in 1883, Mr. Stansfeld's motion, that these acts had neither checked disease nor promoted morality, was carried by a large majority; the vote of supply accordingly was lost. The administration of the acts was suspended, and the acts practically abrogated for the time being.

CONTARI'NI, the name of a noble family in Venice, one of the twelve that elected the first Doge. Between 1041 and 1674, seven Doges were furnished by this family, and several of its members were men of note.—Ambrogio C. was sent as ambassador from Venice to Persia, 1473—1477, and gave an account of his travels in his *Viaggi fatti da Venitia, alla Tana, in Persia, in India, et in Constantinopoli* (Ven. 1487).—Cardinal Gasparo C. distinguished himself as Venetian ambassador at the court of Charles V., and was papal legate at the diet of Ratisbon, 1541, where he displayed great moderation.—Giovanni C., born 1549, was one of the most famous painters of his time; he painted the Resurrection, in San Francisco di Paolo's, in Venice.—Vincenzo C., born 1577, had acquired, at the age of 26, such a fame for learning, that the magistrates of Padua, in order to secure him for their university, established an extraordinary professorship of Greek and Latin eloquence.

CONTE'MPT, against the crown's ecclesiastical supremacy, by assuming local ecclesiastical titles under the authority of the court of Rome, is forbidden under penalties by 10 Geo. IV. c. 7, s. 24, and by 14 and 15 Vict. c. 60.

CONTEMPT, against the sovereign's title. See Præmunire.

CONTEMPT OF COURT. There is probably no country in which courts of law are not furnished with the means of vindicating their authority and preserving their dignity by calling in the aid of the executive, in certain circumstances, without the formalities usually attending a trial and sentence.

Of this the simplest instance is where a judge orders the police to enforce silence, or to clear the court. Contempts by resisting the process of a court, are in England punished by Attachment (q. v.); contempts done in the face of the court, by directly obstructing its proceedings, may be visited with commitment and fine. Striking a supreme judge in the discharge of his duty, or even threatening him by drawing a weapon, or the like, has been an offence at common law in England of the highest kind since the times of the Anglo-Saxons; and in Scotland it is a statutory offence, punishable either capitally or by very severe arbitrary pains (1593, c. 173; 1600, c. 4). See Judge. In the latter country, minor contempts are punishable arbitrarily, either *ex proprio motu* of the court, where the offence has come under its immediate observation, or by a summary complaint at the instance of the public prosecutor, where, though not committed in the immediate presence of the court, it has relation to a matter which is, or has been recently, in dependence before it.

CONTEMPT OF PARLIAMENT. See Parliament.

CONTI, House of, a branch of the House of Condé (q. v.). Armand de Bourbon, first prince of C., and brother of the great Condé, was born at Paris in 1629. He took his title from the little town of Conti, situated five leagues from Amiens. Of a feeble constitution and deformed shape, he was early destined for the church, but the fame of his brother inspired him with military ardor. He commenced his martial career as the opponent of his brother, but soon entered into an alliance with him. After 1657, he retired from the world, and gave himself up, without reserve, to devotion. He died at Pezenas in 1666.—Louis Armand, Prince de Conti, Comte de Pezenas, and peer of France, eldest son of the preceding, was born in 1661. After a short career in arms, he died of smallpox at Fontainebleau, 5th November 1685. He left no children, and was succeeded by his brother François Louis, Prince de la Roche-sur-Yon et de Conti, who was born at Paris in 1664. This was the most remarkable member of the family. Educated under the eyes of the great Condé, he early conceived a passion for bearing arms. His first campaign was made in Hungary, where he distinguished himself; but having fallen into disgrace with the court, he was banished to Chantilly, with strict orders not to leave it. The great Condé, before his death, persuaded Louis XIV. to pardon him. Subsequently, C. served under the Duc de Luxembourg, who was warmly attached to him, and took a brilliant part in the victories of Steinkirk and Neerwinden.

In 1697, he narrowly escaped being made king of Poland. On his return to France he was still coldly received by Louis, who, however, was at last forced by disaster to employ him. He received the command of the army of Flanders in 1709, but died on the 22d February of the same year. Massillon pronounced his funeral oration. Saint-Simon, in his celebrated *Mémoires*, thus speaks of him: 'He was the delight of armies, the divinity of the people, the hero of officers, the darling of parliament, and the admiration of the most learned savans.'—The last member of the House of C. was Louis François Joseph, born 1734, died in Spain 1807.

CO'NTINENT. Though no mathematical distinction has ever been drawn between a C. and an island, the usage of language has generally recognized five great masses or divisions of land as continents—Europe, Asia, Africa, America, and Australia. Europe, Asia, and Africa form properly one great C., the only one known to the ancients; the second was discovered by Columbus; and the third made its appearance at the antipodes of Europe in the beginning of the 17th century. The existence of an antarctic C. has not yet been satisfactorily established. The apparent irregularity in the shape of the continents disappears on nearer examination, and certain uniformities become apparent, the causes of which have long been subjects of speculation. Bacon remarked, that the continents were pointed towards the south polar sea, and presented broad conformations toward the north. J. R. Forster followed up this remark by the generalization, that these southern points are the ends of mountain-ranges, which are continued northwards; and that at the east side of these promontories there are always larger or smaller archipelagos of islands, while the west side of the continents is indented with large bays.

Not only have attempts been made to reduce the horizontal outlines of the continents to rule, but their vertical dimensions have been examined with the same view. Observation had been confined to ascertaining the heights of individual summits, until Alexander von Humboldt enriched physical geography with a new numerical element, by endeavoring to determine the mean height of continents—i. e., the elevation of the center of gravity of their mass. He estimated the mean height of Europe at 103 toises (a toise is about 6 feet 6 inches), of North America at 117, of South America at 177, and of Asia at 180 toises. Laplace had calculated the mean height of all the continents at 1000 metres; Humboldt found this too great by two-thirds, and gives the height of the center of gravity of all the continents, except Africa, above the sea-level at 307 metres, or 1007 feet.

CONTINE'NTAL SYSTEM; BERLIN DECREE; ORDERS IN COUNCIL. The C. S. was the name given to Napoleon's plan for shutting England out from all connection with the continent of Europe, and thus compelling her at least to acknowledge the maritime law established at the peace of Utrecht. See NEUTRALITY. This system began with Napoleon's famous 'Berlin Decree' of November 21, 1806, which declared the British islands in a state of blockade, and prohibited all commerce and correspondence with them; every Englishman found in a country occupied by French troops or by their allies was declared a prisoner of war; all merchandise belonging to an Englishman, lawful prize; and all trade in English goods entirely prohibited. No ship coming direct from England, or from a British colony, was allowed to enter any port; and any ship seeking by false declarations to evade the regulation, was confiscated with its cargo as if British property.

England was not long in making reprisals. By an 'order in council,' issued January 7, 1807, all neutral vessels were prohibited from entering any port belonging to France or her allies, or under her control. Every neutral vessel violating this order was to be confiscated with its cargo. Still more oppressive for neutral commerce was a second order in council of November 11, 1807, by which all harbors and places of France, and her allies in Europe and the colonies, as well as of every country with which England was at war, and from which the English flag was excluded, were placed under the same restrictions as if strictly blockaded. These orders were followed by reprisals on the French side. By the Milan Decree of December 17, 1807, strengthened by a second of January 11, 1808, from the Tuileries, any vessel, of whatever nation, that had been searched by an English ship, had submitted to be sent on a voyage to England, or paid any duty to the English government, was to be declared *denationalized*, and treated as English. In order the more effectually to annihilate English commerce, there appeared, August 3, 1810, the tariff of Trianon for colonial goods; this was extended by a decree of 12th September, and on the 18th October followed the Decree of Fontainbleau, ordering the burning of all English goods; an order which was to be carried out with more or less modification in all countries connected with France.

The consequence of the C. S. was undoubtedly the springing up on the continent of many branches of manufacture to the prejudice of England; on the other hand, the price of foreign produce rose to an extraordinary height on the continent, enabling a few commercial men to make fortunes, but sensibly affecting the daily comfort of the middle classes. This violent interruption of human intercourse and sociability was an unnatural condition, which could not last long, and could only serve to strengthen the hatred of Europe against French tyranny. Accordingly, with the breaking up of Napoleon's power, the C. S. fell to the ground.

CONTI'NGENCY, in Law, an event, the occurrence of which, though uncertain, is sufficiently probable to be provided for. Thus, contingent debts, by the law of Scotland, are taken into account in estimating the claims on the estate of a bankrupt, though a contingent creditor is not entitled to concur in a petition for sequestration, or to vote in the election of a trustee, until his claim shall be valued.

CONTI'NGENT is the quota of troops furnished to the common army by each member of an alliance or confederation of states. The word was especially applied to the proportions contributed by the several German states to the army of the confederation, which has given place to the empire. See GERMANY.

CONTI'NUED FRACTIONS. See FRACTIONS.

CONTO'RNIATE (Ital. *contorno*, Fr. *contour*), a term applied to a class of antique medals, which have a deep line cut round the edge, like a furrow.

CONTO'RTED STRATA are beds which are bent and twisted, so that in a section their edges would be seen to follow crooked and curved lines, often doubling back and running altogether out of their former course. An account of extensive C. S. will be found under the article APPALACHIANS.

CO'NTRA, a term in Music, meaning opposite, lower, and applied to the alto and tenor parts when they form the lowest part in the harmony. When a part lower than the usual bass is employed, it is called contra-basso. C. is also used in organ-building, to indicate that a certain stop, or register of pipes, is an octave lower than the usual pitch.

CONTRA BASS, or VIOLO'NE, the largest species of stringed instrument, commonly called the double bass. In Britain, this class of instrument has three strings, the lowest being A, a minor third below the low C of the violoncello; the next is a fourth above, viz., D; and the highest is G, a fourth above D. This manner of stringing is defective, as all the great masters have written for the C. B. down to E, for which reason the German instruments have all four strings, the lowest a fourth below our low A. C. B. is also the name of an organ stop of 16 feet pitch.

CONTRABAND OF WAR (Lat. *contra bannum*, against the proclamation), is a name applied to certain commodities, or the rules relating to them, during hostilities between states which acknowledge what are called the laws of nations. One such law is, that neutral nations must not carry on, for the advantage of either of the belligerent powers, any branches of commerce from which they are excluded in time of peace. Another is, that the name of C. of W. shall be given to such articles as pertain to military or naval warfare—guns, ammunition, and stores of all kinds. Unless there are special treaties defining exactly what articles are C. of W., the interpretation of this law often leads to much embarrassment. Another law insisted on by England during the last great war was, that each belligerent shall have a right to visit and examine neutral ships, to see whether they carry any articles which are C. of W., and which seem likely to be intended for the enemy. A neutral state may carry on ordinary trade with either belligerent, except when prevented by blockade (see BLOCKADE); but the ships, according to the above rules, must not contain articles C. of W.; nor must a conterminous land frontier be crossed by such commodities. If a merchant evades these rules, he does so at his own risk; his merchandise may be seized, and his own government will not protect him. By the law and practice of nations, it is for the Admiralty Court of the capturing power to decide what is or what is not contraband of war. Upon such questions it is the province of this tribunal to adjudicate; and from its final judgment there is no appeal. At various times, discussions have arisen whether corn, hay, or coal, can ever be included in the list of articles C. of W.; they are obviously articles of peaceful commerce, but they are also essential to the maintenance of an army, and sometimes a supply would give one belligerent a great advantage over the other. Especially is this the case in reference to coal, in the present age of war-steamers.—Contraband in commerce depends upon the special laws of each country. See SMUGGLING.

CO'NTRACT. For a statement of the principles on which contracts in general are founded, see CONSENT.

CONTRA'CTIONS. The wish or necessity of economizing labor and parchment, led the scribes of the middle ages to use a great many abbreviations or C. in their manuscripts. These C. were transplanted into the first printed books; and more recently they have been reproduced in many works, as well in this country as on the continent, where it was thought desirable that the modern print should represent as nearly as possible all the peculiarities of the ancient manuscript. A knowledge of C., therefore, is indispensable not only to readers of old writings, but to readers of the printed books of the 15th, the 16th, and the earlier part of the 17th centuries, and to all who desire to avail themselves of the vast stores of historical and archæological materials accumulated in the rolls and records published by the governments of Great Britain, France, and other countries.

C. may be divided into six classes: 1. C., properly so called; 2. C. by elision or suspension; 3. C. by writing a smaller letter

above the word contracted; 4. C. by running two or more letters into one character; 5. C. by symbols representing syllables or words; 6. C. by initial letters.

1. *Of C., properly so called*, there are three great kinds: (I.) A straight line over a letter denotes the omission of an *m* or an *n* after it, as in the following examples:

ā ānus, *annus*; quā, *quam*; faciāt, *faciant*; tenendā, *tenendam*.
ē faciēt, *facient*; regē, *regem*; seruiētibus, *seruientibus*.
ī statī, *statim*; ī, *in*; īmediate, *immediate*.
m̄ om̄es, *omnes*; om̄ia, *omnia*; om̄i, *omni*.
ō nō, *non*; cōmunis, *communis*; hōines, *homines*; cōcessa, *concessa*.
ū hūc, *hunc*; volūtatē, *voluntatem*; festū, *festum*; hōiū, *hominum*.

(II.) A crooked or circumflex line over or through a letter signifies that one or more letters are omitted after it—occasionally both before and after it—thus:

ã cã, *causa*; añ, *ante*; aña, *antea*; añlo, *angelo*; miãm, *misericordiam*.
ꝑ ꝑe, *beate*; ꝑi, *beati*; noꝑ, *nobis*; liꝑtatē, *libertatem*.
ꝑꝑ aꝑꝑe, *abbate*; aꝑꝑ, *abbas*.
ꝯ aꝯus, *dictus*; ecc̃ia, *ecclesia*; sc̃a, *sancta*.
ꝓ ꝓ, *de*; ꝓ, *dans*; ꝓo, *deo*; dn̄s, *dominus*; dn̄i, *domini*; ebda, *ebdomada*.
ꝺ *David*; ꝺ ꝺ, *David*.
ẽ ẽe, *esse*; ẽ, *est*.
�fr fr, *frater*.
g̃ mag̃ro, *magistro*; mg̃r, *magister*; mag̃, *magis*.
h̃ h̃eat, *habeat*; h̃ui, *habui*; h̃nt, *habent*.
ĩ aĩa, *anima*; aĩal, *animal*; aĩā, *animam*; feĩa, *femina*; mĩe, *minime*; oĩo, *omnino*.
k̃ k̃mus, *karissimus*; k̃mi, *karissimi*.
ꝉ fiꝉ, *filio*; vꝉ, *vel*; ꝉia, *licentia*; ꝉ, *lege*; ꝉr, *libenter*; pꝉaꝉ, *pluralis*.
ll̃ ball̃is, *ballivis*; sigill̃, *sigillo*; Will̃mo, *Willelmo*.
m̃ om̃es, *omnes*; hom̃ibus, *hominibus*; com̃, *comite*; m̃s, *meus*; tm̃, *tantum*, *tam*, *tamen*.
n̄ dn̄s, *dominus*; n̄r, *noster*; n̄ro, *nostro*; n̄dū, *nondum*; tn̄, *tandem*, *tamen*; sn̄iā, *sententiam*.
õ õia, *omnia*; õro, *oratio*; rõis, *rationis*.
p̃ ep̃is, *episcopis*; p̃p̃, *papa*; ap̃lice, *apostolice*; p̃r, *pater*; tp̃s, *tempus*.
q̃ q̃stio, *questio*; extorq̃re, *extorquere*.
r̃ gr̃a, *gratia*; nr̃m, *nostrum*; pr̃, *pater*; pr̃na, *paterna*.
s̃ s̃btus, *subtus*; s̃, *sum*, *sunt*; s̃s, *suis*.
t̃ dict̃, *dictus*, *dicti*, *dicto*, *dictum*; salt̃, *salutem*; it̃m, *item*; t̃c, *tunc*.
ũ aũ, *autem*; ũre, *uestre*; ũba, *uerba*.
ṽ ṽr, *vester*; ṽris, *vestris*.

(III.) The sign ᵓ over a letter shows that *er*—or occasionally *re*—is omitted after it, as:

Ꝭ haꝬe, *habere*.
ꝯ ꝯto, *certo*; exerꝯe, *exercere*; feꝯit, *fecerit*.
ꝑ possiꝑe, *possidere*; evaꝑe, *evadere*.
ꝼ ꝼvida, *fervida*; preꝼre, *preferre*.
ᵹ infringᵹe, *infringere*; eᵹssum, *egressum*; transᵹressor, *transgressor*.
ꝛ ꝛes, *heres*; coꝛcioni, *cohercioni*.
ꝕ cꝕicus, *clericus*; expelꝕe, *expellere*.
ꝛꝛ amꝛcietur, *amercietur*; ꝛꝛcis, *mercis*; ꝛꝛcator, *mercator*.
ꝓ oꝓa, *onera*; geꝓosi, *generosi*; itiꝓe, *itinere*.
ꝙ inquiꝙe, *inquirere*.
ꝝ ꝝvus, *servus*; ꝝvicium, *servicium*.
ꝑ ceꝑa, *cetera*; ꝑram, *terram*; ꝑs, *tres*; ꝑr, *ter*.
ꝟ fꝟit, *fuerit*; hꝟit, *habuerit*.
ꝶ ꝶbo, *verbo*; oꝶtes, *overtes*; reꝶt̃e, *revertere*.
ꝴ eꝴcitum, *exercitum*.

2. *In C. by elision or suspension*, the word is not fully written, the want of the terminating letters being denoted by the marks ⸗, or ', or .; thus:

assꝫ	*assisa*.	dat.	*datum*.
test'	*teste*.	temp.	*tempore*.

3. *C. by writing a smaller letter above the word contracted.*—If the letter so written be a vowel, it denotes the omission of a consonant; if a consonant, the omission of a vowel. Occasionally the omission extends to two or more letters, whether vowels or consonants.

qᵃm	*quam*.	mᵒ	*millesimo*, *modo*.
gᵃtia	*gratia*.	intᵒitus	*introitus*.
occₐone	*occasione*.	magᵒ	*magistro*.
pⁱmis	*primis*.	mᵒasteriū	*monasterium*.
mⁱ	*mihi*.	pʳsas	*prisas*.
nⁱ	*nisi*.	figʳa	*figura*.
sⁱ	*sibi*.	cꝛcis	*crucis*.
impⁱsonetʳ	*imprisonetur*.		

4. *Of C. by running two or more letters into one character*, the diphthongs *æ* and *œ*, and the sign *&* for *et*, are familiar examples. The modern *&* has often, in old writings and books, the form of ⁊, and 7, and ⁊. A circumflex over this last character ⁊̂ represents *etiam*.

5. *C. by symbols representing syllables or words.*—The most common of these are shown in the following table:

cō *cio*; invencōe, *invencione*.
ꝯ *con* or *com*; ꝯuentus, *conuentus*; ꝯpellere, *compellere*.
ꝑ *pre*; ꝑ oculis, *pre oculis*; ꝑstito, *prestito*.
ꝓ *per*, *par*, and *por*; ꝓpetuo, *perpetuo*; ꝓ atus, *paratus*; corꝓum, *corporum*; ꝓnª, *persona*.
ꝓ *pro*; ꝓprio, *proprio*; ꝓ ꝓpetuo, *pro perpetuo*.
ꝗ *que*; absꝗ, *absque*.
ꝝ *rum*; ꝙuoꝝ, *seruorum*.
ꝛ *ser*; ꝛuicio, *seruicio*.
ꝫ *us* and *et*; quibꝫ, *quibus*; quilibꝫ, *quilibet*; sꝫ, *set* (*sed*).
ꝛ *ur*; auditᵒis, *audituris*; visᵒis, *visuris*.
ꝰ *us*, *os*, and *ost*; hujꝰ, *hujus*; dedimꝰ, *dedimus*; pᵒ, *post*; pᵒt, *post*; pᵒtea, *postea*.
ꝣ *tz*; fiꝣ, *fitz*.
ꝭ *is*; Scotꝭe, *Scottis*; lordꝭe, *lordis*.
ꝭ *est*.
ẽ *est*.
gª *igitur*.
gᵒ *ergo*.
hꝰ *hic*.
ñ *hec* or *hoc*.
ꝟ *vel*.
ñ *non*.
q̃ *que*.
ꝙ *quod*.
ꝓª *quam*.
qᶻ *quia*.

6. *Of the more common C. by initials*, a list has already been given in this work, under ABBREVIATIONS (q. v.). In this way of writing, a whole sentence may be expressed without so much as one word being written at length, as in the well-known epistolary form S.V.B.E.E.Q.V.; that is, *Si vales, bene est, ego quidem valeo*. Among the initials used in old writings and books, it will suffice here to mention the following:

A.	Alexander, Alanus, Arthurus.
B.	Benedictus, Bernardus, Bonifacius.
B.M.V	Beata Maria Virgo.
B.P.	Beatus Paulus, *or* Petrus.
B.V.	Bene vale.
C.TT.	Cardinalis Tituli.
D.	David, Durandus, Duncanus.

D.N.PP.	Dominus Noster Papa.
E.R.	Ecclesia Romana.
F.F.F.	Fiat, Fiat, Fiat.
G.	Gulielmus, Gilbertus, Guido, Georgius.
G.G.	Gregorius.
I.C. or I.X.	Jesus Christus.
I.D.N.	In Dei Nomine.
J.	Johannes, Jacobus, Julietta, Josephus.
M.	Malcolmus, Martinus, Matilda, Maria.
N.E.R.	Notarius Ecclesiæ Romanæ.
O.S.B.	Ordinis Sancti Benedicti.
P.S.R.I.	Princeps Sacri Romani Imperii.
R.	Robertus, Rolandus, Ricardus.
R.P.D.	Reverendissime Pater Domine.
S.	Symon, Samuel, Siwardus.
S.C.M.	Sacra Cæsarea Majestas.
S.D.	Salutem Dicit.
S.D.N.R.	Supremus Dominus Noster Rex.
S.M.E.	Sancta Mater Ecclesia.
S.P.	Sacri Palatii.
S.R.E.	Sacra Romana Ecclesia.
S.V.	Sanctitas Vestra.
T.	Thomas, Turgodus, Thoraldus.
V.R.P.	Vestra Reverendissima Paternitas.
V.S.	Vestræ Sanctitatis.
W.	Willelmus, Walterus, Wido.

Doubling an initial, shows that it is to be taken in the plural sense, as PP. for Papæ, TT. for Tituli, MSS. for Manuscripts.

C. Corrupted.—The Anglo-Saxon p, denoting *th*, has been corrupted into *y*; whence y^e is put for *the*, y^r for *their*, y^n for *then*. In Scotland, the numerals j^m vj^c, that is, 1600, have been corrupted into the unmeaning word jaj, or jajc.

C. Exemplified.—A sentence of the famous Declaration of Scottish Independence of 1320 is here given, with the contractions of the original (now in the Register House at Edinburgh); the same sentence with the contracted words written at length being placed by its side.

Original.	Contracted words at length.
Quia q^adiu Centū viui remanserint / nūcq^a Angto$\mathcal{Y}$ dñio aliq^{a}ten^9 volum^9 subiugari / Non eni ppt' gtiam / diuicias aut honores pugnam^9 / set ppt' libtatem solūmodo / q^am nemo bon^9 / n^i simul cū vita amttit.	Quia quamdiu Centum viui remanserint, nunequam Anglorum domino aliquatenus volumus subiugari: non enim propter gloriam, diuicias, aut honores pugnamus, set propter libertatem solummodo, quam nemo bonus nisi simul cum vita amittit.

That is, 'So long as a hundred of us remain in life, we will never be brought under the dominion of the English; for it is not for glory, or riches, or honors that we fight, but for freedom alone, which no good man will part with, except with his life.'

Collections of C. have been engraved in *fac-simile* in several works, among which may be enumerated Baring's *Clavis Diplomatica*, Hanov. 1737 and 1784; Anderson's *Diplomata Scotiæ*, Edin. 1739; Walther's *Lexicon Diplomaticum*, Gotting. 1745; the *Nouveau Traité de Diplomatique*, Paris, 1750—1765, one of the many noble works of the Benedictines of St. Maur; Lemoine's *Diplomatique Pratique*, Metz, 1765; Trombelli's *L'Arte di conoscere leta de' codici Latini ed Italiani*, Bologn. 1756 and 1778; M. Nat. de Wailly's *Eléments de Paléographie*, Paris, 1838; M. L. Alph. Chassant's *Paléographie*, Paris, 1839 and 1854, and his *Dictionnaire des Abréviations*, Evreux, 1846.

CONTRA'VENTION, in the law of Scotland, any act done in violation of a legal condition or obligation. The term is most frequently applied: 1. To an act done by an heir of entail, in opposition to the provisions of the deed; 2. To an act of violence or molestation, in opposition to Lawburrows (q. v.). Stair, i. 9, s. 30, and iv. 48.

CONTRAYE'RVA, a medicine once in much repute against low fevers, and as a mild stimulant and diaphoretic, and still used in some countries, although not much in Britain, consists of the root-stocks (rhizomes) of different species of *Dorstenia*, a tropical American plant of the natural order *Moraceæ*. The genus is remarkable for the plane receptacle in which the numerous small flowers are fixed, the male flowers in superficial depressions, the female flowers in deep sockets. The flowers have neither calyx nor corolla. The fruit consists of *achenia*, imbedded in the fleshy receptacle from which they are projected by elastic force when ripe. *D. Contrayerva* is a perennial plant, with palmate leaves, and somewhat quadrangular receptacles. Its root-stock is knotty, 1—2 inches long, about half an inch thick, reddish-brown, pale within, sending out on all sides many slender fibres (roots), which are generally loaded with small brown knots. It has a peculiar aromatic, overpowering smell, and a somewhat astringent, warm, bitterish taste. It keeps badly. It contains so much mucilage that a decoction of it will not pass through a filter.—*D. Brasiliensis*, a stemless species, with oblong, heart-shaped leaves and a circular receptacle, a native of the West Indies and Brazil, possesses similar properties, but is said to be more energetic, and furnishes the C. of British commerce. Other species possess similar properties. They have also been represented as efficacious against serpent-bites, and hence the name C., a *counter-poison*.

CON'TUMACY, a Scotch law-term, in one sense, equivalent to non-appearance in England (see DECREE IN ABSENCE; DEFAULT); but sometimes used in the wider sense of disobedience to a judicial order. In a criminal process, C. is punished by a sentence of fugitation; in a civil process, its only consequence is that the case will be proceeded with, and decree pronounced against the contumacious defender.

CONVALESCENT HOSPITALS are institutions of the greatest importance. Many patients die on returning to their own unhealthy homes from our ordinary hospitals; the convalescent home or hospital supplies a valuable stage in the process of cure. Either a series of detached cottages, or one large and well-appointed house, may serve to secure pure air and wholesome treatment. Of the latter kind, one of the first and best models was the magnificent establishment at Vincennes, founded in 1857. It contains more than 400 beds; permits an average stay of from twenty to thirty days; and in three years received 14,000 convalescent artisans.

CONVALLA'RIA. See LILLY OF THE VALLEY.

CONVENT. See MONASTERY.

CONVECTION. See HEAT.

CONVE'NTICLE (Lat. *conventiculum*, a diminutive of *conventus*) originally meant a cabal among the monks of a monastery, formed to secure the election of a favorite as abbot. The word consequently fell into disrepute. It was first given as an appellation of reproach to the assemblies of Wickliffe's followers, and was afterwards applied to the meetings of the English and Scottish noncomformists. Severe statutes were often passed for the suppression of these conventicles. See ACT OF TOLERATION, TEST ACTS.

CONVENTION. See NATIONAL CONVENTION.

CONVENTION OF ROYAL BURGHS, in Scotland. The burgh system of Scotland is very ancient (see BURGH), but it was by stat. 1487, c. 111, that the royal burghs of Scotland were first ordered to hold an annual meeting by commissioners, at what is now the unimportant town of Inverkeithing, where 'the welfare of merchandize, the gude rule and statutes for the common profit of burrows,' should be discussed, 'and which should provide for remeid upon the skaith and injuries sustained within the burrows.' This convention is conjectured by Mr. Burton to have taken the place of the more ancient 'court of the four burghs'—Edinburgh, Sterling, Berwick, and Roxburgh. The powers conferred by this act, which were renewed by later statutes, are still in force, and in virtue of them the C. of R. B. meets annually in Edinburgh on the second Tuesday of July. This court had a partial jurisdiction in questions as to the general regulation of trade, along with legislative authority over the constitutions of the burghs, which, previously to the passing of the Burgh Reform Act, included a right to adjust their 'Setts' (q. v.). Its operations are now almost entirely limited to discussing measures connected with trade, for which it may be proposed to apply to parliament. In this respect, it acts in the character of something like a general chamber of commerce (q. v.).

CONVENTION PARLIAMENT. It is a branch of the royal prerogative, that no parliament shall be convened by its own authority, or by any other authority than that of the sovereign. Where the crown is in abeyance, this prerogative cannot of course be exercised, and the expedient of Convention Parliaments has been resorted to, the enactments of which shall afterwards be ratified by a parliament summoned in accordance with the provisions of the constitution. The C. P. which restored Charles II. to the throne met above a month before his return, and was afterwards declared to be a good parliament, notwithstanding the defect of the king's writs (13 Car. II. c. 7 and c. 14). In like manner, at the revolution of 1688, the Lords and Commons, on the summons of the Prince of Orange, met in Convention, and disposed of the crown and kingdom, and this convention was subsequently declared (1 Will. and Mary, st. 1, c. 1) to be really the two Houses of Parliament, notwithstanding the want of writs and other defects of form. Under the name of CONVENTION, there also took place a meeting of the Estates of Scotland, called by the Prince of Orange on the same occasion. The meeting commenced on the 14th of March 1689, and was turned into a parliament on the 5th of June thereafter. The principal act of the Convention was to settle the Scottish crown upon William and Mary. After these precedents, we are perhaps almost entitled to regard the meeting of a C. P. as the constitutional mode in which the general

will of England expresses itself on such questions as cannot be constitutionally discussed in parliament—e. g., a change of the reigning dynasty.

CONVE'NTIONAL, in Art, is that which is in accordance, not with the absolute principles of beauty in form and color, but with the opinions and sentiments with reference to forms and colors, which chance to prevail at a particular time, in a particular country, or social class. Conventionality in art holds the same relation to the beautiful that conventionality in morals does to the good, or a speculative opinion to the true.

CONVERGING, or CONVERGENT, is applied, in Geometry, to straight lines that meet or tend to meet in a point; looked at in a direction from the point, they are *divergent*, or separating. C. and divergent are often used in reference to rays of light. See CATOPTRICS. In Algebra, the term convergent is applied, in a loose way, to any infinite series the terms of which go on diminishing; while a series is called divergent when its terms continually increase. Strictly, however, a C. series is one whose terms diminish in such a way that no number of them added together will be as great as a certain given number. Thus, however far we extend the series, $1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}$, &c., the sum will never amount to 2, though always approaching nearer to it. But the series, $1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+$ &c., has no such limit, and is therefore not convergent in this sense.

CONVERSA'NO, a town of South Italy, in the province of Bari, about 19 miles south-east of the city of that name. It is pleasantly situated on a hill in a fertile wine, oil, almond, and cotton producing district. It has a cathedral and several convents. Pop. about 10,500.

CO'NVERSE AND CONVE'RSION are terms in Logic, signifying that one proposition is formed from another by interchanging the subject and predicate: as 'Every A is B;' the C. of which is, 'Every B is A.' This example is termed a case of *simple* conversion; besides which, however, logicians recognize two other kinds of conversion—viz., *limited* conversion, and conversion by *contra-position*. The former may be exemplified thus: 'Every A is B;' the limited C. of which is, '*Some* Bs are As;' and the latter thus: 'Some A is not B;' which, converted by contraposition, is, 'Something that is not B is A;' 'Some men are not wise; some beings that are not wise are men.' Of these logical converses, the second and third are *necessarily* true, but not the first. When we say, 'Every A is B,' the reader might at first sight conclude that 'Every B is A' also; but if, instead of these letters, to which he probably attaches no meaning, he employ terms denoting objects with which he is familiar, he will see that a simple C. may be very far from the truth. Thus, 'Every penny is a coin,' has for its simple C. 'Every coin is a penny.' The reason why a simple C. is not necessarily true is, that in such a proposition as 'Every A is B,' the subject 'A' is—to speak logically—universally distributed, whereas the predicate 'B' is not. If it were, the proposition would read as follows: 'Every A is *every* B;' the simple C. of which, 'Every B. is every A,' would be true.

CO'NVEX. See CONCAVE.

CONVEY'ANCE, in Law, is the deed or writing by which property is conveyed or transferred from one person to another. The term, though strictly applicable, is not generally applied to the act of transferring personal, or, as it is called in Scotland, movable property. As regards real or heritable property, the more special nature of a C., and the consequent duties of the conveyancer, in so far as they fall within the scope of this work, will be explained under separate heads. See, for England, FEE, FREEHOLD, COPYHOLD, LEASEHOLD, MORTGAGE, CHATTELS, BILL OF SALE, ASSIGNMENT, FEOFFMENT, DEED, COMMON FORMS, GRANT, TRUST, SETTLEMENT, USAGES, &c.; and for Scotland, FEU, SUPERIOR, VASSAL, WARD-HOLDING, MORTIFICATION, BLANCH-HOLDING, BURGAGE-HOLDING, CHARTER, SASINE, DISPOSITION. A statement of the general nature of a C., and of the feudal system, with which the conveyancing of many of the countries of Europe is still so intimately connected, will be given under CONVEYANCING.

CONVEY'ANCER is a person who practises the art of preparing the deeds or writings used for the conveyance or transference of property from one person to another. Conveyancers in England are generally barristers, who in most instances belong to the Equity bar. There is also a special class of practitioners, known by the name of conveyancers, who are members of the Inns of Court, though not called to the bar. These must take out an annual certificate. But although most deeds respecting real estate are drawn by conveyancers, they are also the ordinary work of an attorney or solicitor, and may be drawn indeed by any party if he chooses to take the risk.

CONVEY'ANCING is the art of preparing the deeds or instruments used for the transference of property from one person to another. Such writings form the title or evidence of the right of the person possessing or claiming possession of property; and it is of the greatest importance that the conveyancer employed to prepare them, should be possessed of a competent knowledge of the law as applicable to such deeds, and have the skill required to frame them in such a form as clearly to express and attain the object intended. In the earliest stage of society, there was no call for the profession of a conveyancer; property was held in right of occupancy, without any written title, and was also conveyed from one to another without writing, the new owner being usually put in possession in presence of witnesses called for the purpose, by some symbolical form, such as the delivery of earth and stone to represent the land, a wand to represent wood, grass and corn to represent tithes, and other appropriate symbols to represent mills, fishings, or other kinds of property.

In the earlier period of the history of the Jews, the symbolical mode of changing the ownership of property was curious. 'Now this was the manner in *former time* in Israel concerning redeeming and concerning changing, for to confirm all things: a man plucked off his shoe and gave it to his neighbor: and this was a testimony in Israel' (Ruth iv. 7). In later times, the Jews appear to have had a much more artistic system of C., making use of all the safeguards that are used in modern times—viz., writing, witnesses, subscribing, sealing, and recording the documents. There is a very distinct account of a Jewish conveyance in the later period in Jeremiah xxxii. 9—12, 'And I bought the field of Hanameel, and weighed him the money. And I subscribed the evidence, and sealed it, and took witnesses. So I took the evidence of the purchase, both that which was sealed according to the law and custom, and that which was open: and I gave the evidence of the purchase unto Baruch, in the sight of Hanameel [the seller], and in the presence of the witnesses that subscribed the book of the purchase, before all the Jews that sat in the court of the prison.'

The Romans made no distinction in principle between real and personal or movable and immovable property, in their conveyancing. Each kind of property was held free of any superior. Their deeds were therefore simple, not requiring any reservation or declaration of the superior's rights. They had public registers in which conveyances were recorded. After the invasion of the southern by the northern nations, the feudal system spread over nearly the whole of Europe, and C. was regulated in accordance with it; the rights of the superior and the rights of the vassal or proprietor being carefully distinguished. The Leges Barbarorum, contained in the Burgundian Code, and the Code of the Longobardi, embody the older feudal uses, from which the modern are derived. In the 7th c., a work of peculiar interest to the conveyancer was compiled by Marculfus, a monk, containing the germs of modern conveyancing. It is in substance a book of styles or forms of deeds, partly Roman and partly feudal. The genius of the system of land-rights derived from the barbarians was to concentrate the property of land, for the sake of individual power; while the Roman laws and customs tended in the opposite direction, for they treated land in regard to succession like movables, as the French now do, dividing it among the whole members of a family. Alienation by sale or gift was freely permitted, a power long denied by the feudal rules. Indeed, feus or grants were originally revocable by the superior, and did not become hereditary till the time of Charlemagne.

Among the ancient Goths and Swedes, the conveyance of land was made in the presence of witnesses, who extended the cloak of the buyer, while the seller threw a clod of the land into it, as a symbol of the transference of possession. Among the Saxons, the delivery of a turf by the seller to the buyer was necessary. Written titles were, however, introduced at an early period, and at first were short and simple in form, but increased in length and complexity as civilization advanced, containing various conditions, provisions, and limitations, so that the art of the conveyancer became both a difficult and laborious one. He had not only to prepare the appropriate form of conveyance, but to examine the prior writings forming the title to the property, in order to judge whether they were in proper form and valid. As a general rule, a written title is now essential to the possession of real property in civilized communities; and if there is no written title, the property falls to the crown or state. In the Roman empire, extending over the greater part of Europe, the system of land-rights was allodial—that is, the lands were held independent of any superior. After the irruption of the northern nations into Italy, the feudal system was introduced, by which the proprietor has only a limited right under a superior. The introduction of the feudal system tended to complicate written titles to land very much, as not only had the rights of the grantee or vassal to be expressed and defined, but those of the granter as overlord or superior, also. In the present century, again, the tendency is towards simplicity; and in France, the feudal system has been superseded by the Code Napoleon.

In Great Britain and other countries still retaining the feudal system, the forms of C. have been much shortened and simplified. While the feudal system, on the one hand, increased the com-

plexity of C., it ought not to be forgotten that, on the other hand, it greatly lessened the number of conveyances. Under the Roman law, real property descended equally to all the heirs of a deceased proprietor, each heir requiring a written title to his own share; while the genius of the feudal law was to concentrate property in the heads of families, and the eldest son inherited the whole real estate of his ancestor; and alienation, by gift or sale, was long denied to feudal proprietors. Improvement in the science of law occasions improvement in conveyancing. Under the Roman empire, the art of C. had attained to much precision in the hands of the imperial notaries. After the fall of the empire, C. fell into the hands of ecclesiastical notaries; by them it was communicated to the conveyancers of the church, who performed the duties of the conveyancer for some centuries, till after the revival of letters, when the art again passed to laymen.

The feudal system does not seem to have been generally introduced into Great Britain till after the Conquest, though traces of it are to be found earlier. The inherent character of the feudal tenure is a grant of land made voluntarily by a king or leader, on the condition of the fidelity of the grantee and military service. While, on the one hand, the superior was a protector to the vassal in time of trouble; on the other hand, the vassal was exposed to the cupidity and rapacity of the superior, whose right to casualties or feudal incidents enabled him to oppress his vassals. The nature of these casualties or incidents will be explained under FINE, QUIT-RENT, HERIOT, COPYHOLD, ESCHEAT, WARDSHIP, MARRIAGE. One of the most curious of these incidents was that last mentioned. A male heir required the consent of his superior, and large fines were exacted for the consent. In the time of Charles I., the Earl of Warwick exacted £10,000—equal to a much larger sum now—for his consent to a lady-vassal marrying a husband in every respect suitable.

So long as feudal forms are retained, C. must be complex and expensive. Public opinion has latterly tended unmistakably towards a thorough abolition of the complex and expensive deeds required in the sale and mortgage of land; and the legislature has of late years done much towards this reform. Movable property is usually conveyed by delivery, but there are exceptions; thus, if it has been part of the bargain that the sale has to be completed by writing, the contract must be reduced to writing; and by statute, ships must be conveyed by writing. An Act for simplifying and improving the practice of conveyancing (44 and 45 Vict. c. 41) was passed in 1881.

CO'NVICT (from the Latin) means a person convicted of any criminal charge. The term came by custom to be applied to persons subject to punishment for the more serious class of offences, and of late its meaning has become almost entirely restricted to the class of criminals who used to be transported to the distant colonies of Britain. These criminals are now condemned to penal servitude for longer or shorter periods, and are usually spoken of as convicts under penal discipline, while offenders sentenced to short periods of detention in the ordinary jails are called prisoners. The convicts are confined in special C. establishments in different parts of the United Kingdom. The earlier history of the treatment of these criminals will be found under the head TRANSPORTATION. In the year 1840, the system of transportation to the chief penal colony, New South Wales, was suspended. Grave doubts had become prevalent as to the efficiency of the system, and all questions created by these doubts were solved by the refusal of the colonies to receive convicts, and the impossibility of disposing of them abroad, except in trifling numbers to the small districts of Western Australia. It was thus necessary to solve the question, how these convicts could be treated at home in a manner consistent with the objects of punishment—the protection of the community, and the reformation of the offender to the extent to which that is practicable. Before this necessity occurred, considerable progress had been made in prison-discipline by arrangements which, without subjecting criminals to absolute silence or absolute solitude, separated them from the contaminating society of each other. It was naturally supposed that a system found beneficial for ordinary prisoners would suit convicts. But it was discovered that the discipline beneficially applied during a short period of imprisonment, could not be endured for a long period without physical and mental deterioration; and that the depression and anxiety created by their long sentences—sometimes for twenty years, and sometimes for life—made convicts break down under it within the period for which it could be quite easily endured by ordinary prisoners.

It is a fixed principle of prison-discipline, that while punishment may be made to any extent disagreeable, it is never to be permitted, if possible, to injure either the body or the mind. It was found unsafe to subject male convicts to separate imprisonment for more than eight months; females, owing to some constitutional difference, are found to bear it without detriment for four months longer. At the end of eight months, then, or a year, as the case may be, the C. is gradually, so far as is consistent with safe custody, brought back into the habits of the freer population. It is usual to call the early stage of their discipline the probationary, and the later the reformatory. In the latter, they are associated under precautions and careful inspection, and are occupied in trades in which they may make their bread when free. Public works, such as the breakwater, quarries, and fortress at Portland, and the works at Chatham and Portsmouth, afford a valuable outlet for C. labor. In such establishments may be seen a thousand men or more, with hammers, mattocks, axes, and all descriptions of formidable tools, working under the eye of their warders as quietly and systematically as ordinary laborers. There are establishments where, as far as possible, the same system is administered to females—as at Woking and the general prison for Scotland at Perth. The great hold by which the convicts are kept in order, is the system popularly called 'the mark system,' under which, by steady application to work, convicts earn a remission of part of their sentence. Conduct is not taken into account in assigning these marks, but on the occasion of any specific misconduct a proportion of earned and registered marks is forfeited. The present C. establishments of the United Kingdom are: In England—Dartmoor, in which the great proportion are invalids; Portland, Portsmouth, Chatham, and Borstal, for males, in each of which there are public works; Pentonville, Parkhurst, Wormwood Scrubs, and Brixton, for males; Woking and Millbank for males and females; and Fulham, for females. In Scotland, the C. department of the general prison at Perth is occupied by a limited number of males for the first nine months of their sentence (after which they go to public works prisons in England), and by females for the whole period. In Ireland—Spike Island (with Forts Camden and Carlyle) and Lusk for males; and Mountjoy for males and females. The number of convicts in England on 31st March 1880 was—males, 9239; females, 1139: Scotland (1881), males, 31; females, 179: Ireland (1879), males, 750; females, 179.

CONVOCA'TIONS (from Lat. *convocare*, to call together) were originally synods of the clergy or the ancient ecclesiastical councils of the archbishop, but became incorporated into the English constitution of church and state, and endued with certain parliamentary privileges. Some writers distinguish between councils and C.—the former as being for spiritual purposes, and summoned without authority from the crown; the latter as being for civil purposes, and by command of the crown. The two, however, in process of time, especially after the Conquest, became gradually blended; C. made canons, and councils granted subsidies, and all distinction had disappeared before the Reformation. The circumstances attending the famous assembly at Northampton, 1282, in the reign of Edward I., helped to settle the form which C. have since assumed. In England, the provinces of Canterbury and York have each their convocation. Previous to the Reformation, these were sometimes convened into a *National* Synod; but since then, matters have usually been concluded in the C. of Canterbury, and transmitted to York for concurrence. A convocation consists of three elements—1. The archbishop; 2. The bishops; 3. The clergy of the second order. They originally met in one assembly, but since the beginning of the 14th c. the clergy in the province of Canterbury have retired into a distinct chamber, presided over by a *prolocutor*, with officers and journals of their own. These two bodies are called the Upper and Lower Houses. In the Convocation of York the same distinction exists, but on the rare occasions of their meeting, the business has been generally conducted in one assembly. The archbishop has the sole power of summoning, presiding, and proroguing; he has also a veto upon all measures. He cannot, however, summon without authority from the crown. The Upper House is the proper *locus synodi*, where the bishops have a right to sit and vote, and before the Reformation the mitred abbots had place there also. The Lower House consists of the lesser dignitaries, as deans and archdeacons, and the proctors sent by capitular bodies and by the parochial clergy. In Canterbury, the beneficed clergy only elect, and they send one proctor for each diocese; in York, all the clergy elect, and send one proctor for each archdeaconry. The Lower House deliberates on matters proposed by the archbishop; it may present petitions to the Upper House and state grievances, be with it in judicature on persons convened, and dissent from and so hinder the passing of any synodical act.

The passing of subsidies in convocation ceased in 1665, and the records were destroyed in the fire of London in the following year. Meetings of convocation fell into abeyance from the political troubles caused by the Revolution of 1688. They have been revived with considerable advantage to the church, but their action has been and is greatly restricted. In Ireland, the C. of the four provinces assembled at Dublin, all together, and were on the model of those in England. From the Union downwards, the Irish C. never assembled. Since the disestablishment, the legislative assembly of the Protestant Episcopal Church is called the General Synod. An act of parliament was passed in 1663, for

regulating the meetings of convocation in Scotland; but shortly after the Revolution of 1688, the Episcopal Church ceased to be the national church; and ever since, the meetings of the Presbyterian Church, embracing clergy and laity, have been called General Assemblies. See ASSEMBLY, SYNOD.

The position of the church of England as respects its C. is exceedingly anomalous, but is incidental to certain circumstances in the constitution and polity of the country. As essentially interwoven with the state, the church possesses no independent action; its articles, liturgy, organization as to benefices, &c., are all regulated by parliament; while its discipline falls within the scope of the ecclesiastical courts, a class of tribunals apart from the ministering clergy. The church, therefore, in its capacity as an institution to teach certain doctrines of religion, is left little to do in the way of jurisdiction. It is further urged, as a reason for restricting the power of Convocation, that being purely sacerdotal, it might be apt to run into excesses, and put forth claims adverse to the prevailing tone of sentiment on religious matters; that, in short, as things stand, it is safer for the public to be under the authority of parliament than to be subject to the ordinances of a body of ecclesiastics. At the same time, it is generally allowed that some kind of reform is desirable, though how this should be effected in a manner satisfactory to all parties, it would be difficult to say. The convocations of Canterbury and York assemble annually at the opening of parliament, each keeping up its own distinctive customs. See Trevor's *Convocations of the Two Provinces*, Cardwell's *Synodalia* and *Documentary Annals;* Lathbury's *History of the Convocation of the Church of England.*

Convolvulus: *a*, part of stem with leaves and flower; *b*, a flower-stalk and flower, the corolla and stamens removed.

CONVO'LVULUS, (Lat. *convolvo*, to twine together), a genus of plants, the type of the exogenous natural order CONVOLVULACEÆ. This order contains nearly 700 known species, herbaceous and shrubby; generally with a twining stem and milky juice; large and beautiful flowers; a 5-partite calyx; a monopetalous corolla, with regular 5-lobed and plaited limb; five stamens, the ovary free, with 1—4 cells and few ovules; the fruit a capsule, sometimes succulent.

The plants of this order are very abundant in the tropics, but comparatively rare in cold climates. Many are cultivated as ornamental plants, particularly species of *Convolvulus* and *Ipomœa*. The acrid milky juice is often strongly purgative; and jalap and scammony are products of this order. Some species, however, have large farinaceous roots, capable of being used as food, of which the Batatas (q. v.), or Sweet Potato, is the most important. A few are natives of Britain, and are known by the name of BINDWEED. *C. arvensis* is a troublesome weed in some sandy soils in England, and *Calystegia sepium* in richer soils. The former has rose-colored fragrant flowers, the latter large white flowers. Both are ornamental; the latter is now often planted to cover posts and trellises. *C. scammonia* yields scammony, and the root of *C. panduratus* is used as a purgative in the United States. *C. scoparius*, a shrubby species, native of the Canary Isles, yields one of the kinds of wood called Rosewood, which has a strong smell of roses.

CO'NVOY (Fr. *convoi*) is the name given to one or more ships of war appointed to protect a fleet of merchant-vessels against the attacks of an enemy or of pirates. If a merchant-ship part company with the C., or neglect to obey the signals, all claims of insurance are forfeited. The name is sometimes applied to the merchant-vessels so escorted. In the military service, a C. is, properly speaking, a train of wagons laden with provisions or warlike stores; the term, however, is applied also to the detachment of troops, or escort, appointed to protect such train.

CONVU'LSIONARIES, the name given to a fanatical sect of Jansenists who sprang up in France about 1730. Their meeting-place was the churchyard of St. Medardus, in a suburb of Paris, where was the tomb of a certain Francis of Paris, who died in 1727, and was reckoned very holy by the Jansenists on account of his extravagant asceticism. At this tomb a multitude of people poured forth fanatical prayers, preachments, and prophesyings. Miracles are also alleged to have been performed, for proof of which we are referred to a work written by M. Montgeron, a French senator, and entitled *La Verité des Miracles opérés par l'intercession de François de Paris* (Paris, 1737). After 1731, the fanaticism of the C. increased to utter madness. 'They threw themselves into the most violent contortions of body, rolled about on the ground, imitated birds, beasts, and fishes, and at last, when they had completely spent themselves, went off in a swoon.' In 1733, the king issued an order for the imprisonment of these fanatics, but it was found impossible to put a complete stop to the mischief. They took to predicting the downfall of the throne and the church, which prophecy the French Revolution appeared to fulfil. They were not much heard of in Paris after the middle of last century, but have occurred in country-places at various times within the present century. They brought Jansenism into so much disrepute, that Voltaire declared the tomb of Francis to be the grave of Jansenism.

CONVU'LSIONS, a form of disease very frequently affecting infancy, in which the body is thrown into violent spasmodic contractions, the sensibility and voluntary motion being for a time suspended. A fit of C. may last from a few minutes to some hours, and may readily prove fatal, if not relieved within a short period. The first symptom observed is often a twitching of particular muscles or groups of muscles, and a change in the habitual expression or color of the face, with distension of the features, and turning of the globes of the eyes suddenly upwards. The fingers are sometimes clenched in the palm, and the feet turned inwards; sometimes, however, C. occur absolutely without warnings of this kind, and even in the midst of perfect apparent health. Their cause is usually to be found in some source of irritation, capable of producing fever if long continued; as, for instance, disordered dentition, worms in the intestine, hooping-cough, &c. Most epidemic fevers are also apt to be attended, in children, by C. in their early stages; and diseases of the brain and its membranes at every stage of their progress. C. are greatly promoted by bad ventilation and injudicious feeding, with deficient exercise; and a great part of the cure consists in discovering and removing the causes of the disease.

When a child is suddenly seized with C., or with a tendency to spasm, such as twitching of the features, or contractions of the fingers and toes, it should be placed at once in a very free current of air, with its feet towards the fire; the extremities should be kept warm, and a cold lotion may be applied to the head, especially if there is much flushing of the face; a little castor oil may be given if the bowels are confined; and if there is flatulence, the belly may be rubbed with a warm hand, or with some simple stimulating liniment, such as camphorated oil. Not much more can be done without medical assistance; but in the event of the case being very serious, and medical aid at a great distance, it might perhaps be right to cause the child to inhale a little chloroform, great care being taken that plenty of air is also admitted to the lungs. The strictly medical treatment commonly consists in the administration of medicines adapted to the state of the bowels, with the application of cold to the head, and sometimes the inhalation of chloroform. Leeches and bleeding are very rarely useful, though too often employed.

C. are rare amongst horses and cattle. In young dogs, however, they frequently occur from intestinal worms, disordered digestion, or in connection with distemper or other debilitating diseases: they usually disappear when their special causes are removed.

CO'NWAY, or ABERCO'NWAY, a seaport town of Caernarvonshire, North Wales, on the estuary of the Conway, here crossed by a fine tubular, and a suspension bridge, 22 miles north-east of Caernarvon. The town, which is triangular in form, is beautifully situated on a steep slope on the left bank of the Conway, and is surrounded by walls 12 feet thick, with towers and battlements. The principal streets are well proportioned and regular, and contain several ancient houses. C. Castle, one of the noblest castellated structures in Britain, stands on a precipice overlooking the river. It was first built by Hugh Lupus, Earl of Chester, and rebuilt in 1283 by Edward I., to check the Welsh. Its walls are 12 to 15 feet thick, with eight vast towers, four of which are each surmounted by a slender turret. In 1646, the parliamentary forces took the castle, but did not injure it; but after the Restoration it was dismantled by the Earl of Conway. The Plâs Mawr, 'Great Mansion,' is a noble pile erected in 1585, in the Elizabethan style, with the exterior and interior profusely ornamented with figures, coats of arms, scrolls, &c. The harbor is dry at low water. Conway was an opulent town until the great plague in 1607 almost depopulated it. A Cistercian abbey was founded here by Llywelyn ab Jorwerth, prince of North Wales. Llywelyn the Great, and several other princes and illustrious persons, were buried in it. The Castle Hotel occupies its site. Pop. (1881) 3179. C. (a chartered borough since 1876) unites with Caernarvon, Bangor, Criccieth, Nevin, and Pwllheli in returning one member to parliament.

CONWAY, a river in North Wales, 30 miles long—one of the most noted in Wales for the bold romantic scenery along its higher, as well as the rich beautiful scenery along its lower course. It rises in a small mountain-lake where the three counties, Merioneth, Denbigh, and Caernarvon meet, and runs north-west, north-east, and north, past Llanrwst, Trefrhiw, and Con-

way, to Beaumaris Bay in the Irish Sea. It receives many rapid mountain-streams. In the lower 12 miles of its course it is a large, winding, smooth stream, up which the tide flows, and is navigable for vessels of 100 tons. At Conway it is half a mile broad at spring-tides, which rise here 21 to 24 feet. The C. has been famous for its pearls since Roman times.

CONY, an old English name for the rabbit, but employed in the authorized and other versions of the Bible as the translation of

Daman or Ashkoko. The Cony of the Bible.

a Hebrew word which certainly does not designate the rabbit. The C. of the Old Testament is with the greatest probability supposed to be the Daman (q. v.) or ashkoko.

CONY'ZA, a genus of plants of the natural order *Compositæ*, sub-order *Corymbiferæ*, of which one species, *C. squarrosa* (also known as *Inula conyza*), is of frequent occurrence in England and throughout great part of Europe. It has a stem two or three feet high, downy ovato-lanceolate leaves, and yellow flowers. It receives the English name Fleabane and Ploughman's Spikenard, and has a strong peculiar smell, which is said to drive away fleas and gnats. In most of the languages of Europe, it bears names referring to this property.

COOK, CAPTAIN JAMES, one of the most eminent among England's celebrated navigators, was born October 27, 1728, at Marton, in Yorkshire, where his father was an agricultural laborer. At first apprenticed to a haberdasher, he afterwards went to sea, and having spent some years in coasting-vessels, entered the royal navy, in which he soon rose to the rank of master. The charts and observations which he drew up as marine-surveyor of the coasts of Newfoundland and Labrador, introduced him to the notice of the Royal Society, who offered him the command of an expedition to the Pacific Ocean, to make an observation of the transit of Venus over the face of the sun. The voyage being one to his taste, C. immediately accepted the offer, and set sail from Plymouth on the 26th of August 1768 in the *Endeavour*, a small ship of 370 tons. The expedition arrived at Tahiti (or Otaheite, as he named it) on the 13th April of the following year; and the transit was witnessed in a most satisfactory manner on the 3d June. Leaving Tahiti on the 13th July, C. visited New Zealand, which had not been touched at by Europeans for a century and a quarter; and after exploring the coast for six months, sailed westward, reaching (on the 19th April 1770) New Holland, now Australia, which he called New South Wales, and took possession of in the name of Great Britain. Having explored a large portion of the coast, he steered for New Guinea, passing between Australia and that island, and thus proving, what had heretofore been doubted, that the two were distinct islands. Continuing his voyage by Java, Batavia, and the Cape of Good Hope, C. anchored in the Downs on 12th June 1771. This voyage, besides vastly increasing geographical knowledge—one of the most important results in this respect being, that it proved that neither Australia nor New Zealand belonged to the southern continent at this time supposed to exist, and that to the northward of lat. 40° S. no continent could exist—also added not a little to the sciences of botany and astronomy. A second voyage, for the discovery of what was then called the *Terra Australis Incognita*, which was now believed to lie in higher latitudes than had hitherto been explored, was undertaken by C. in the year of his return; and the expedition, consisting of two ships—the *Resolution* and the *Adventure*—sailed from Plymouth on the 13th July 1772.

It would be out of the scope of this article to follow Captain C. through his three years' navigation of the Pacific and Southern Oceans, in the course of which time he sailed upwards of 20,000 leagues. It can only be stated generally, that his voyage proved the non-existence of land of any extent between the 50th and 70th parallels. C. arrived in England again on the 30th July 1775. So admirable had been his arrangements for the health of his crew, that during the whole voyage he lost only one man by sickness; and so skilful his seamanship, that not a spar of any consequence was lost. C. wrote an account of his second voyage himself. The belief in a practical North-west Passage, notwithstanding the failure of attempts extending over two centuries, still held possession of men's minds; and C. had no sooner returned from his second voyage, than he offered his services to the Admiralty, who had resolved on another effort for the discovery. They were gladly accepted, and C. determined to seek the passage by the way of Behring's Strait, instead of by Baffin's Bay and Davis' Strait, the routes formerly attempted. In his old ship, the *Resolution*, accompanied by Captain Clerke in the *Discovery*, C. sailed from Plymouth on the 12th July 1776. In this last voyage, C. met his death at the hands of savages, on the island of Hawaii, while endeavoring to recover a boat which had been stolen from the *Discovery*. This tragical event occurred on the 14th February 1779; not, however, before C. had made valuable additions to our geographical knowledge of the coasts of America and Asia, in the region of Behring's Strait. The news of his death occasioned deep and general regret in England. The king granted his widow a pension of £200, and each of his children £25; while the Royal Society did honor to his name, by having a gold medal struck in his commemoration. C. was one of England's greatest navigators. A practical and scientific seaman, he was also a sagacious, self-possessed commander, kind although strict to his crew, and marked by indomitable perseverance and ready decision.

COO'KERY. To prepare and soften food by the action of fire, and so to render it fit for digestion by the human stomach, has been a general custom from remote times; and more or less of skill in accomplishing this primary end has been displayed, according to the knowledge, wealth, and refinement possessed by each nation or people.

In ancient times, the occasion of a banquet appears chiefly to have arisen in a sacrifice to the gods, when a part of the victim was brought to the dwelling of the sacrificer, and was cooked for the feast. Birthdays, funerals, and victories were also celebrated in this manner. 'The Persians,' says Herodotus, 'were accustomed to honor, above all others, that day on which they were born, when the rich among them would sacrifice an ox, a horse, or a camel, which they roasted whole in ovens, while the poorer class gave only the smaller animals, as sheep. Yet the Persians were not great eaters of meat, but consumed much sweet food, and did not use salt.' The appendages to the higher order of banquets were most magnificent, so that in point of quantity and display they were very expensive.

Herodotus says on this head, 'that the Greeks who invited Xerxes to supper all came to the extremity of ruin; and that, wherever he took two meals, dining as well as supping, that city was utterly ruined.'

The Egyptians, it is said, were great bread-eaters. Though they possessed wheaten-flour of the finest sorts, they do not appear to have used it for their common bread, which was made of spelt, or of the center of the lotus dried and pounded. Fish they salted and dried in the sun; quails, ducks, and small birds they salted and ate raw. We read of their roasting and boiling the flesh of the ox. Large flocks of geese and of fowls were kept by them for the use of the table, hence their plan for the artificial hatching of eggs. 'Fish was used by all classes except the priests, but the staple food of the people consisted of vegetables, of which they had a large supply.' Herodotus mentions their making beer from barley, which they called *lythus*. We may still see the form in which their food came to table; ducks, loaves made round, and some biscuits and cakes, which have been taken from Egyptian tombs, are to be found in the British Museum. Apollonius, who wrote a treatise on the feasts of the Egyptians, says that they ate in a sitting posture, using the very simplest and most wholesome food.

There appears to have been considerable difference as to the manner in which good eating was appreciated in different parts of Greece. The Athenian meals are ridiculed by the comedians for their parsimony. After the Homeric age of simplicity, in which roast and boiled meat seems to have sufficed the kingly table, a diversity of preparation was obtained in cooking, and a certain epicureanism displayed in the quality, seasoning, and method of dressing food. The names of many authors of C. books are preserved in the writings of Athenæus; that of Archestratus, who is called the guide of Epicurus in his pleasures, and styled the inventor of made dishes, being the most renowned.

Fish was a principal article of food with all classes of Greeks; but with the wealthier, much skill and delicacy were used in cooking it, and choice and expensive sorts were sought after. Archestratus writes of 'a boiled torpedo done in oil and wine, and fragrant herbs, and some thin grated cheese.' Fish, stuffed with forcemeat and fried, boiled in pickle, baked in fig-leaves soaked in oil, cooked in hot ashes, &c., are among the recipes we find recorded. Large quantities of salt-fish were brought from the shores of the Euxine and the Hellespont; and this, with meal, cheese, and onions, was the chief food of the armies and navies when on service.

The Greeks boiled and roasted the flesh of sheep, pigs, lambs, and goats. They had poultry, small birds, and game, and sausages made of blood, partaking of the character of black-puddings. The bread made at Athens was the most celebrated; it

was sometimes household, but chiefly bought in the market, and was made in great variety, as pan-loaves, rolls, sweet loaves, &c. The bread eaten by the poorer classes was made of barley, and sometimes flavored with oil, honey, poppy-seed, &c. Athenian cheese-cakes were also famous; and they had honey and sesame-cakes, which, with fresh and dried fruits, as figs, almonds, olives, and nuts, seem to have been partaken of after dinner. They consumed vegetable food also in abundance, and had cabbage, onions, lettuce, and so on.

In the Greek house there was no regular cook, though in the establishments of the wealthy several females were kept, to attend to the kitchen. The women, in general, saw to the requirements of the table, and even the lady of the house was not idle. Cooks stood in the market at Athens, ready to be hired for particular occasions; the most celebrated were those of Sicily; they were probably persons of some importance.

'To roast some beef, to carve a joint with neatness,
To boil up sauces, and to blow the fire,
Is anybody's task; he who does this
Is but a seasoner and broth-maker;
A cook is quite another thing. His mind
Must comprehend all facts and circumstances:
Where is the place, and what the time of supper;
Who are the guests, and who the entertainer;
What fish he ought to buy, and where to buy it.'

Quoted by Athenæus from Dionysius, a comic poet.

In the early days of Rome, a gruel made of barley, and called *puls*, was the principal food of the people, and with green and other vegetables was, till later times, the usual fare of the inferior classes—meat being used but sparingly. By degrees, however, a taste for better eating crept in; and after the Asiatic conquests luxury was imported. Lucullus introduced habits of epicureanism after his return from Asia; the gourmand Apicius earned for himself a deathless name. The wealthy Romans cared for the elegant serving of their table, as well as for the quality of viands placed before them. With them, as with the Greeks, fish was a necessary as well as a luxury: they took much trouble to procure their oysters, and gave large sums for other fish. We read of a mullet of six pounds sold for 8000 sesterces (£70 16*s.* 8*d.*), and of the rhombus or turbot from Ravenna being held in high estimation.

They seem to have been as clever as the French in preparing *surprizes*, and in carrying out *disguises* in their dishes. The *pistor*, who made the bread and pastry, and the *structor*, who composed artificial figures of fruits or flesh, and who also arranged the dishes, seem to have shared the duties of the cook. We read of dainties, as ring-doves and fieldfares, hares, capons, ducks, peacocks, pheasants, and the livers of geese; also of such a formidable *pièce de résistance* as a 'huge boar, surrounded with sucking-pigs made in sweet paste, which were distributed among the guests.' The Romans prepared and cooked their food with oil to a great extent. Their meals probably consisted of two courses and a dessert, the first course being of materials intended to sharpen the appetite, and the second the 'brunt of war,' that is, a joint roasted or baked. The discovery or cultivation of vegetables, perhaps, gave rise to some proper names, as Lentulus, Fabius, &c. It is a Roman saying, that the number of persons at a repast should not be less than that of the Graces, nor more than that of the Muses. The Greeks and Romans used honey for the purposes for which we use sugar. The sugar-cane probably was cultivated in China, and its manufacture understood there; but the Greeks took it for a kind of concrete honey, and used it only for medicinal purposes.

Of ancient British C., nothing is known; it was probably of an extremely rude description. Hares, poultry, and fish are said to have been forbidden as food. We do not find much mention of the art of C. in the Saxon chronicles. The Danes and Germans appear to have been great drinkers, and to have paid little attention to the preparation of their eatables. The Normans were more curious in these matters; some offices among them were held in right of the kitchen. In early English C. much use was made of the mortar. Oil and lard were used instead of butter. Several English C. books bear an early date, as *The Forme of Cury*, by Mr. Pegge, 1390; and others date as follows: Sir J. Elliott's book, 1539; Abraham Veale's, 1575 *The Widdove's Treasure*, 1625.

The C. of France was probably of an imperfect and rude kind, till the introduction of Italian tastes by the princesses of the House of Medici. The ancient use of oil was modified by the discovery made by the French, of dressing meat in its own gravy. In our own day, there is no denying that the French cook is a true artist. We may, if we please, impute the trouble he takes with the dressing of his meat to the inferiority of the material, but this can be said of meat only; the preparation of vegetables and fruits is attended to with equal care, although, probably, the French have some of these things in greater perfection than ourselves.

The great difference between French and English C. consists in the fact, that they cook their meat much longer than we do. They consider that this renders it more digestible. They are thereby enabled to multiply dishes by altering or annihilating the original taste of the meat, and making it a vehicle for foreign flavors. The variety, daintiness, and grace of form which dishes thus acquire, is advantageously made use of by us, when we admit them at our repasts to mingle with our heavier and radically English joints. But, for ourselves, we desiderate the integrity of the form and flavor of our meats, considering that to be *over-cooking* which the French think only sufficient. In the point of economy, the French have a decided superiority over us. The French cook throws nothing away. Instead of going to the butcher for meat for stock, as our English cook does, he uses the trimmings for stock and glaze, and the skimmings of his boiled meats for purposes to which we apply butter or lard; and like a true workman, he produces great results from small means. This requires an education which few mistresses demand and few cooks obtain, but which, when achieved, justifies the expression of Voltaire:

Qu'un cuisinier est un mortel divin!

The estimation in which the services of a cook are held, may be known by the large salary attached to the office in great families, hotels, and club-houses. A visit to the kitchens of one of these establishments will teach us what a highly important post is that of *chef de cuisine*. There must be in such a person not only the necessary knowledge how things are to be done, but the power to arrange and direct the work of the numerous assistants, as to the exact part they must fulfil at each moment of their long and busy day. These places, indeed, are excellent schools for cooks, where they can undergo that severe training, without which a thorough practical knowledge of the business cannot be attained. It is indeed to be regretted—because a source of so much disappointment, discomfort, and waste—that a knowledge of plain C., at least, is not more desired by mistresses for themselves. That acquirement, and household management generally, are important enough to be made part of the education of all classes. The poorer would thereby be enabled both to lay out their money profitably, and to prepare their food so that it might satisfy and nourish them; and the heads of establishments in the upper classes would be more in a position to direct, appreciate, or, if necessary, condemn the performance of the cook. A cultivated and elegant taste is as much shown in the arrangement of viands as in the furnishing and decoration of the choicest boudoir.

The art of C., as a branch of female education, has latterly engaged considerable attention in England; and there are in London, Edinburgh, and other places, establishments where young ladies receive this kind of instruction. Recently, a school of cookery has been attached to the South Kensington Museum. Efforts are also made to teach C. to the humbler classes of girls, but much in this respect remains to be done.

For any shortcomings in cooking, however, the taste of the English is in some measure accountable. The universal practice of roasting large pieces of meat, which cannot be consumed while hot, causes no little waste, and is obstructive of improvement. The Scotch—who derive some part of their C., along with other usages, from the French—deal more in soup and boiled meat than the English, and their processes, while not less savory, are perhaps more economical.

So numerous are the books on C., that it would be out of our power to name even all the excellent ones. We can only say that Miss Acton's *Cookery Book*, Webster and Parkes' *Encyclopædia of Domestic Economy*, Mrs. Beeton's *Household Management*, Soyer's work, and Francatelli's are all good; *Meg Dods's Cookery* is also excellent. For cheapness and simplicity we may refer to Chambers's *Cookery for Young Housewives* (1*s.*). The two last mentioned embrace Scotch along with English cookery. See FOOD, BOILING, ROASTING, &c.

COOKERY, ARMY, is now becoming an important feature in the English military system. The sufferings in the Crimea in the winter of 1854—5 drew public attention to the subject; it was then found that C. was little understood by the British troops, and that the soldiers seldom had meat otherwise than boiled. M. Soyer was sent out by the government, principally to advise in reference to hospital C., but also to improve the system of camp-C., so far as military routine would allow. He devised new forms of stove, and constructed recipes for using to the best advantage all the available provisions for a camp. The officers at Sebastopol made a highly favorable report of Soyer's *field-kitchen*, a kind of camp-stove, with a caldron holding 12½ gallons: two such stoves would easily cook for a company of 100 men; both could be carried by one mule, with sufficient dry wood for three day's fuel. Though mainly intended for boiling, the apparatus afforded facilities for many varieties of cooking. When M. Soyer returned to England, he made a few improvements; and finally the apparatus presented itself as a sort of upright can, suitable for boiling,

steaming, baking, roasting, stewing, and making tea or coffee: with 14 lbs. of fuel, one of these would cook for 50 men; and if twenty such were put near together, four cooks could serve for 1000 men.

A committee which inquired on the subject of barrack economy some years ago, recommended that every large barrack should have a bakery with two ovens, where the men could learn to make and bake their own bread; and that the barrack-kitchens should be so furnished as to enable the men to bake their meat if so inclined instead of being confined, as heretofore, almost wholly to boiled dinners.

A school of cookery has been formed at Aldershot, where men are trained to act as sergeant-cooks, of whom there is now one to each regiment. His duty is to superintend and direct the operations of the soldiers detailed from the several companies to act as cooks.

Numerous forms of apparatus have been invented for baking and cooking food in the field. Several of them are based on modifications of Papin's Digester; such as the compressed steam cooking-pot of Captain Warren. Steam baking-ovens have also been successfully used; and apparatus has been devised for cooking while *the kitchen itself is on the march.*

COOK ISLANDS, otherwise known as the Harvey Archipelago, were visited rather than discovered by the navigator whose name they bear, during his first voyage. They lie about midway between the Society and Navigator groups, near lat. 22° S. and long. 158° W. The principal members of the cluster are Mangeia, Atiou, Harvey, and Raratonga. The natives, estimated at about 15,000, have been generally converted to Christianity; Raratonga, in particular, being one of the most successful missions in Polynesia.

COOK, MOUNT, the highest peak of Australasia, is one of the Southern Alps in the South Island of New Zealand. It is 14,000 ft. high, is covered with perpetual snow, is difficult of access, and was scaled for the first time in 1882.

COOK'S STRAIT, discovered by Captain Cook on his first voyage, separates the north and south islands of the New Zealand group, and varies from 80 to 100 miles in width. The proof of its existence dissipated the popular belief that New Zealand, as previously known, was merely a salient point of a great southern continent.

COO'KSTOWN, a town in the county of Tyrone, Ireland, 23 miles E.N.E. of Omagh. It consists of one very long and broad street, shaded with trees. It has a linen trade. Pop. (1881) 3870.

COOKTOWN, on the extreme north of Queensland, 1050 miles north of Brisbane, is one of the chief ports of the colony, though only founded in 1873. There are already handsome banks, schools, and public buildings. Pop. about 5000, of whom 3000 are Chinese. Near there are gold diggings and iron mines, and fisheries of beche de mer.

COO'LIES, or COULIES, originally the name of one of the aboriginal or hill tribes of Hindustan. From the circumstance that many of this tribe are employed as laborers and porters in Bombay and other places, the name is applied by Europeans in Hindustan to porters in general; and it is now used to denote emigrant laborers from India and China to tropical and other countries.

The importation of this useful class of laborers to the Mauritius, West Indies, and British settlements on the mainland of South America, has grown up as a result of negro emancipation—the emancipated slaves showing an indisposition to become regular laborers. Hence the necessity for resorting to imported labor from India or China.

Much difference of opinion prevails as to the propriety of coolie immigration. It is one of those vexed questions on which something can be said on both sides. We would refer to Mr. A. Trollope's *West Indies and Spanish Main* (1860), for some general observations on the introduction of C. to certain British West India settlements. A later work by Mr. Jenkins, *The Coolie, his Rights and Wrongs* (1871), though relating exclusively to British Guiana, is full of most interesting matter. The conclusion at which he arrives regarding the system is thus expressed: 'Taking a fair review of the whole system, it is one which spite of its disabilities, its difficulties, its present evils, is full of promise, and, in my belief, can be made, with care, and skill, and honest endeavor, not only an organization of labor as successful as any hitherto attempted, but one leading to almost colossal benefits' (p. 367). Mr. Jenkins, further asserts that 'any one who has seen the coolie in British Guiana is forced to admit that he has undergone a change for the better. In illustration of this, we may mention that the number of immigrant depositors in the British Guiana Savings Bank on June 13, 1870, was 1817, whose deposits amounted to 138,425 dollars, or over 70 dollars a head. The commissioners appointed by her Majesty to take evidence on the working of the system at the time Mr. Jenkins went out, state in their Report (pp. 854, 855): 'From papers submitted by the Immigration Agent-general, the commissioners gather, that in 12 ships which sailed with returning Indian immigrants between 15th November 1834 and the 11th November 1869, 2828 immigrants took away with them money acquired in the colony to the amount of 433,369 dollars, or £94,452.' The great drawbacks of the system appear to be the reckless mode of recruiting in India; the insecurity, if not the actual worthlessness, in Guiana of contracts drawn up in the former country; the severe penalties attached to breach of contract, and the practical difficulties, as the law stands at present, in the way of the coolie obtaining a remedy for any injustice inflicted on him. Immigration from China was stopped for all the West Indies in 1867, on account of the Chinese government insisting on a return passage at the end of five years, which the planters find will not pay them for their outlay. The total number of C. at present in British Guiana is about 50,000.

The reports (1872 and 1877) of the governor of *Trinidad* on the coolie question are satisfactory. In 1870 various laws were passed, all of a just and beneficent character. 'Among the most important provisions,' says Governor Longden, 'are those which regulate the allotment of immigrants upon their arrival in the colony, the supply of food to them during the first two years of their residence, their lodging, the medical attendance and hospitals provided for them, their wages, the exemption of women from labor, the prevention of vagrancy, and the right of repatriation.' In proof of this it may be stated, that although the coolie has a right to a free passage back to India at the public expense, after a continuous residence in the island for ten years, in many cases he has preferred to commute this right for a grant of ten acres of crown land, and to settle permanently in the colony. The number of Indian immigrants in 1871 amounted to 27,400. In addition to these must be reckoned 1400 Chinese.

Sir J. P. Grant, while governor of *Jamaica*, was no less emphatic in expressing his opinion that a great change for the better has taken place in the treatment of the coolie in that island also. His words are (*Report* for 1871): 'Under the old state of things this department [the Immigration Department] in Jamaica was in a disgraceful state, but it has now been completely reformed under the new system introduced by the new law of 1869.' This law secures to the coolie full payment of day-wages at the rate fixed by law as a minimum, unless where he prefers task-work, and also regular daily rations during the whole of his five years' term of indenture, besides putting an end to all stoppages of wages at the arbitrament of only one party to the bargain. Many of the details of medical supervision are extremely creditable to the planters. The public returns for 1872 give the gross number of Indians at 7793; for 1879, at 15,134. Here also, as well as in Trinidad, the C. show a disposition to become settlers on the crown lands.

Some recent reports from the island of *Mauritius* are less encouraging, which is much to be deplored, because that island contains more C. than all the rest of our colonial possessions put together. Out of a total population of (1881) 359,419, more than 247,000 were Indian immigrants. It would seem that the relations between employers and employed are not quite satisfactory, though here too, improvement can be noted.

Besides what may be called the *legitimate* traffic in Chinese C. (stopped at present), an infamous counterfeit was long carried on at Macao (q. v.). Native crimps brought thousands of their countrymen to that Portuguese island, and shipped them for Cuba and Peru. This 'involuntary emigration,' as it has been called, began in 1848, and as many as 13,000 persons were shipped in the course of a year; but as in reality it was nothing more than an elaborate system of kidnapping, the Chinese and British governments, in 1872, prohibited any vessel suspected of being engaged in this trade, from fitting out in any Chinese or British port, and the 'trade' was practically destroyed in consequence. At the close of 1873, the Portuguese government formally declared the 'exportation' of C. illegal, and the atrocious traffic may now be considered at an end.

Similar to the coolie immigration, though the laborers are not called C., is the importation of Polynesian natives into Queensland to work on the sugar plantations, and into the Fiji Islands. By laws of 1868 and 1875, the Imperial Parliament has secured the rights of a helpless but industrious race. See *In Quest of Coolies*, by J. L. A. Hope (1872).

COOMA'SSIE, the capital of the kingdom of Ashantee, Western Africa, is situated about 120 miles N.N.W. of Cape Coast Castle, in lat. 6° 35′ N., long. 2° 12′ W. C. occupies the side of a rocky hill, and is about four miles in circuit. The walls of the houses are mostly formed of stakes and wattle-work, the interstices being filled up with clay; the roofs are of palm-leaves. The king's palace is here. C. was captured and burned in 1874 during the war with Great Britain. See ASHANTEE. Pop. stated by natives to be 100,000; but other reports, including observations during the war, say 20,000.

COO'PER, James Fenimore, an American novelist, was born at Burlington, New Jersey, United States, September 15, 1789. Having received his early education from a private tutor, he, at the age of 13, passed to Yale College, and after three years' study there, entered the American navy as a midshipman. He remained six years at sea, gathering the experience of which he was afterwards to make such good use in his novels. On his retirement from the sea in 1811, he married; and the next ten years of his life were spent in a quiet, domestic fashion. In 1821 appeared his first work, *Precaution*, a novel that afforded no indication whatever of the talent he subsequently exhibited. In the following year, however, he published *The Spy*, a tale which at once secured for him a place in the first rank of novelists. By not a few critics he was even elevated to a higher pedestal than that which Scott occupied; but time sobered their judgment, while it still left him a deservedly high position as a writer of fiction. In quick succession followed *The Pioneers*, *The Pilot*, *The Last of the Mohicans*, *The Red Rover*, and *The Prairie*, with which C.'s genius culminated; for though between this date (1827) and 1850 he wrote about 26 different works, none of them equalled in merit those we have mentioned. The secret of C.'s success as a novelist lies in his graphic descriptive powers, and his thorough knowledge of the matters he describes—whether it be the boundless ocean or the broad prairie—together with an attentive study of character. Not a little of his popularity in America, however, must be attributed to his nationality; and in Europe a good deal of it was owing to the freshness of the scenes in which his stories were laid. About 1827, C. visited Europe, where he remained several years; the fruits of his sojourn, besides novels, being some ten volumes of sketches of European society, which added nothing to his reputation. Many of his works have been translated into most modern languages, and one—*The Spy*—can be read in Persian. C. died at Cooperstown, in the state of New York, 14th of September, 1851.

COOPER, Sir Astley, a celebrated English surgeon, was born at Brooke, in Norfolk, where his father was a curate, in August 1768. In his 16th year, he went to London, and placed himself under the care of Mr. Cline, one of the most noted surgeons of his day. He devoted himself with ardor to his profession, and was a constant attender at the dissecting rooms, and also at the lectures of the famous John Hunter. In 1787, C. was appointed demonstrator of anatomy at St. Thomas's Hospital; and four years after, he assisted Mr. Cline, who was surgeon at St. Thomas's, in the course of lectures on anatomy and surgery. In 1792, he was appointed Professor of Anatomy at Surgeon's Hall; and in 1800, surgeon to Guy's Hospital. In 1813, he received the professorship of comparative anatomy in the College of Surgeons. Meanwhile, C. had been enriching medical literature by various contributions. An essay on the effects resulting from the destruction of the *membrana tympani* gained him, in 1802, the Copley medal of the Royal Society, of which he was elected a fellow three years afterwards. In 1804—1807 appeared his great work on *Hernia*, with illustrations mostly of life-size, a contribution of the utmost value to medical science—the anatomy of the disease and the mode of operating for its relief being alike ill understood before—though in a pecuniary point of view it proved very unprofitable to himself. The practical part of his profession was not neglected during this time. He was the first to attempt the tying of the carotid artery, an attempt which, though unsuccessful in his hands, has since proved effectual in the hands of other practitioners. His annual income, which in the fifth year of his practice only amounted to £100, had in 1813 risen to the enormous sum of £21,000, perhaps the largest ever received by a surgeon. In 1817, he tried what has been considered the boldest experiment ever attempted in surgery, the tying of the aorta, which did not prove successful; and it has since been tried with no better result. In 1820, C. removed a steatomatous tumour from the head of George IV., who marked his appreciation of the operation by conferring a baronetcy upon C. some six months after. In 1822, he was elected one of the Court of Examiners of the College of Surgeons, and in 1827, President. In the following year he received the appointment of sergeant-surgeon to the king, and in 1830 was made Vice-president of the Royal Society. Other honors flowed in upon him. He was made a member of the French Institute, and corresponding member of the Royal Academy of Sciences, a D.C.L. of Oxford, and an LL.D. of Edinburgh.

Ever busy with his pen as with his knife, he, in 1822, published a work on *Dislocations and Fractures*, which threw much new light on the subjects discussed, and also suggested improved methods of treatment. His treatise on the *Anatomy and Diseases of the Breast* (1829—1840) was characterized by all the care, research, and originality which distinguished his previous works; so likewise was his *Anatomy of the Thymus Gland*, 1832. C. died 12th February 1841. A colossal statue to his memory is erected in St. Paul's Cathedral, London. As a teacher, C. possessed the faculty of communicating knowledge in a manner at once easy and agreeable; and he elevated medical surgery, the operations of which before his time have been described as a series of 'frightful alternatives, or hazardous compromises,' into a science.

COO'PERAGE, the art of making vessels of pieces of wood bound together by hoops. It is a very ancient art, such vessels having been in use among the Romans at the period of the Christian era. The upright pieces forming the sides of a barrel or cask, or other cooper's work, are called *staves*; and as casks are usually larger in the middle than at the top and bottom, this swelling, called the *belly* or *boulge*, is formed by skilfully shaping each stave so that it shall form part of the required double conoid, and that, when all are built and hooped together, their edges shall coincide perfectly; for this purpose each stave is made broadest in the middle, and narrowed down in a curved line towards each end. A skilful cooper can work this curve so accurately, that no further fitting or alteration shall be needed when the staves are put together. The staves are made to meet at their inner edges, and by driving the hoops very hard, the inner part is compressed until the slight gaping outside is closed, and thus slight inaccuracies of fitting are remedied.

There are several branches of cooperage. The *wet* or *tight* cooper makes vessels for holding liquids. The *dry* cooper does inferior work, such as barrels for containing dry goods, where an inferior degree of accuracy is sufficient. The *white* cooper makes churns, pails, &c., which for the most part have straight sides.

The best work is made of oak, which must be thoroughly dried before being put together. In warm countries, the drying of the sun is sufficient, and casks are therefore mounted in summer only; but in Britain, artificial drying is commonly resorted to. The hoops are hammered down from the narrow to the wide part of the cask, by means of a mallet striking a piece of wood held against the hoop. Iron hoops are sometimes put on hot, in order that their contraction on cooling may bind the work together.

CO-OPERA'TION is the term applied to a system of united effort for commercial or industrial purposes. It refers simply to a joint-stock copartnery on ordinary commercial principles, with limited liability of members; but by the interposition of the legislature for protecting individual interests, and encouraging self-denial and thrift, it possesses some distinct features. Usually, a co-operative society consists of a body, several hundreds in number, belonging the manual laboring classes, clerks, shop-assistants, &c.; the object being the distribution of articles of daily consumption among the members. A store is established under a manager, and assistants; goods of the best quality are purchased on favorable terms, and retailed to members at such an advance on cost price as will pay expenses and leave a small profit over. All the sales whatsoever are for ready money; no credit is given. Soundness in the articles bought and comparative cheapness are alone aimed at; and such results are attained by care in the management, and by adhering to the ready-money system. There is little trouble in book-keeping, no loss from giving credit. In point of fact, the customers of the concern are their own shopkeepers. To carry out any such principle of co-operation with advantage, there must be a large intelligent population, along with mutual trust, and a considerable similarity of tastes.

Membership is constituted by payment of shares. Ordinarily, the share is one pound sterling, to be paid up at once, or by small weekly instalments. By 18 and 19 Vict. c. 63, a member can own shares to the amount of £200. The shares are not transferable, unless the rules of the society make them so in whole or part, but in general non-transferability is adopted, with power of withdrawal; this constitutes the chief difference between C. and the common joint-stock system of business. The peculiarity of making the shares personal to the holder is most valuable; for by it all stock-jobbing or gambling in shares is prevented. When a member dies, his shares are accounted for to his representatives. If more money is paid in by members than is wanted, the directors can order the overplus to be taken back. The first shilling paid in, and the last shilling at the credit of a member, on drawing out, are carried to a fund called Redemption-money, which is designed to make good the deterioration of property. In this and some other respects, however, societies differ, according to the rules established. In some societies, shareholders or members are alone entitled to purchase goods at the stores; in others, the privilege is extended to 'friends of members' approved by the association.

By prudent management, numerous co-operative societies in England have reached an extraordinary degree of success. One of the more remarkable is the Rochdale Equitable Pioneers' Society. Beginning in 1844, with a capital of only £28, its affairs, at the end of 1880 stood thus: Number of members, 10,613; amount of funds, £323,225; business done in 1880, £283,654; profits in 1880, £35,023. In the proceedings of this society is offered a surprising example of what may be done by C. when properly conducted. One material cause of the prosperous extension of this undertaking consists in the fact that members allow their dividends and profits to accumulate to their credit, instead of drawing them

out as they accrue, and spending them. Another feature of this society consists in setting aside a part of the profits for the support of an Educational Department, in which are comprehended a lending library, a reference library, news-rooms, and collections of globes, maps, and scientific instruments. Out of the successes of this society sprang several gigantic concerns at Rochdale and elsewhere. The most notable of the London societies is the Civil Service Supply Association, designed for the benefit of others than the poorer classes of the community. It has four thousand five hundred shareholders, and many thousands of members. The wages paid amount to nearly fifty thousand pounds a year. The premises which form the headquarters of the Association are valued at thirty-two thousand pounds. In the first year, 1867, the sales of the Association represented a value of £21,322; in the year ending August 1880, the value of the sales reached the large sum of £1,420,000. On an average the prices charged to members and clients are at the rate of ten per cent. above wholesale prices, thus allowing a profit to defray working expenses, which amounted to about seven-and-a-half per cent. This allowance has proved more than sufficient; between March 1874 and August 1877, the surplus profit accumulated to the amount of very nearly one hundred thousand pounds. As the aim of the Association is 'to supply articles at the lowest possible prices,' it was thought desirable to reduce the rate of interest.

A step beyond retail store-keeping was taken in 1864 by the establishment of the North of England Co-operative Wholesale Society (Limited), the central office of which is at Manchester. Its object is to supply goods wholesale to co-operative stores. Besides importing foreign articles, the society purchases vast quantities of butter, provisions, and dry goods in all parts of the United Kingdom; latterly, the manufacture of biscuits and the business of banking have been added to this comprehensive concern, which has numerous branches and agents. C., however, has gone even beyond this. At Rochdale, Leeds, and elsewhere, co-operative societies composed of working-men have set on foot large cotton-factories, flour-mills, or other industrial establishments, which compete in the general field of manufacturing enterprise. In these concerns, the operatives receive weekly wages, and also dividends on profits after paying for management.

Co-operative societies are registered pursuant to 18 and 19 Vict. c. 63, 20 and 21 Vict. c. 101, and 30 and 31 Vict. c. 117. The rules of the society are binding, and may be legally enforced—protection is given to members, their wives, children, and heirs in enforcing their just claims, and against any fradulent dissolution of the society; the property of the society is declared to be vested in the trustee or treasurer, who may, with respect to the property of the society, sue and be sued in his own name; fraud committed with respect to the property of the society is punished by justices. With a view to afford means for mutual advice and consultation, there has been established a Central Co-operation Board at Manchester; the members connected with which hold congresses and conferences at different places.

For further information, we refer to the statutes; also to the *Co-operative News*; the reports of the above-mentioned bodies; the *Transactions of the Social Science Congress*; and Chambers's *Information for the People*, No. 85; Holyoake's *History of Co-operation* (1878); *Co-operation as a Business*, by Charles Barnard (1881); and Escott's *England* (2 vols., 1879). See likewise the article BENEFIT SOCIETIES.

CO-O'RDINATES. What is called the method of C. is an invention of Descartes, whereby algebra and the calculus may be employed in geometrical investigations. The method is sometimes called algebraical geometry—sometimes, and more properly, analytical geometry; and it is commonly treated under the heads 'geometry of two dimensions,' and 'geometry of three dimensions,' according as it is applied to investigate the properties of figures all in one plane, or of curved surfaces. The method is capable of popular explanation. C. are lines so measured off from a fixed point, called the origin of C., along fixed lines passing through it, called the axis of C., as to determine by their quantities the position of any other point relative to the origin. The first step is to find how to determine the position of a point in a plane. Take any fixed point in it for the origin of C., and through it draw two fixed lines—the co-ordinate axes—at right angles to one another. Then, if the perpendicular distance of the point from each of these axes be given, its position will be determined. Referring to Fig. 1, if P. be the point, and O be taken for the origin of C., OX, OY for the axes, then if we know NP or OM, the perpendicular distance of P from OY, and measure off from O, OM on the axis OX, and through M raise a line perpendicular to OX, P must lie in this line, for it contains all the points in the plane which are at the perpendicular distance OM from the axis OY.

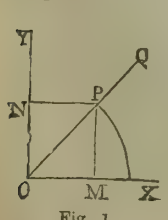


Fig. 1.

Similarly, if ON or PN, the perpendicular distance of P from the axis OX, be known, and we measure that distance off from O along OY, and through N draw a perpendicular to OY, the point must be in that perpendicular. It is therefore at the intersection of the perpendiculars through M and N respectively. When, as in the figure, the fixed lines are at right angles to one another, the C. OM, ON are called the rectangular C. of the point. Let us now see what use can be made of this mode of determining the position of the point, for the discovery of the properties of lines and surfaces. As the values of the C. change for the different points in the plane, they are denoted by the variables x and y. Now, if we suppose the point P to begin to move according to a determinate law, and the C. to change their magnitudes so as always to be its C., knowing the law of P's motion, we are able to express in algebraical language the law of the corresponding changes in its co-ordinates. For instance, if P moves, so as to be always at the same distance from O, OP is constant, and (47th Prop. Euclid, Book I.) the square on OP is equal to the sum of the squares on OM and PM. Putting this into algebraical language we have the equation, $x^2 + y^2 = R^2$, or $y = \pm\sqrt{R^2 - x^2}$, where R = OP. This is called the equation of the circle referred to its center as origin, and to rectangular C.; and it expresses the law according to which the changes of the C. must take place: and from this equation, combined with that to a straight line, &c., every property of the circle may be determined. If P move so that the sum of the distances from two fixed points shall always be the same, and we express the relation between x and y in that case, we should have the equation of an ellipse. This suffices to show in a general way the nature of the method. Equations between x and y are called the equations of the lines, whether straight or curved, traced out by the point P; and by means of them, though they but express relations between *quantities*, the *qualities* of the lines to which they refer may, by artifices explained in every treatise on the subject, be detected. Nay, by assuming equations between x and y, and examining the lines which points represented by them would trace, many singular curves have been discovered. There are a variety of conditions to be attended to in the interpretation of such equations, depending on the assumptions set out with, in choosing the origin and axis. The axis of x or OX being taken to the right of the origin, and the axis of y or OY being perpendicular to it and above it, x and y are counted positive when they are measured along their axes to the right of and above the origin respectively, and negative when they are measured to the left and downwards respectively.

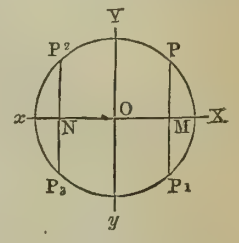


Fig. 2.

Suppose $x = OM = ON$, and $y = MP = MP_1 = NP_3 = NP_2$, the C. of the points P, P_1, P_2, P_3 would be $(+x, +y)$, $(+x, -y)$, $(-x, +y)$, $(-x, -y)$ respectively. These points being equidistant from O, we may suppose a circle to pass through them. Recurring now to the equation of the circle, $y = \pm\sqrt{R^2 - x^2}$, the meaning will be seen of the two values + and − of y given by the quadratic. Often the axes of C. selected for convenience are oblique, i. e., inclined at some other angle than a right angle. An equation between C. referred to one set of axes may always be transformed to C. referred to another, by the process known as the transformation of co-ordinates. A similar transformation of equations by the same process may be made where it is desired to refer the line to a new origin.

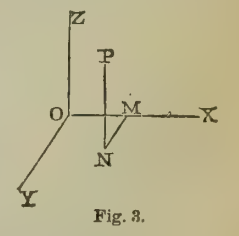


Fig. 3.

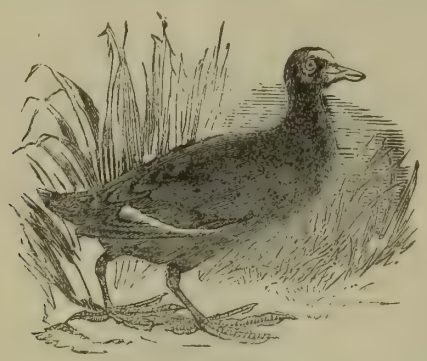
What has hitherto been said refers entirely to the C. of a point in a plane, or to what is called geometry of two dimensions. But the rationale is the same with that of connecting in equations the C. of points in space—the subjects of geometry of three dimensions. The position of a point in space requires three C. to determine it, and these are usually denoted by the symbols x, y, z. An origin being taken, and three axes, OX, OY, OZ, mutually at right angles to one another, the point is referred to the three planes through these axes. z, or PN, is its height above the plane through YOX; y, or NM, is its distance perpendicularly from the plane XOZ; and x, or OM, is its perpendicular distance from the plane ZOY. It is clear that these three determine the position of the point. In three dimensions, as in two, the problem may be stated to be: Given the law of the motion of P, to express the law regulating the variations of its C. as it moves. The algebraic expression of the latter law is, the equation of the surface traced by the point in moving over all the space it can traverse consistently with the law of its motion. The method of C., besides its use in geometry, is of great value for resolving forces in mechanics, and also for finding the resultant of a great many of them.

COORG, a province under the government of India, bounded by Mysore, Malabar, and Canara, is situated in lat. 11° 56′—12° 45′ N., long. 75° 25′—76° 13′ E. It contains about 2000 sq. miles; pop. (1871) 168,312; (1881) 178,283. Down to 1834, it was a native principality of ampler dimensions. As now defined, C. appears to be wholly within the basin of the Cauvery, one of the chief tributaries of the Bay of Bengal. From its elevated situation—the lowest point is more than 3000 feet above the sea—C. is exposed to both the south-west and north-east monsoons.

Hence the yearly fall of rain amounts to about 120 inches. For the same reason, the temperature is comparatively low and equable. Nearly the whole of this rugged region is covered with forests, more or less dense, but seldom so full of undergrowth as to form jungle. The zoology of C. comprises elephants, tigers, bears, &c., with birds and reptiles in vast variety. The natives, mostly Nairs, are handsome and athletic. Among them there exists a community of wives between brothers. But C. has perhaps nothing so worthy of notice as its artificial fortifications. The country is intersected by ramparts, which are from 15 to 25 feet in height, and by ditches of about 10 feet in depth and about 8 in width; while, being in some places double or triple, or even quadruple, they measure in aggregate length upwards of 500 miles. These works are very ancient. The true name of this territory is *Kudagu*, C. being a corrupt form.

COO'SY—not to be confounded with the much smaller Coosy which enters the Hoogly from the right below Calcutta—is one of the largest rivers of India. It rises in lat. 28° 25′ N., and long. 86° 11′ E., on the southern slope of the Himalayas, receiving, however, at least one affluent from the northern face of that range. On emerging from the mountains, in lat. 26° 45′, and long. 87° 13′, it shows a greater volume than does the Ganges itself, in the corresponding position of Hurdwar. After a course of 325 miles in all, through the state of Nepaul and the district of Purneah, it joins the Ganges from the left, in lat. 25° 19′, and long. 87° 19′.

COOT (*Fulica*), a genus of birds of the order *Grallæ*, either ranked in the family *Rallidæ* (rails, crakes, &c.), or in a separate family, *Lobipedidæ*, which differs chiefly in having the toes edged with a scolloped membrane, thus making an approach to the web-footed birds. Coots have a strong, straight, and somewhat conical bill, the base of which extends up the forehead, and there dilates so as to form a remarkable naked patch. The tail is very short. They are aquatic in their habits, preferring lakes or pools with reedy margins, and retreating among the reeds on any alarm. The Common C. (*F. atra*) is found in most parts of Europe, Asia,



Common Coot (*Fulica atra*).

and the north of Africa; occurring in the more northerly regions as a summer bird of passage, which is the case in the north of Scotland; although in the more southerly parts of Britain it is plentiful during winter. It is about sixteen inches long, of a black color, with a narrow white bar across the wings, and the naked patch on the forehead pure white, from which it is often called the Bald Coot. It makes a large nest of water-plants among reeds or rushes. Although not very highly esteemed for the table, the circumstance that many can be killed by a single shot, on the mud-banks to which coots resort in winter, as on the south coast of England, makes C. shooting profitable to the fowlers who purvey for the market.—The American C. (*F. Americana*), a very similar species, is found in all parts of North America, from the West Indies to the Saskatchewan.

COO'TEHILL, a town in the north-east of Cavan county, Ireland, on the Cootehill, an affluent of the Annalee, 28 miles west-north-west of Dundalk. It consists chiefly of four wide streets, and is situated at the west end of a series of lakes navigable for about 7 miles to the east to near Ballybay. It has a trade in linen. Pop. (1881) 1789.

CO'PAIS, LAKE. See BŒOTIA.

COPAI'VA, or COPAIBA. BALSAM OF, a valuable medicinal substance, consisting chiefly of a resin (*Resin of Copaiva*) and a volatile oil (*Oil of Copaiva*). It flows from incisions made in the stems of trees of the genus *Copaifera*, trees with pinnate leaves, of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*, natives of the tropical parts of America. It has a peculiar, not disagreeable odor, and an acrid taste. It has stimulant properties, is diuretic when taken in small doses, aperient in larger doses; but is principally useful from its powerful action on the mucous membranes. It is much used in affections of the urino-genital system, and is also employed in chronic catarrhs, &c. Balsam of C. is not unfrequently adulterated with castor oil. The Wood Oil (q. v.) or Gurgina Balsam of India, the produce of a species of *Dipterocarpus*, is sometimes sold in Britain as balsam of copaiva.

Balsam of Copaiva Tree.

CO'PAL, a resinous substance used for a variety of purposes in the arts. It appears in commerce in smooth rounded masses, colorless or lemon-yellow, translucent or transparent, rather brittle, and in a cold state, almost without smell or taste. It is readily fusible and inflammable, is insoluble in water, and only partially soluble in alcohol and oil of turpentine, but becomes entirely soluble in them when it has been for a short time melted. Various useful pale-yellow or almost colorless varnishes and lackers are made of melted C. and alcohol, oil of turpentine, or boiled linseed oil.

C. is said to be a general Mexican name for resins or gums, and the C. of commerce was perhaps originally brought from Mexico. C. is also obtained in Africa, Brazil, Madagascar, and India. Mexican C. is now believed to be the produce of a species of *Hymenæa*, a tree of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*. *Vateria Indica*, a large tree of the natural order *Dipteraceæ*, yields the C. of India, very nearly resembling true C. in its properties, but also sometimes called Gum Animé (q. v.) in British commerce.—A mineral substance resembling C., and therefore called *Fossil C.* or *Copaline*, is found in some places, as at Highgate, near London, from which it is called *Highgate Resin.*

COPA'LCHE BARK, a bark resembling Cascarilla Bark (q. v.) in its properties, and produced by shrubs of the same genus, *Croton pseudo-china* and *C. suberosum* (see CROTON), natives of Mexico. The former yields a variety of small quills; that produced by the latter is in larger quills, and has a corky epidermis. C. B. is much used as a substitute for *Cinchona* in the cure of intermittents in Mexico, and is imported, although not to a large extent, into Europe.

COPALM. See LIQUIDAMBAR.

COPA'N, a ruined city of Honduras, on the borders of Guatemala, in Central America. It stands on a stream of its own name, an affluent of the Montagua. The remains, extending about two miles along the river, comprise a temple of 624 feet in length, various pyramidal structures and sculptured idols similar to those of Egypt and India.

COPA'RCENARY. An estate in England originating in descent to two or more persons, called thence coparcenars or parcenars. It generally arises under the rule of law which makes the daughters of one dying without male heirs inherit equally, but it may also arise by local custom, as in the case of Gavelkind (q. v.). Although the property remains unsevered, yet each parcenar is entitled to a distinct share of it, and consequently there is no benefit of survivorship, but the right of each descends to his or her heirs, who are still called coparcenars with the surviving original parcenars. The rule of descent is also *per stirpes*, so that the heirs of one who has predeceased the common ancestor take only the share which would have come to their immediate ancestor had he or she survived, and thus a grandson of the common ancestor will also exclude his own sisters. If one of the coparcenars alienates his share, the C. is destroyed, and the estate becomes a tenancy in common (q. v.). C. may also be destroyed by partition, when the estates become in severalty (q. v.). This may be effected either by voluntary agreement, or by a suit in Chancery. Such parts of the property as cannot be divided (such as the manorhouse, &c.), pass to the eldest sister or her issue, but an equivalent in value is assigned to the remaining sisters.

An Advowson (q. v.) is exercised in turns, according to seniority. If the estates in C. are by descent reunited in one person, they become again an estate in severalty.

COPA'RTNERY. See PARTNERSHIP.

COPE, an ecclesiastical vestment, worn during the celebration of mass, at processions, vespers, and other solemnities. The C. was originally a cloak worn for ordinary purposes. In form it is a semicircle, without sleeves and with a hood. It is fastened across the breast with a clasp or morse. Copes soon began to be ornamented with embroidery, and even with jewels; and so early as the 13th c. they became the most magnificent and costly of all the vestments of the priesthood.

Cope.

COPE, a custom or tribute due to the crown, or lord of the soil, out of the lead-mines in Derbyshire.

COPE, SIR JOHN, an English general of the first half of the 18th c., is known through his ignominious defeat at the battle of Prestonpans by the Highlanders, under Prince Charles Edward Stuart, September 21, 1745, and more widely through a sarcastic Jacobite song.

CO'PEC, a Russian coin, the oldest kind in Russia, and the first substitute for furs as a medium of exchange. The name is derived from the Russian word for a lance, St. George and his lance having anciently figured on the coin. Copecs were originally coined of silver alone, but copper copecs were afterwards introduced. The present C. is the hundredth part of a silver ruble, which is worth 3*s*. 1½*d*. sterling.

COPENHA'GEN (Dan. *Kjöbenhavn*, 'Merchants' Haven'), the capital of Denmark, is situated on the island of Sjælland, in the Sound, which is here about 15 miles broad, and includes the island of Amager or Amak, which is separated from Sjælland by a narrow arm of the sea, forming a fine and capacious harbor. Lat. 55° 41′ N., long. 12° 35′ E. C. lies very low, and was strongly fortified until 1864, when the land-works were destroyed, although the citadel of Frederickshavn, and some of the batteries on the sea, were left in a condition to admit of being defended in case of emergency. The old ramparts of the city and citadel, which are planted with trees, afford pleasant walks. The population of C. was, in 1880, 235,254. Copenhagen proper, in Sjælland, and Christianshavn on Amager, which form the main divisions of the city, are united together by the bridges Langebro and Knippelsbro. The business quarter of C. stretches from its noble harbor in a N. E. direction towards the principal and central square, Kongens Nytorv, which in itself forms the focus of the life of the city. Further N. and E. of this point lies the aristocratic quarter, with the handsome Amalienborg Square of royal and administerial palaces; and this district is bounded in the extreme N. by the citadel, and the adjoining public gardens and walks on the shores of the Sound. C. has suffered so severely during the last century from the effects of fires and bombardments, that the city contains comparatively few remains of antiquity. Amongst its few buildings of historical interest or intrinsic beauty, we may instance the metropolitan cathedral-church, known as Vor Fruekirke, rebuilt after the bombardment of 1807, and distinguished now for possessing statues of Christ and the Apostles, together with a kneeling angel bearing a baptismal shell-font, which were designed, and in part executed, by Thorwaldsen himself. Trinitatiskirke, only remarkable for its round tower, which is ascended by a winding causeway instead of steps; and Holmens' Kirke, containing interesting monuments to the great naval heroes, Juel and Tordenskjöld. The royal palace, called Christiansborg, is one of the most extensive in Europe, though its architectural character is not high. It contains, however, a picture gallery, and some noble works of art by Thorwaldsen and others. The castle of Rosenborg, where the regalia are kept, contains interesting collections of objects of art; and the palace of Charlottenborg is now used as an academy of arts.

The university was founded by Christian I. in 1479, but the constitution under which it at present exists bears date 1788. The number of professors amount to about 50, and that of students to 1200. Connected with the university are a surgical academy, two observatories, a botanical garden, a polytechnic institution, and a library of 240,000 volumes, containing also a great collection of ancient Persian MSS., and another of ancient northern MSS. C. is the center, not only of Danish, but of northern literature and art, and is the seat of a number of societies for the advancement of these in all their branches, amongst which the most important are the Literary and Scientific Association, founded in 1742; the Academy of Arts; and the Royal Society for Northern Antiquities, founded in 1825. The royal library contains 500,000 volumes, besides great treasures of Sanscrit and other MSS. The Museum of Northern Antiquities in Christiansborg is unrivalled in its kind, and contains an admirably arranged collection of *stone* weapons, ornaments, &c., to 500 B.C., bronzes to 500 A.D., and articles wrought in iron, silver, and gold to 1000 A.D., besides numerous specimens to illustrate arts and manufactures in Scandinavia during the Christian ages. The Thorwaldsen Museum, opened in 1846, consists of works of art by that sculptor himself, and others left by him to the Danish nation, for which a separate building has been erected. C. contains also a number of well-supported benevolent institutions. Since the war of 1864, C. has rapidly recovered its commercial activity, and now its trade is steadily increasing; between 8000 and 9000 vessels annually enter its port. The chief exports are grain, rape-seed, butter, cheese, beef, cattle, wool, and hides. Excellent watches are made at C.; its royal porcelain works have long enjoyed a European reputation, but besides these and a few manufactories for gloves, glass, &c., C. has no branches of industry worthy of any special notice in this article.

About the middle of the 12th c., C. was an insignificant fishing-village, in the neighborhood of which Bishop Axel, or Absalon, built a castle. He bequeathed the castle, village, and neighboring district to the bishopric of Roeskilde. In 1254, the village obtained the privileges of a town, and in 1443 King Christopher made it the capital of the kingdom. It was several times attacked by the Hanseatic League; was besieged and bombarded by the Swedes in the 17th c.; suffered grievously by fires in 1728, 1794, and 1795; witnessed a great sea-fight in its roads on 2d April 1801, when the English, under Sir Hyde Parker, with Nelson as his second in command, were victorious over the Danish fleet; and was bombarded by the English from the 2d to the 5th of September 1807, when great destruction was wrought, both in houses and public buildings, and about 2000 persons lost their lives.

COPERNICAN SYSTEM, THE, is that which represents the sun to be at rest in the center, and the earth and planets to move round it in ellipses; in other words, it is that which we now know, on unquestionable evidence, to be the true system of the world. It got its name from Copernicus, but, in point of fact, it may be described as being a growth in which he was only one of many contributors. The merit of having first formed the general notion of the system seems to be due to Pythagoras; Copernicus has the credit of having, after the lapse of centuries, again drawn the attention of philosophers to it, and of having greatly increased the probability of its truth by his calculations and arguments; for the rest, the glory of having matured its idea belongs to Kepler, Galileo, and others, and to our own Newton, who, through the discovery of the law of gravitation, demonstrated its truth effectually. Many who have been used to reverence the name of Copernicus in connection with this system, would be surprised to find, on perusing his work *De Revolutionibus Orbium*, how much of error, unsound reasoning, and happy conjecture combined to secure for him in all times the association of the system with his name.

De Revolutionibus Orbium, dedicated to Pope Paul III., consists of six books, in which Copernicus undertook to demonstrate his whole system. The character of the reasoning which then passed for demonstration, must be borne in mind in judging of the author's procedure in establishing his various positions. It was then thought a sufficient demonstration of a phenomenon to make a supposition, on which its occurrence would be intelligible, without attempting to bring the supposition itself, by an induction of facts, within the truth of nature; many abstract propositions, too, which would now appear to be simply silly, were at that time universally admitted to be of great weight in scientific arguments.

Illustrations of both of these peculiarities may be gleaned from the first of the six books of *De Revolutionibus*. It contains the following propositions: 1. That the universe is spherical. This is established by such arguments, as that the sphere is the most perfect figure, &c. 2. That the earth is spherical, which flows from the same kind of considerations. 3. That the earth and sea make one globe. 4. That the motions of all the heavenly bodies must be uniform and circular, or compounded of uniform and circular motions. Here, again, we meet with singular reasons. A *simple* body must move circularly, and nothing but circular motion could give periodicity to phenomena. 5. That, supposing the distance of the stars to be immense, there is no reason why the earth should not have a motion round its axis as well as a motion in its orbit. 6. That the sphere of the stars is immensely distant. The proof is fanciful, and shows he had no notion of a universe of stars pervading space. 7 and 8. The ancients were wrong in placing the earth at the center of the universe.

The arguments under this head are as imaginary as those which they were designed to refute. The falling of a body to the earth he deduces from the assumption, that it is only given to wholes to move circularly, while it is of the nature of parts, separated from their wholes, to move in right lines. That there must be a *centrum mundi*, an entity unknown to modern science, is admitted, the

question being as to its position. 9. It is possible for the earth to have several motions. 10. He establishes the order of the planets, and draws a diagram of the system much as it is now represented. It may be observed that, following the old systems, such as the Ptolemaic, he lays down *a sphere* for the fixed stars. (See FIRMAMENT.) It is clear, also that he had no idea, of the motions of the planets other than that they were such as would be caused by their being fixed in immense crystal spheres revolving round the sun.

The most brilliant and valuable part of the *De Revolutionibus* is that in which he explained, for the first time, the variations of the seasons, the precession of the equinoxes, and the stations and retrogradations of the planets. In general, his explanations are right, and perfect as to the general nature of the causes of the phenomena. But Copernicus had neither mathematical nor mechanical knowledge sufficient to enable him to explain more than the mean motions of the solar system. To account for irregularities, he was obliged to introduce a system of epicycles entirely resembling that of Ptolemy. See PTOLEMAIC SYSTEM. This arose from the false notion of his times, that all motions must be compounded of circular ones, with the application of which idea, and with the invention of convenient epicycles, the greater part of the *De Revolutionibus* is occupied. It may further be added, to rectify the vulgar notion regarding the relation of Copernicus to the system of the heavens, that he had no answer to offer to the mechanical objections to his system. Most of them, indeed, were such as could not possibly be met in the then state of mechanical knowledge. One of the commonest was that against the axial motion of the earth, that it was inconsistent with the fact of bodies falling to the points of the earth directly beneath the points from which they are dropped; for this he had no answer nor could he have, the laws of motion being not yet discovered. Such being the state of the case, the reader will consider whether, when Copernicus wrote that he held the doctrine of the earth's motion as a mere hypothesis, and not as absolutely in fact true, it is more likely that he made a concession to the religious prejudices of his times, or to difficulties surrounding his hypothesis, which he could well appreciate though not overcome.

COPERNI'CIA. See CARNAHUBA PALM.

COPE'RNICUS, NICOLAS, an eminent astronomer, was born at Thorn, in Prussia, 19th February 1473. He was instructed in the Latin and Greek languages at home; afterwards he was sent to the university of Cracow, where he studied philosophy and mathematics, and took the degree of doctor of medicine. He also studied law at Bologna University. His natural bent, however, was towards mathematics, the study of which he pursued with passion through all its branches.

Having become enamored of the study of astronomy, he projected a journey to Rome in his enthusiastic admiration of Regiomontanus, who resided there, and was then the most illustrious of the astronomers. On his arrival he was kindly received by Regiomontanus, whom he soon rivalled in fame. Here his reputation, and the favor of his distinguished friend, led to his being chosen professor of mathematics, which he taught for several years most successfully. After several years he left Rome and returned to his native country, where, having entered into holy orders we suppose, he obtained through his uncle, the Bishop of Warmia, a canonry at Frauenburg, in the enjoyment of which he passed the rest of his life. His working-day, it is said, he divided into three parts—one devoted to the duties of his office, another to giving medical advice gratuitously to the poor, and the third to study.

Soon after his return to Prussia, he began, in his 35th year (1507), to apply his fund of observations and mathematical knowledge to correcting the system of astronomy which then prevailed. The result was his *De Revolutionibus Orbium*, some account of which is given in the previous article. He completed it in 1530, in his 57th year. But though finished at this date, it was twelve years later before he could be persuaded to give his book to the world by his friends, who urged its publication out of regard at once to his fame and the interests of science. Perhaps the strongest motive for his reticence, was the fear of the unpopularity which the work threatened to bring him (for many who had heard of the views it advocated, doubted if these were in harmony with religion), while it is pretty certain that his desire to conciliate the church (which afterwards showed in the case of Galileo what it was capable of in such a matter), led him to dedicate his book, when it was published, to Pope Paul III. It is related that the first copy of this labor of his life reached him when he was no longer able to enjoy the triumph. An attack of dysentery, followed by paralysis of the right side, had destroyed his memory and obscured his understanding. In this state he lingered several days. The copy, it is said, just arrived a few hours before he died. It was placed in his hands, and he *seemed* to know it! He died 24th May 1543, aged 70.

Besides the *De Revolutionibus*, may be mentioned among C.'s works a treatise on Trigonometry, entitled *De Lateribus et Angulis Triangulorum*, Wittemberg, 1522, 4to; and *Theophylactici Scholastici Simocattæ Epistolæ Morales, Rurales, et Amatoriæ, cum Versione Latina*. He also wrote a work on money, and several MS. treatises from his pen are said to be in the library of the bishopric of Warmia. His life has been written by Gassendi. See also the life by Von Hipler (1873) and Polkovski's *Zywot Kopernika* (Warsaw, 1873).

COPIAPO', a name of various application in the north of Chili, marking at once a volcano, a river, a district, a village, and a city. 1. The volcano is a peak of the Andes, in lat. 27° 32′ S. 2. The river has a westerly course of 120 miles from the Andes to the Pacific; its mouth being in lat. 27° 20′ S., and long. 71° 2′ W. 3. The district, sometimes reckoned a part of the province of Coquimbo, is rich in silver and copper; but, excepting on the immediate banks of streams, almost valueless for agricultural purposes. 4. The village, known as Port C., stands at the mouth of the river, containing about 1200 inhabitants. 5. The city built on the river, about 30 miles from the sea, had in 1875 a population of 11,432. It is connected by railway with Caldera, a harbor of the republic, about 20 miles to the north of the mouth of the river. The C. Railway has 120 miles in operation. The shares owned by British subjects amount to the sum of 1,500,000 dollars. The exports from this region are copper, silver, cobalt ore, and hides. The imports are almost wholly from the United Kingdom, consisting of coals, iron, bricks, machinery, &c. There is also some trade across the Cordillera with the Argentine Provinces.

CO'PLAND, JAMES, a distinguished physician, born at Deerness, in the Orkneys, in 1792. After studying medicine at Edinburgh, he traveled on the continent, and subsequently undertook a journey to Africa, to investigate the nature of epidemic diseases prevalent in tropical lands. He settled in London about 1820, and was made a member of the Royal College of Physicians. In 1822, he undertook the editorship of the *London Medical Repository;* and being chosen in that year to deliver the annual oration of the London Medical Association, he in his lecture advanced a new theory of electro-galvanism. His *Outlines of Pathology and Practical Medicine*, in which he especially treated of the ganglionic nerves and their functions, and proposed a new and more simple classification of diseases, appeared in 1822, and the *Elements of Physiology* in 1824. But C.'s most important work was the *Dictionary of Practical Medicine*, four closely printed volumes, to which he devoted the labor of many years. This comprehensive work has attained an extensive reputation in America and Germany, as well as in England. The views given in his essay on *Pestilential Cholera*, published in 1832, when the cholera first appeared in Britain, have been confirmed by experience. He also published, besides various contributions to medical periodicals, a treatise on Palsy and Apoplexy, and, in connection with Dr. Annesley, one *On the Diseases of Warm Climates*. He died in 1870.

CO'PLEY, JOHN SINGLETON, the father of the late Lord Lyndhurst, and a historical painter of some note, was born at Boston in the United States, July 3, 1737. In 1774 he came to England, and after a visit to Italy, settled permanently in London. In 1783 he was elected a member of the Royal Academy, and died in 1815. C.'s best work is the 'Death of Lord Chatham,' now in the national collection. Besides it, may be mentioned his 'King Charles Ordering the Arrest of the Five Members of Parliament,' the 'Death of Major Pierson,' the 'Assassination of Buckingham,' and 'King Charles Signing Strafford's Death Warrant.'

CO'PPER is one of the most anciently known metals, and its name is derived from the island of Cyprus, where it was first obtained by the Greeks. In the earlier times C. does not appear to have been employed by itself, but always in admixture with other metals, principally tin, forming what is now called bronze (q. v.). There is every reason to believe, that next to the large quantities of tin which they obtained, one of the great inducements which the Phœnicians had in making searches for metals in Great Britain, was the C. which they procured in their workings in Cornwall.

C. is sometimes met with in nature in a state of purity, but generally it is associated with oxygen, water and carbonic acid, forming the native carbonate of C. or *malachite* ($CuO,HO + CuO,CO_2$), or with iron and sulphur, forming the native sulphurets of C. and iron or C. *pyrites* (Cu_2S,Fe_2S_3). In smaller quantity C. occurs as the oxide (CuO), and sulphate ($CuOSO_3$), and in all cases the ore is obtained from fissures or veins in other rocks. The principal yield of C. ore in Great Britain is from the mines in Cornwall, but large supplies are also obtained from Australia, from Cuba and Chili, and recently from Little Namaqua Land, in South Africa. In North America, in the neighborhood of Lake Superior, C. ore occurs abundantly, and a thick vein of metallic C. is there found.

In the extraction of C. from its ores, the metallurgic processes followed are very tedious and complicated, which mainly arises from the difficulty of separating the iron and sulphur from the

copper. The general principle which regulates the working-up of the ore is to burn away the sulphur (S) as sulphurous acid (SO_2), and to carry off the iron by means of fluxes in the form of scoriæ or slag. Metallurgists enumerate ten distinct steps in the production of commercially pure copper.

C. (symb. Cu, from Lat. *cuprum*) has the equiv. 31·7—new system, 63·4. It is the only red metal, has the specific gravity 8·78 when cast, and 8·96 when rolled or hammered; fuses at 1996° F. (Daniell), and at a white heat passes off in vapor and burns with a green flame. It is very malleable, and can thus be beaten out into thin leaves; it is very ductile, so as to admit of being drawn out into thin wires; and its tenacity is only inferior to that of iron. It is a powerful conductor of electricity, and hence is employed in the construction of lightning-conductors, and in telegraph wires for underground or submarine communication. C. is also employed largely in the sheathing of wooden vessels, and in the coinage. See also ALLOY.

C. forms many compounds. There are two oxides. The black oxide (CuO) and the red oxide (Cu_2). The latter is employed in coloring glass of a ruby-red tint. The *green rust* which forms on the surface of a C.-sheathed ship, and on C. coins and vessels which lie in moist places for some time, is a carbonate of C., and is due to the carbonic acid and oxygen of the air acting upon the C. in the presence of moisture. It is very poisonous, and hence any barnacles which may attach themselves to the C. sheathing are poisoned. The carbonate of C., under the name of *blue verditer*, is largely prepared and sold as a pigment. The subchloride of C., moistened and exposed to the air, yields the pigment known as *Brunswick green*. There are several compounds obtained by allowing acetic acid to act upon oxide of C., which are commercially called *blue* and *green verdigris*. The sulphate of C., or *blue vitriol* (CuO,SO_3+5HO), is prepared by dissolving the black oxide in sulphuric acid, and allowing the salt to crystallize out. The crystals are large and present a fine blue color. It is soluble in water, and is extensively used by the dyer and calico-printer for the production of several blue and green colors. The solution of blue vitriol is also employed in the preservation of timber from dry rot and it forms a constituent of some writing inks.

Mineralogy.—Native C. is not of very rare occurrence; it is sometimes massive, or in grains, plates, &c.; sometimes crystallized in cubes or octahedrons; sometimes it assumes dendritic and other beautiful forms. Great masses of native C. have been found both in North and South America. One of the most productive copper mines in existence is that of Ookiep, Little Namaqua Land, South Africa. What are called C. ores in commerce, generally consist of the true ore disseminated through rock, and are therefore very variable in productiveness. Among the most plentiful and valuable C. ores is the *C. Pyrites* already mentioned, or *Yellow C. Ore;* but there is a richer ore called *Purple C.* or *Variegated C.* or *Bornite*, also a compound of sulphur, C., and iron. *Malachite* and *Azurite*, both consisting essentially of carbonate of C., are valuable ores; as are some ores which are essentially composed of oxygen and C., particularly *Red C. Ore* (*Cuprite*) and *Black C. Ore* (*Tenorite*). Some ores of C. contain also silver, and some contain arsenic, antimony, &c. *Gray C. Ore* is very compound, containing silver, mercury, zinc, antimony, arsenic, iron, and sulphur. *Atacamite*, wrought as an ore of C. in South America, is composed of chloride of C. and hydrochlorate of copper.

COPPER I'NDIGO is an ore of copper found in spherical masses of an indigo-blue color, in Thuringia and Vesuvius, and is very nearly pure sulphuret of copper. Its composition in 100 parts, is copper 64¾; sulphur, 32¾; iron, ½; and lead, 1.

CO'PPERAS is the commercial term for the sulphate of iron. See IRON.

COPPERED, COPPERING, in Ship-building, are terms used in reference to the sheathing applied to the bottom of timber-built ships. The copper so used is in sheets, weighing from 18 to 32 ounces per square foot, and usually measuring 48 inches by 14. A layer of felt, paper, or coarse linen, is first applied to the planking; and the copper is nailed down upon it. So much of the bottom as is immersed in the water is thus covered. The timbers are by this means protected from molluscs, cirrhopods, and weeds; and consequently the ship can sail quicker than if no such sheathing were applied. Some builders copper their ships up to load-water line, while others go no higher than the light-load line; there being a difference of opinion whether the intermediate space, sometimes dry and sometimes wet, ought to expose a wood or a copper surface.

A *copper-bottomed* ship always ranks better at Lloyd's than one not so sheathed. The same is the case with a ship said to be *copper-fastened ;* i. e., in which bolts of copper are used instead of iron in those parts of the ship immersed in water. Ships can be insured at a lower premium when thus provided.

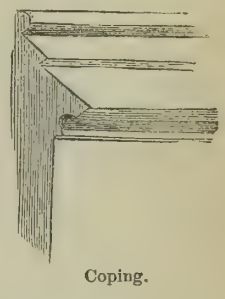
CO'PPERMINE RIVER—so named, in common with the mountains to the west of it, from the metallic products of the vicinity—enters a bay of the Arctic Ocean about lat. 68° N., and long. 116° W. Its overland discovery by Lieutenant Hearne, then of the Hudson's Bay Company's service, in June 1771, excited considerable interest, as incontestably proving that the supposed Strait of Anian, whatever might be the truth as to its westward terminus, had its eastward outlet, if any, only in the Icy Sea. The C. R. rises near a feeder of Great Bear Lake, which itself is tributary to the Mackenzie—the former of the diverging watercourses taking a vastly shorter route to the coast than the latter. Hence the C. R. is throughout little better than a series of falls and torrents, being thus, even without regard to its isolated position, but little available in itself for navigation.

CO'PPERPLATE PRINTING. See ENGRAVING.

CO'PRA, the dried kernel of the cocoa-nut, from which cocoa-nut oil has been expressed. It is much used in India as an ingredient of curries.

CO'PROLITES (from Gr. *kopros*, dung, and *lithos*, a stone), are the fossilized excrements of animals found in the Secondary and Tertiary strata of the earth's crust. Their true nature was first inferred from their occurrence in the bodies of several species of *Ichthyosaurus*, in the region where was situated the intestinal tube. It has been since shown that they are the voidings chiefly of saurians and of sauroid fishes. They often contain portions of scales, bone, teeth, and shells, the indigestible parts of the food on which the animals lived.

Occasionally, they may be found exhibiting the spiral twisting and other marks produced by the confirmation of the intestinal tube, similar to what is noticed in the excrement of some living fishes. These peculiar markings obtained for them the name, when their true nature was unknown, of 'larch-cones' and 'bezoar-stones.' C. are found to contain a large quantity of phosphate of lime; and as this forms a valuable manure, the deposits containing them have been of late years largely quarried by the manufacturers of artificial manures.



Coping.

COPS, COPING (Anglo-Sax. *cop*, Ger. *kopf*, the head). The merlons or rising parts of battlements are sometimes called cops, but the term coping is usually applied to the covering course of a wall, which is made either sloping or round, so as to throw off water. Where the coping is of hewn stone, it is frequently ornamented with a circular moulding running along the top, and sometimes the angle at the top is simply taken off, to prevent it from being chipped.

COPSE, or CO'PPICE, a natural wood or plantation, of which the trees are cut over from time to time, without being allowed to attain the size of timber trees, sending up new shoots from their roots or stools. Some kinds of trees—as the firs—are incapable of being treated in this manner, refusing to send up new shoots; but many—as the oak, birch, chesnut, ash, elm, maple, alder, hazel, and willow—very readily do so, at least if they have not been allowed to attain too considerable a size before being cut over. C.-woods are sometimes planted chiefly to vary and beautify the landscape, but more generally with a view to profit, either owing to great local demand for their produce, or to peculiarities of soil and situation. It often happens that owing to scantiness of soil or to unfavorable subsoil, oaks and other trees, after growing vigorously for a number of years, are arrested, and remain almost stationary in their growth. In such circumstances, it is advantageous to cut them over early, and to treat the plantation as a C., the former vigor being again manifested in the young shoots, and the land yielding in this way a greater return to its owner. Oak is much planted as C.-wood, in consequence of the demand for its bark: in some parts of Herefordshire, the trees are cut over every twelve years; but in the Highlands of Scotland, twenty-five or thirty years are often necessary for sufficient growth, nor is the bark thought to have attained it highest perfection till the stems are of this age.

The largest pieces of the wood are used for making wheel-spokes, and for other purposes of timber; the smaller portions for charcoal, and firewood. Ash is sometimes planted as C., with a view to the employment of the wood for handles of implements, hurdles, hoops, &c., the wood of the ash, even when very young, being highly valued for strength and elasticity. Chestnut copses are planted in England to supply hop-poles. Hazel is a very common C.-wood, being in great demand for making crates, &c. Besides the cultivation of different kinds of willow or osier for basket-making, in which they are cut over annually, some of the species are cultivated as C., and cut every five, six, or seven years, for hoops, crates, &c.; the species which is deemed most suitable of all being *Salix caprea*. See WILLOW. In some countries, C.-wood is particularly valued for the regular supply of fuel which it affords.

In cutting C.-wood, care is taken to dress the stools so that water may not lodge in them and cause them to rot. The size to which the stems are allowed to attain before being cut, and the frequency of cutting, differ according to the different kinds, and the uses intended. Stems more than four inches thick are generally cut with the saw, but smaller stems with a curved bill, cutting upwards. Extensive copses are sometimes divided into portions, of which one is cut every year.

CO'PTIS, a genus of plants of the natural order *Ranunculaceæ*. *C. trifoliata* is a native of the north of Europe, Siberia, Greenland, Iceland, and North America. It grows in swamps. From its long, thread-like, golden-yellow rhizomes, it derives the name of *Golden Thread*. Its leaves have three wedge-shaped leaflets, and its leafless stems bear each a solitary, rather pretty white flower.

CO'PTIS. Very similar to the *C. trifoliata*, noticed in the article COPTIS, is *C. teeta*, the *Golden Thread* of Assam, the root of which has long been in high repute in Assam and neighboring countries. It has come into extensive use in India as a bitter tonic, and is sold at a very high price. Great efficacy is ascribed to it as a tonic for patients beginning to recover; but it is of no value as a febrifuge.

COPTS, the Christian descendants of the ancient Egyptians. Various derivations have been given of the name, which, however, is most probably from the same root as E-*gypt*. The C. are in number about 150,000, only about a fourteenth of the population of the country. There are about 10,000 of them in Cairo. They are not of great stature, have black eyes, and rather curly hair, and in a number of points resemble the ancient Egyptians, from whom also they have inherited the custom of circumcision. They dress like the Moslems, but are generally distinguished by a black turban.

Their character is in general gloomy, deceitful, and avaricious. They are very expert in calculations, and are therefore much employed as accountants and book-keepers, by which they have acquired a great influence in the country, filling very important posts. In religion they are generally monophysites (q. v.) of the Jacobite sect; smaller sections of them, however, are united to the Greek and Roman Catholic churches. They ascribe their conversion from heathenism to St. Mark, whom they regard as the first patriarch of Alexandria. Their highest dignitary is the patriarch of Alexandria, whose residence, however, is in Cairo. Their other orders of clergy are bishops, archpriests, priests, deacons, and monks. The patriarch is named by his predecessor from among the monks of the convent of St. Anthony, or chosen from among them by lot. He is not permitted to marry. He nominates the Metropolitan of Abyssinia. See ABYSSINIA. There are twelve bishops. The C. are very strict in their religious observances, and hate other Christian sects even more than they hate the Moslems. They baptize by immersion; practise unction, exorcism, and auricular confession; and celebrate the Lord's Supper with leavened bread which has been dipped in wine. They keep Friday with great strictness as a fast-day. They have many schools, but only for boys, who learn the Psalms, Gospels, and Apostolic Epistles in Arabic, and then the Gospels and Epistles in Coptic. The Coptic, however, is not grammatically taught, and is not now a spoken language, having been everywhere supplanted by the Arabic. It has not been spoken in Lower Egypt since the 10th c., but lingered for some centuries longer in Upper Egypt. It is, however, still used by the C. in their religious services, but the lessons, after being read in Coptic, are explained in Arabic. The Coptic literature consists in great part of lives of saints and homilies, with a few Gnostic works. The alphabet was borrowed from the Greeks at the time of the introduction of Christianity, with the addition of a few letters. There are two principal dialects of the language—the Sahidic or Upper Egyptian, and the Memphitic or Lower Egyptian, which is sometimes exclusively called Coptic. A third dialect, the Bashmuric, of which only a few remains exist, was spoken in the Delta, and is interesting from its points of resemblance to the language of the hieroglyphics.

CO'PULA (Lat. band) is a term employed in Logic to designate the word which unites the two notions of a sentence—viz., the subject and predicate into one judgment or thought. Thus, in the sentence, 'Art is long,' *art* is the subject, *long* the predicate, and *is* the copula. The C. is either expressed apart by some part of the verb 'to be,' as in the above sentence, or it is contained in the word expressing the predicate—as, 'The flower blooms'—i. e., *is* blooming.

CO'PY, in the Fine Arts, is a reproduction of a work, whether painting, statue, or engraving, not by the original artist. A C. made by the master himself is called a repetition (in French, a *doublette*). It is said that copies are of three degrees: first, where the original is mechanically imitated in its minutest details (this is always done when an engraving is to be obtained); second, where only the principal traits are imitated; and, third, where the general idea merely is borrowed. A C. of a statue, or other piece of sculpture, taken from a mould, is not called a C., but a *Cast* (q. v.).

CO'PYHOLD, a species of estate or right of property in land, in Ireland and England, nearly resembling in many particulars the feu-rights of Scotland. C. is expressed technically as 'tenure by copy of court-roll, at the will of the lord, according to the custom of the manor.' This means, that it is tenure of land, being part of a manor, the title being evidenced by the court-rolls of the manor, and the right of the owner being in conformity with the immemorial customs of the manor. The addition, 'at the will of the lord,' serves only as a memorial of the derivation of this species of estate from the estates granted in old times to the bondsmen, or *Villeins* (q. v.), which were of course resumable at the pleasure of the lord. But the will of the lord is now absolutely controlled by the custom of the manor, which forms the law of the tenure; and as this custom must be immemorial, i. e., extending to the reign of Richard II., no C. can now be created.

The custom of each manor may vary in important particulars. In some, the C. lands are held for life only; in some, they descend according to particular rules of their own; in most, however, they descend according to the ordinary rules of succession. But the custom, whatever it may be, cannot be altered by the holder of the C.; he cannot, for instance, entail his land unless the custom warrants him.

An important point, also dependent entirely upon special custom, is the amount of the money-payments due by the copyholder to the lord of the manor. These are divided into the *rents*, an annual payment of the nature of the Scottish feu-duty; *fines*, payments on particular occasions, such as alienation or succession; and *heriots*, or the best piece of personal property, to which, on the death of the copyholder, the lord becomes entitled. As to fines, it may be observed, that the custom may either fix the amount, or it may leave them to be at the pleasure of the lord; but as the courts of law require that all customs, even when indefinite, shall be reasonable, they have fixed the extreme amount that can be exacted at two years' rent of the land.

One practical distinction of much importance, drawn between freehold and C. land, is the mode in which it must be conveyed. An ordinary conveyance is ineffectual in regard to C., and indeed would operate, like other attempts to break through the custom which forms the title, as a forfeiture. The course adopted is almost identical with the Scottish *resignation*. The owner comes to the steward of the manor, and by a symbolical delivery, according as the custom may prescribe, surrenders the land to the lord of the manor, in order that it may be granted again to such person, and on such terms as are desired, and as the custom authorizes. The steward, by a repetition of the symbolical delivery, transfers the C. to the person in question, in terms of the surrender; and he then pays the customary fine, and takes the oath of fealty.

This is called conveyance by surrender and admittance. In the case of an heir succeeding, there is no surrender, but there is admittance only upon payment of the customary fine, and it is enforced by a customary penalty. A mortgage is effected by a surrender, upon condition that the money is repaid, and the admittance takes place only in event of failure of payment. A C. may, in like manner, be devised by will, the devisee being admitted on the death of the devisor. A comparison between C. and the Scotch feu will be found in Paterson's *Compendium of English and Scotch Law*, p. 57.

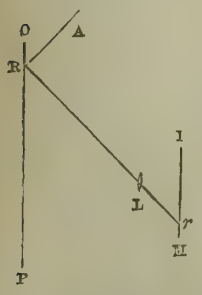
The inconveniences and loss accruing through the variety of customs to which C. lands are subject, have led the legislature to make provision for their extinction. By the copyhold commissioners, all the services due to the lord of the manor may be commuted for a fixed rent. The lord of every manor is also authorized to enfranchise, or convert into freehold, the C. lands by agreement with their owners. And after the next admittance subsequent to the 1st of July 1853, either the lord or the tenant so admitted may compel enfranchisement on payment, either of a fixed sum, where it is at the instance of the lord, or of an annual rent, where it is at the instance of the tenant, fixed in both cases by the commissioners.

COPYING, a term applied in Photography to the reproduction of paintings, engravings, manuscripts, &c. The kinds of camera and lens most suitable for the purpose, will be found described under their respective heads; the quality and condition of chemicals necessary are based upon the facts, that long exposure is almost invariably required, and that, in the majority of cases, it is desired to copy black marks upon a white ground, as in a sheet of music, for example. Where it is obvious that nothing that can be called a middle tint is required, but simply pure black and white, recourse should be had to organic matter in the bath; a little acetate of soda, and an extra amount of acetate of acid, may be also added, and an old collodion containing free iodine employed.

It is important that the work or surface to be copied should be

placed in a strong light, and exactly at right angles to the axis of the lens, which should be furnished with a *small* stop. These three conditions, it will be seen, are such as are calculated to insure density in the blacks of the negative, freedom from distortion, and sharpness at the edges of the picture. The copying of oil-paintings seems to the amateur, at first sight, to present almost insuperable difficulties, on account of the reflected light from the varnish passing through the lens, and producing black patches on the negative. This may, however, be completely avoided by the employment of a lens of long focus, which admits of the oblique pencils of light passing off without entering the camera.

This will become more intelligible by reference to the following diagram, in which OP is supposed to be an oil-painting, L the lens, and IM the image. Let A be a ray of light, incident at R; reflection at the varnished surface will cause it to pass through the lens, and come to a focus on the sensitive surface at *r*, causing an increased action at that point, resulting in a black patch. If, however, a lens of longer focus be employed, and the camera be moved further from the picture (as it must be to obtain the same sized image), as shown by the dotted line, it will be seen that no reflected rays can fall upon the sensitive plate, but that they will all pass beyond the field of view.



Attention to the laws of the reflection of light, will suggest to the reader the importance also of avoiding a bright light immediately behind the camera, as the rays of light would then fall on the varnished surface, nearly at right angles, and be reflected into the camera. The oil-painting, therefore, though placed in strong sunshine, for the purpose of giving vigor to the more obscure parts, should be so arranged as to allow the light to fall on it at an angle of about 35° or 40°.

In copying transparent negatives, a somewhat different arrangement is required, as will appear from considering the following facts. Every object to be copied may be regarded, for the sake of illustration, as an assemblage of bright points, from each of which divergent pencils of rays are reflected, and suffer refraction on passing through the lens; an engraving or oil-painting is, in fact, in its relation to the sensitive surface, the *source of light*. In a negative, however, many of the parts of which are transparent glass, it is manifest the case is different, for if we suppose the sun or a luminous background to be placed behind the negative, *that* will act as the source of light, and any rays coming therefrom will pass almost directly through those parts of the negative which are bare glass, to the lens; thus producing the same effect as if the transparent parts were opaque, but luminous, and emitted divergent pencils of light. It is necessary, therefore, that the rays should be made to intersect at those points where bare glass exists, and this may be accomplished by employing what is called a condensing lens, by which means negatives may be most successfully copied, by placing an artificial light behind it, or still better, by reflected sunshine through it.

Negatives are sometimes copied on glass by direct superposition in the ordinary pressure-frame, such as is used for printing photographs on paper, in which case, dry plates are used, prepared either by the albumen or collodio-albumen process; and the latent image so obtained yields a transparent positive when developed by gallic or pyro-gallic acid.

COPYING-MACHINES. The various contrivances for procuring duplicates of writings without the labor of transcribing them, may be reduced to two classes. In the one, the writing is first made, and then copied; in the other, the copy and the original are produced at the same time. The essence of the first method is this:—In writing the original, an ink is used that is made for the purpose, or common ink thickened by the addition of a little sugar. When the writing is dry, a damp sheet of thin unsized paper is laid upon it, and over this a piece of oiled paper. The whole is then subjected to pressure, and the damped paper is found to have taken off an impression of the writing. It is of course the reverse of the original, but the nature of the paper allows it to be read right on the other side. The machines for communicating the pressure are of various kinds. Some pass the sheets between rollers like the copper-plate press; others act on the principle of the common printing-press. A simple plan is to wrap the sheets round a wooden roller of about an inch diameter, lay this upon a table, and roll it under a flat board, pressing all the while. Another very common method of copying, is by means of prepared blackened paper laid between two sheets of thin writing-paper. The writing is traced firmly on the upper sheet, with a steel or agate point, or common black-lead pencil, and the lines are found transferred in black from the blackened sheet to the paper adjacent. By having several of these blackened leaves, a number of copies may be produced at once. The blackened paper is prepared by saturating it with a mixture of lard and lampblack, and cleaning it so far that it will not soil paper unless pressed against it.

CO'PYRIGHT, an author's exclusive right of property in any work which he writes, and which, under certain limitations, is transferable to his heirs and assigns. Such is the chief or general meaning of the term, which now, however, embraces several varieties of right; and these, from the importance of the subject, we propose to consider separately.

Books.—The idea of a right of property in literary composition is of modern origin. Nothing is heard of C. previous to the invention of printing, nor for a long time afterwards. In ancient and mediæval times, books appear to have been transcribed freely by other parties than their authors, and as freely disposed of, often at great prices. After the introduction of printing, the liberty to publish books became the subject of licenses and patents; and these privileges may be said to have constituted a special monopoly of the nature of copyright. In the absence of any license or protection of this kind, authors could only resort to the common law to vindicate their real or fancied rights. But the common law of England was silent on the subject. There were serious differences of opinion among lawyers as to the availableness of an exclusive right in literary composition, viewing it as a chattel or thing that could be held, inherited, or assigned.

How, it was asked, could ideas, or the way of writing a narrative, be made property? Supposing, however, that a certain structure of ideas and written words could be invested with the quality of property, it was reasonable to conclude that the property should be absolute and perpetual to the owner, his heirs and successors. Such being the case, it would be proper for the heirs of Shakspeare, Milton, Bunyan, and other literary luminaries of past times, to claim possession of the works of their respective ancestors; leaving them, of course, the right either to maintain a monopoly, or to suppress the works altogether. Such were the questions that puzzled the English jurists of the early part of the 18th c. A compromise appears to have been made. No decision was come to, as to whether literary composition was property in the ordinary sense of the word. Yet, looking at it as a thing on which thought and labor had been expended, and professedly 'for the encouragement of learning,' it was deemed worthy of legal protection for at least a period limited by considerations of public policy. An act of parliament was accordingly passed on the subject in 1709.*

This, the first C. act, 8 Anne, c. 19, sets out as follows: 'Whereas printers, booksellers, and other persons have of late frequently taken the liberty of printing, reprinting, and publishing, or causing to be printed, reprinted, and published, books and other writings, without the consent of the authors or proprietors of such books and writings, to their very great detriment, and too often to the ruin of them and their families: for preventing, therefore, such practices for the future, and for the encouragement of learned men to compose and write useful books, may it,' &c. The chief provisions of the act were, (1.) That authors who, after April 10, 1710, had not sold their C. of works in print, were to have the sole right of printing them for 21 years; (2.) Authors of books not printed and published, and their assignee or assigns, to have the sole liberty of printing and reprinting such book and books for the term of 14 years, to commence from the day of the first publishing the same; (3.) After the expiration of the said term of 14 years, the sole right of printing or disposing of copies to return to the authors, if they were then living, for another term of 14 years.

Under this act, authors disposed of the C. of their works for the specified period, at the end of which, 28 years at the most, the C. lapsed. Although the works might then have been considered public property, a custom arose among publishers of not interfering with each other's lapsed copyrights; and in a sense each assumed a kind of perpetual monopoly of the works which he had purchased for a terminable period. So stood matters, when Alexander Donaldson, an Edinburgh bookseller, of whom some notice has been taken in the article BOOK-TRADE, broke through the conventional regulations, by issuing cheap reprints of works out of copyright. There ensued a litigation, of which it is necessary to present some details. At divers times in 1729, James Thomson sold the C. of his *Seasons* and other poems to Andrew Millar, a London bookseller, for sums amounting to £242, 10*s*. Thomson

* Until this act came into operation, the law of Scotland, as regards copyright, had been as defective as that of England. Under date November 9, 1699, the following occurs in the *Domestic Annals of Scotland*, by R. Chambers, vol. iii.: 'It was customary for the Lords of Privy Council to grant exclusive right to print and vend books for certain terms—being all that then existed as equivalent to our modern idea of copyright. Most generally, this right was given to booksellers and printers, and bore reference rather to the mercantile venture involved in the expense of producing the book, than to any idea of a reward for authorcraft. Quite in conformity with this old view of literary rights, the Council now conferred on George Mossman, stationer in Edinburgh, "warrant to print and sell the works of the learned Mr. George Buchanan, in ane volume in folio, or by parts in lesser volumes," and discharged "all others to print, import, or sell, the whole or any part of the said Mr. George his works in any volume or character, for the space of nineteen years."' Some other instances of the same kind are given, making it clear that in these times books could not be printed in Scotland without authority from the Privy Council.

died in 1748. According to the Act 8 Anne, c. 19, the utmost length to which the C. of these works could be extended was 28 years, which terminated in 1757. Millar died in 1768, and his executors, in 1769, sold by auction the C. of the works in question for £505. The purchasers were 'Beckett and others.' This sale was, in reality, an imposition; for, as just mentioned, the C. had expired in 1757. Aware of this fact, Donaldson, in 1768, issued a cheap edition of Thomson's *Seasons*. He was now challenged for an invasion of C.; and in 1771, Beckett and others applied for, and procured, an injunction from the Court of Chancery to restrain him from further printing and selling the work, and to make him answerable for the profits he had already realized. The only explanation of this extraordinary proceeding is, that the applicants for the injunction imagined that at common law they had acquired a property in Thomson's *Seasons* in all time coming. The question at issue was nothing less than the creation of perpetual monopolies in literature—not for the benefit of authors and their families, but for certain publishers and their assigns. The notion of a common-law right had prevailed in granting the injunction, and the validity of such a notion was now for ever to be determined. Donaldson appealed to the House of Lords. The chief points pressed for consideration were, whether at common law an author had the sole right of printing his works, and whether, possessing a right of that kind, it was taken away by the statute 8 Anne, c. 19. The Lords differed in opinion, but the decision finally come to was, that any right at common law was impeached and taken away by the statute; and the decree of the Court of Chancery was accordingly reversed. See Brown's *Parliamentary Cases*, vol. ii., p. 136. By this famed decision, it was settled that claims of C. rest altogether on the statute and its interpretations. Ever since, any one is at liberty to print and sell works of which the statutory term of C. has expired; on the simple ground, that all such works are public property.

The C. law did not extend to Ireland till after the union with that country, when (1801) the whole United Kingdom was included by the Act 41 Geo. III. c. 107. Previous to this time, many of the most saleable of the British C. works were freely reprinted in Dublin, and occasionally found their way across the channel to the annoyance of English authors and publishers. The next act concerning copyrights was that of 54 Geo. III. c. 156 in 1814, by which the period of C., instead of being 14 years, and contingently for 14 years more, was fixed to be 28 years certain, and for the residue of an author's life, if he were living at the end of 28 years.

The impetus given to literature during the early part of the present century, by the popular and voluminous writings of Scott, Byron, Moore, Wordsworth, and others, along with the growing taste for reading among the middle and less affluent classes, greatly increased the market value of C. in every species of literary production. As a natural consequence, that kind of disinterestedness so strikingly demonstrated in Robert Burns, who could hardly be prevailed on to accept a few pounds complimentarily in requital for hundreds of the most beautiful lyrics was no longer seen; on the contrary, it became a recognized principle that an author was entitled to regard the product of his brain as purely a mercantile commodity. At length, under an impulse communicated by the assigns of some valuable copyrights about to expire, and on the assumption of benefiting the families of certain popular writers, the legislature was induced to extend the term of copyright.

By the Act 5 and 6 Vict. c. 45, called Talfourd's or Lord Mahon's act, 1st July, 1842, the term of C. was extended as follows: 'And be it enacted that the copyright in every book which shall after the passing of this act be published in the lifetime of its author shall endure for the natural life of such author, and for the further term of seven years, commencing at the time of his death, and shall be the property of such author and his assigns: provided always, that if the said term of seven years shall expire before the end of 42 years from the first publication of such book, the copyright shall in that case endure for such period of 42 years; and that the copyright in every book which shall be published after the death of its author shall endure for the term of 42 years from the first publication thereof, and shall be the property of the proprietor of the author's manuscript from which such books shall be first published, and his assigns.' In the case of subsisting copyrights, the term was to be extended to 42 years, except when they belonged to an assignee for other consideration than natural love and affection; in which case they were to cease at the expiration of the 28 years, unless their extension were agreed to between the proprietor and author.

In this act, there is a remarkable clause giving power to the Judicial Committee of the Privy Council to license the publication of books of importance, which the proprietor refuses to republish after the death of the author. Formerly, there was an obligation on publishers to deliver 11 copies of new works to certain universities and other public institutions; the obligation was now modified to 5 copies. The importation of English C. works printed in foreign countries is prohibited. C. is declared to be personal property, and may be bequeathed as such; in case of intestacy, it is to be subject to the same law of distribution as other personal or movable estate. The old obligation to register the C. of new works at Stationers' Hall was also modified; registration is no longer obligatory, but the practice of registering is still requisite for the sake of evidence in making good claims of copyright. Forms of registration and assignment are given by the act, but the use of them is not indispensable. The law of C. makes no distinction between British subjects and aliens. A foreigner may own the C. of a work printed first in Great Britain; thus an American author may secure the copyright of his book in Great Britain by first publication there. A British author cannot receive the same benefit in return, unless some portion of his work be written on American soil. Attempts are sometimes made, by issuing editions of a work simultaneously in the United States and England on the same day, to secure both British and American copyrights.

The ordinary process of stopping the issue of unauthorized reprints of C. works, which receive the name of pirated editions, consists, in the first place, in procuring an injunction from the Court of Chancery (if in Scotland, an interdict from the Court of Session), and of afterwards raising an action of damages at common law. On all that concerns prosecution, as well as for many details respecting C. in its different varieties, we refer to Godson and Burke's *Treatise on the Law of Copyright*.

Such is the history and general nature of the law of C. respecting books. The last-mentioned act, more explicit than previous statutes, remains the great charter on the subject. Unfortunately, it still leaves some defects which it would require a fresh law to remedy. The extension of C. for the assumed benefit of authors and their families, which is the leading feature of the act, must be pronounced generally worthless. In the great majority of cases, authors assign the C. of their manuscripts for a consideration to publishers, who, looking for remuneration within a reasonable length of time, cannot, and as a rule do not, give a higher price for a 42 than for a 28 years' copyright. The tendency of Talfourd's act is still more than ever to lock up copyrights in the hands of the original assigns, where they are apt to become torpid and useless.

A remedy for this evil has lately been found in a practice followed by certain acute and enterprising publishers of cheap reprints. Buying up the unexpired copyrights of books which have gone somewhat out of notice, they issue them in a form suitable to the nature of their business; and such reanimated productions constitute no small share of the cheap volumes that invite public attention—the author and his heirs being not in the slightest degree benefited by the process of literary resurrection.

Extracts, Abridgments, &c.—C. in a book entitles the proprietor to prevent extracts being made from it; but in practice, short extracts for the purpose of criticism, as in reviews, or for historical illustration, are tolerated. Unauthorized abridgments of C. works are deemed piracies, and their sale can be stopped. In such cases, however, the abridgment must show a clear adoption of the language or collocation of the words of the original. It is now determined that no C. can be maintained in mere subject, information, or ideas. A writer may have put himself to great trouble to procure information on a particular subject; but the law does not recognize how information is procured. If a second writer use the information of the first (though that may have little regard to matters of fact), and make out of it a new work, there is no invasion of C. unless the words of the first have been at the same time taken. See Preface to Napier's *Memoirs of Dundee*.

Encyclopædias, Periodicals, &c.—The C. of articles contributed for and included in encyclopædias, magazines, reviews, or other periodical works, and of books published in a series, was regulated by the Act 5 and 6 Vict. c. 45. The C. of such articles, being paid for and assigned, belongs to the publisher, but he cannot publish them separately without the consent of the author. The author, however, may reserve the right of separate publication, and merely sell the right to use the article; but, should he republish any such article or articles, it may only be done in such a manner as not to prejudice the right of the original publisher.

Dramatic Pieces and Musical Compositions.—These with right of representation and performance are, by the Act 5 and 6 Vict. c. 45, subject to the same C. as books. Strictly, a C. song cannot be publicly sung, or a tune publicly played, without the permission of the composer or his assigns. Since 1882 the author must print on the title-page that he reserves the right of performance. Verses must not be taken from a periodical or copyright work, and set to music, for sale, without permission. A C. work of fiction may be dramatized without permission.

Lectures and Public Addresses remain the C. of the person delivering them. By 5 and 6 William IV. c. 65, printers and publishers are liable to a penalty for printing and issuing spoken addresses without the consent of the author. It is understood that no one is at liberty to take down a sermon as delivered by a clergyman, and pub-

lish it without permission; the act, however (§ 5), makes some exceptions: protection is not extended 'to any lecture or lectures delivered in any university, or public school, or college, or in any public foundation, or by any individual in virtue of, or according to, any gift, endowment, or foundation.' Under this permissive clause, it would appear that sermons delivered by clergymen of the Established churches, in endowed places of public worship, are deemed public property.

Letters, and every kind of epistolary correspondence, are the property of the writer. The receiver of a letter may retain it for his own use, but, strictly, he cannot publish it without the permission of the sender or his heirs, neither can he sell it as a curiosity. The sale of letters of distinguished individuals is illegal, though ordinarily tolerated. See *Curtis* on the law of C. As to Scotland, see the case of the *Scotch Thistle* newspaper, in Irvine's report of the trial of Madeleine Smith.

Newspaper matter, when the newspaper in which it appears is registered under the Copyright Act only, is subject to the common law of C., but practically, and for mutual convenience, the intelligence in one paper is freely copied by the more respectable class of papers with, and in the less respectable without, acknowledgment. The taking of leading articles in the same manner might doubtless be checked; as would also be the unauthorized adoption of existing newspaper titles.

Engravings, Maps, Charts.—C. in these is secured by several acts, more particularly the 17 Geo. III. c. 57. The term of C. is 28 years. Each engraving or map must have on it the date of publication and name of publisher. Those who infringe C., forfeit the plates on which the pirated engravings or maps were printed; they forfeit also every pirated sheet, and five shillings for every print undisposed of. There is no C. in subject. Any one may invent or delineate and sell pictures from subjects in C. books, without challenge. It is understood that in painting a portrait, C. remains with the artist, although he be paid for the picture, and the purchaser cannot take copies without permission or assignment. C. as to paintings, however, is ill defined and defective, and an improved law on the subject is said to be under consideration. See DESIGN, under which head is also noticed the C. of models, sculptures, casts, patterns of carpets and paperhangings, &c.

Copyright in the Colonies.—By the Act 5 and 6 Vict. c. 45, the C. of books, &c., printed in the United Kingdom, is extended to all British colonies; and the Act 8 and 9 Vict. c. 93, concerning the trade of the colonies, absolutely prohibited these dependencies from importing pirated editions of C. works. Practically, this last recited act was unavailing. Large quantities of cheap reprints of British C. books continued to be imported from the United States into the British American possessions. Remonstrances against these irregularities at length led to some special legislation. It was ordained by the Act 10 and 11 Vict. c. 95, that the colonies might respectively enact a law to enable them to import pirated C. works on the plan of exacting a custom-house duty on such works, the proceeds to be handed to the proprietors of the said copyrights. Colonial laws were accordingly enacted, in nearly all the British Colonies except Australia. But the provisions were found quite inadequate. In 1874 the Dominion of Canada passed an act, confirmed by the Imperial Parliament in 1875 (c. 53), for securing in Canada the rights of authors, and for prohibiting the importation into Canada of any work for which copyright under the colonial act had been secured. By this act, if there is copyright in the United Kingdom in a book, the author becomes entitled to copyright also in Canada, and none but the owner can import into the United Kingdom any copies reprinted in Canada. A copyright for 28 years from the recording thereof is now secured in Canada to authors; and if the author, or his wife or child, is living at the end thereof, then, for 14 years longer, such copyright being recorded there with the Minister of Agriculture.

Copyright in the United States is well defined. The latest act of Congress on the subject is that of the year 1870. C. can be secured by any citizen of the United States or resident therein, who is the author of any book, map, chart, dramatic or musical composition, engraving, cut, print, photograph, painting, statue, &c. The term of C. is 28 years from date of recording; but at the end of that term the author if living, or, if dead, his widow or child, may record C. for an additional term of 14 years. In cases of renewal, record to be published in one or more newspapers. The first step in securing C. is to send a copy of the title of book or other article, or a description of the painting, statue, &c. to the librarian of congress before publication, and two copies of the book (a photograph in the case of paintings, &c.) must be sent to the librarian within ten days after publication. The librarian makes the proper record, receiving a small fee. It is requisite that notice of entry of C. be stated in each book or on each other article. All pirated copies of C. works are to be forfeited, independently of claims for damages by action at law.

Copyright in Germany was first regulated as respects duration by the Confederation; a resolution of which, in 1837, fixed the duration of property in literary productions and works of art at 10 years; and another resolution in 1845, extended it to the lifetime of the author, and for 30 years after his death. The laws regulating the contract of an author with his publisher varied in the different states. In Prussia, when an author assigned a C. to a publisher without any special stipulation, the publisher was entitled to issue only one edition, the extent of which he might determine. But a distinction is made between reprints or new issues (*auflagen*) and new editions (*ausgaben*). In the case of the former, the publisher is left free, on condition that he shall pay to the author, should no agreement be come to between them, on the occasion of each new issue, half the sum which he paid him for the first. New editions on the contrary, can be published by the first publisher only by entering into a new contract with the author, which must be given in writing. This privilege is limited to the author's life, though his children have a claim for a *honorarium* for each edition issued after his death. The rights of the publisher may be transferred, and those of the author descend to his heirs. When the rights which have been conveyed to the publisher terminate, the author becomes again the unlimited proprietor of the work. Copyright in Germany is now regulated by imperial legislation. The constitution of the new empire recognizes the protection of 'intellectual property,' as one of the matters to be dealt with by the Imperial Parliament. A literary treaty for six years was signed in 1883 between France and Germany.

Copyright in France exists in the author and in his widow for life, in his children for twenty years, and in his other heirs or assignees for ten years after his own death or that of his widow. In *Belgium* the same law prevails with this exception, that the right, whether in children or in other representatives, extends to twenty years after death.

International Copyright is a mutual convention between two countries to protect each other's copyright, translations included. The United Kingdom made such arrangement with Spain, Austria, Belgium, Saxony, Prussia, France, Italy, &c. Formerly the United States had ever refused to enter into any international law of C. with Great Britain; but in 1880, the draft of an international copyright treaty was laid before the British government for consideration.

The late Right Hon. James Wilson contemplated a consolidation of the C. laws, and such a measure is certainly very desirable. Amongst improvements required may be cited the following: 1. An improved system of registration. As matters are now conducted at the Stationers' Hall, any person may make any entry he pleases, with very little check in case of false pretension.

A reform in this particular should embrace a system of registration in Edinburgh, and also in Dublin, as well as in London, for the convenience of the three sections of the united kingdom; the registrar of each section to get copies annually of the other registers for general inspection. 2. A clearer understanding of the posture of articles contributed to periodicals, encyclopædias, &c. It will probably answer the main purposes of justice, if the proprietor of the work contributed to were held as having, by his stipulated payment, acquired the C., unless where a special reservation was made. 3. A protection to publishers for literary services paid under a salary. It is clearly absurd to expect that each particular article, or, say, addition to a formerly existing book, written in these circumstances, should be matter of formal assignment; and in practice no such assignment takes place. Yet, with authors disposed to take advantages, there may be cases in which the honorable understanding as to the sufficiency of salary may be no protection to the publisher from at least a harassing litigation. 4. A remedy for the great mistake made in Talfourd's act, in the extension of copyright—namely by making this extension only to the representatives of authors who had not parted with their copyrights. See also *Copyright, National and International* (1879); Jerrold's *Handbook of English and Foreign Copyright* (1881); Scrutton's *Laws of Copyright* (1883). The copyright of designs is covered by the new Act of 1883 on Patents (q. v.).

COQUEREL, ATHANASE LAURENT CHARLES, an eloquent minister of the Reformed Church in Paris. He was born in Paris in 1795, and studied theology at Montauban. Afterwards he became minister of the French church in Amsterdam, where he remained twelve years. In 1830, Cuvier induced him to return to Paris, where, till his death, he held the office of a preacher of the gospel. In 1848, he was elected a delegate to the National Assembly by the department of the Seine, but he did not appear to much advantage either in this Assembly, or in the Legislative Assembly, of which he was also a member. He wrote many works on religious subjects, history, and literature, all of which are marked by an earnest and liberal spirit. By the more rigidly orthodox of his co-religionists, C. was regarded as a heretic. He died 20th January 1868.—His son, ATHANASE JOSUE LAURENT, also a Protestant pastor of liberal tendencies, died in 1875.

COQUI'LLA NUT, the fruit of a palm, *Attalea funifera*. See ATTALEA. It now forms an article of export from South Amer-

ica, being used to a considerable extent in Britain in the manufacture of buttons and in turnery, as for making knobs of walking-sticks, umbrella handles, handles of bell-pulls, &c. It is very hard, susceptible of a good polish, and beautifully mottled with dark and light-brown. The demand for coquilla nuts seems likely to increase; and probably the fruits of some other palms may be found suitable for similar purposes.

COQUI'MBO, the name of a river, department, and city of Chili.—1. The river, rising in the Andes, enters the Pacific about lat. 29° 55′ S., and long. 71° 25′ W., and forms, at its mouth, one of the best harbors in the republic.—2. The department, extending in lat. from 25° 30′ to 31° S., and in long. from 69° to 72° W., occupies the entire breadth of the country between Aconcagua on the south and Atacama on the north. With the exception of the immediate banks of streams, it is parched and barren, being valuable chiefly for its mines of silver and copper. Physically, the region here and there presents galleries of shingle-terraces with organic remains. See CHILI. The population in 1875 was 157,463.—3. The city stands at the entrance of the river, and contains about 10,000 inhabitants. In addition to copper and silver, it largely exports chinchilla skins. The copper exported in a single year has amounted to as much as 15,000 tons. It goes mainly to England.

COQUI'TO (*Jubœa spectabilis*), a beautiful Chilian palm, of the same tribe with the cocoa-nut, rising with a naked stem to the height of 40 or 50 feet, and bearing a crown of wide-spreading pinnated leaves. By cutting off the crown, the sap is obtained in great quantity, continuing to flow for months; and when boiled down to the consistence of treacle, becomes a very sweet syrup, and forms, under the name of Palm-honey (*miel de palma*), an article of great importance in the domestic economy of the Chilians.

COR ANGLOIS, a wind-instrument of the reed species, the body of which is bent in the form of part of a circle. It is just a large oboe, and played on by oboe-players. Its compass is from F, fourth line in the bass, to B flat above the treble staff. Music for this instrument is written a fifth above the real tones.

COR CA'ROLI. See CONSTELLATION.

CO'RA, CO'RÉ, or CO'RI, a town of South Italy, 30 miles south-east of Rome. It is most picturesquely situated on a commanding elevation in the midst of olive-plantations, and crowned by the ruins of ancient temples. Two torrents dashing through deep ravines on the east and west side of the hill add romance to the situation. The town, divided into an upper and lower part by an olive-grove, is surrounded by walls, chiefly of 15th c. date, and is on the whole well built, clean, and healthy, with a population of 6000. C. preserves the name, and occupies the site, of one of the oldest cities in Italy. Virgil and Diodorus make it an Alban colony, while Pliny ascribes to it a Pelasgic origin. In any case, it was early one of the most important cities of Latium. The ancient remains still existing—including those of the old walls, a Doric temple called the *Temple of Hercules*, a Corinthian temple, consecrated to Castor and Pollux, and a fine bridge—are among the most interesting in Italy.

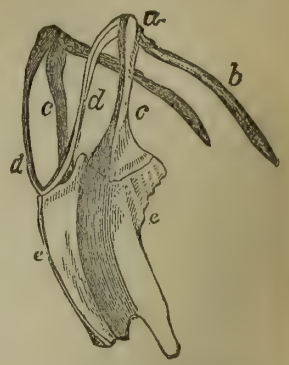
CORA'CIAS. See ROLLER.

CO'RACLE. See CURRACHS.

CORA'IS, ADAMANTIOS, called by the French CORAY, one of the most learned Hellenists of modern times, and a great benefactor of his nation, was born in Smyrna on the 27th April 1748. His father was a merchant, and he for some time also engaged in mercantile pursuits; but having from his earliest youth delighted in the study of ancient and modern languages, he relinquished business, and devoted himself to literature. He fixed his residence in Paris, and there continued to reside till his death on 6th April 1833. He published editions of many ancient Greek authors, adding notes and prolegomena, in which his patriotic zeal was often very strongly displayed. He translated into modern Greek the work of Beccaria, *Dei Delitti e delle Pene;* and by various translations and other publications, exercised a great influence in awakening the minds of his countrymen. When the Grecian war of independence began, C. was too aged to take any active part in it, but by his writings he showed his sympathy with the cause of his country.

CO'RACOID BONES. In the mammalian skeleton, the scapula or blade-bone presents a projecting bony process termed the Coracoid Process, from its supposed resemblance to a crow's beak (Lat. *korax*, a crow); and from the idea that the bones which we are now describing, and which exist in all birds, in saurian and chelonian reptiles, and in the monotremata, correspond anatomically with the comparatively slightly developed coracoid process, they have received the name which is now universally assigned to them.

As the uses of these bones are most obvious in birds, we shall confine our remarks to this class of animals. It is obviously necessary that the scapular arch should be very strong in birds, in order to form a solid resisting fulcrum to the powerful movements of the humerus and other wing-bones. The scapula (see *b* in the fig.) is a long, curved, compressed bone, extending along the back on each side of the dorsal vertebræ, imbedded in the muscles to which it gives attachment, while at its fixed extremity it assists in forming the cavity of the shoulder-joint (*a*). The coracoid bone (*c* in fig.) is the great support of the shoulder; for while at one extremity it sustains the wing, at the other it is firmly secured to the sternum by a broad and strong articulation; indeed, it forms the main resistance to the approximation of the humerus to the median plane, and retains it firmly in its lateral position. The scapula and coracoid bone are anchylosed (or united by osseous matter) at their point of union, thus forming collectively the structure popularly known as the side-bone. The clavicles, *d*, *d*, which are conjoined to form the furcula, combine to add to the stability of the whole apparatus.



Sternum of Barn Owl:
a, the glenoid or shoulder-joint cavity; *b*, the scapula; *c*, *c*, the coracoid bones, articulating at one end with the sternum or breast-bone *e*, and at the other with the scapula *b*, with the clavicle *d*, and with the humerus or great bone of the two clavicles, *d*, *d*, to form the furcula or merry-thought bone, is well shown in this figure.

CO'RAL, a calcareous secretion or deposit of many kinds of Zoophytes (q. v.) of the class *Anthozoa*, which assumes very various, and often beautiful forms, according to the different laws which govern the gemmation of the polypes of the different species. The C.-producing zoophytes are compound animals, which increase by gemmation, young polype buds springing from the original polype, sometimes indifferently from any part of its surface, sometimes only from its upper circumference, or from its base, and not separating from it, but remaining in the same spot, even when the original or parent polype has ceased to exist, and producing buds in their turn. The calcareous deposition begins when the zoophyte is still a simple polype—owing its existence to oviparous reproduction—adhering to a rock or other substance, to which the calcareous matter becomes affixed, and on which the C. grows or is built up, the hard deposits of former generations forming the base to which those of their progeny are attached. One layer of the calcareous polype cells of which the greater number of corals are composed, occasionally surrounds another like the concentric circles in the wood of exogenous trees; one layer is sometimes deposited above another; the whole structure sometimes branches like a shrub, spreads like a fan, or assumes the form of a cup, a flower, or a mushroom. Under the common name C. are included many species, also designated Madrepores (q. v.), and some have received other names derived from peculiarities of their form and appearance, as Brainstone C. (q. v.), &c.

In the greater number of kinds, besides the calcareous plates which form and separate the polype cells, and which are variously arranged according to the form and structure of the polypes themselves, there is a more solid internal or central calcareous part, formed by the additional deposition of calcareous matter at the bottom of each polype cell, or from the common living part in which the polypes are united. The calcareous framework is further strengthened by a greater or less mixture of horny animal matter with the pure calcareous substance. This calcareous framework is analogous to the cartilaginous, leathery, or fibrous framework of many other compound zoophytes, as *Alcyonium* (q. v.), *or Dead Man's Fingers*. The polypes of the common RED C. (*Corallium rubrum*) indeed very much resemble those of *Alcyonium;* but the central axis in this and other corals forming the family *Corallidæ* is quite solid, being produced in concentric layers by the living gelatinous substance, which envelopes it like the bark of a tree, and from which the polypes project like buds, or, when their tentacula are expanded, like little flowers. In the *Madreporidæ*, the general structure more nearly resembles that of *Alcyonium*. Many of them, however, have the whole calcareous framework covered as in the *Corallidæ*, by a gelatinous living substance which unites all the polypes. The whole living part soon decomposes and disappears, when the C. is taken out of the water; in some species, almost immediately running from the calcareous part as a watery slime.

Coral, showing the Polypes. (*Corallium rubrum*).

Corals chiefly abound in the seas of the warmer latitudes, where

they form extensive banks at no very great depth, and their various and bright colors present the appearance of submarine flower-gardens. Numerous species are usually combined in the formation of a single C. reef, and respectively occupy different places in it. Corals of the branching genus *Porites* usually occupy the exposed edge of the reef, and with them is associated *Millepora complanata*, a species which forms thick vertical plates, united at different angles by their edges, the outer plates only being tenanted by living polypes. In the stiller water within are many more delicate kinds, and in the quiet sheltered depths, brainstone corals and flower-like forms appear.

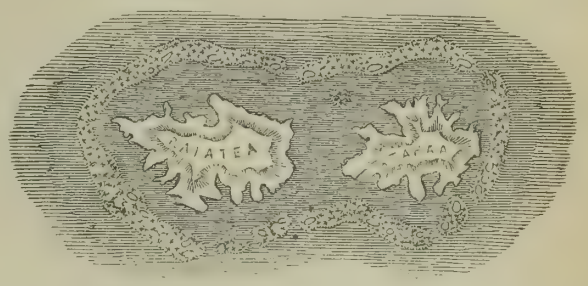
The C. of commerce, or common RED C.—so much admired for its fine color, susceptible of a high polish, and much used for ornamental purposes—is chiefly obtained from the Mediterranean, in some parts of which extensive 'coral fisheries' are carried on. It is brought up from considerable depths by means of a sort of grappling apparatus dragged after a boat or boats; the pieces being broken from the bottom by beams of wood which are sunk by weights, and then entangled among hemp. Red C. has a shrub-like branching form, and grows to the height of about one foot, with a thickness like that of the little-finger. Much of the C. of the Mediterranean is exported to India, but Red C. is also obtained in the Red Sea, the Persian Gulf, &c.—BLACK C. (*Antipathes*), the axis of which is rendered still more solid by the greater mixture of horny with calcareous matter, is still morehighly prized. —C. was known to the ancients, and was used for ornamental purposes by the Gauls.

CORAL FLOWER, or CORAL TREE (*Erythrina*), a genus of trees and shrubs, of the natural order *Leguminosæ*, sub-order *Papilioncaceæ;* of which the species, natives of tropical and sub-tropical regions, generally produce long spikes of beautiful flowers of a rich, dull crimson or scarlet color, resembling coral. The leaves have three leaflets. The *standard* of the flower is remarkably long. The C. F. of Brazil (*E. crista galii*) is common in British green-houses. The Indian C. F. (*E. Indica*) is used in the East Indies for hedges, its stem being covered with thorns. The wood is so light and spongy that it is used for the largest sizes of corks. *Jatropha multifida*, a very different plant, of the natural order *Euphorbiaceæ*, has also acquired the name of Coral Tree.

CORAL ISLANDS exist most abundantly in the tropical and sub-tropical parts of the Pacific Ocean. The formation of coral goes on, in favorable circumstances, with wonderful rapidity, for masses of coral have been found to increase in height several feet in a few months; and a channel cut in the reef surrounding a coral island to permit the passage of a schooner, has been choked up with coral in ten years. It was at one time supposed that the coral polypes began their labors at the bottom of the ocean, and reared their pile from its greatest depths; but it has been ascertained that none of them live at depths of more than twenty or thirty fathoms, and most of them are inhabitants of much shallower water. It appears, therefore, that the foundation of their still marvelous structures must be on rocks that do not reach the surface, probably in most cases volcanic rocks similar to those which, being further upheaved, form the volcanic and often mountainous islands of Polynesia.

Around these volcanic islands, which—although some of them are the largest islands of the Pacific Ocean—are far fewer in number than its C. I., a fringing reef of coral is often found immediately attached to the land; whilst in many other cases, the reef surrounds the island, the intervening space—of irregular, but nowhere of great width—forming a lagoon or channel of still water, protected by the reef from winds and waves. According to a theory proposed by Darwin (but disputed by Semper and Murray), this latter kind of reef is formed from a reef of the former or merely fringing kind, by the gradual subsidence of the rocky basis carrying down the fringe of coral to a greater depth; whilst the greatest activity of life is displayed by polypes of the kinds most productive of large masses of coral in the outer parts which are most exposed to the waves. In this manner also he accounts for the formation of true C. I., or *atolls*, which consist merely of a narrow reef of coral surrounding a central lagoon; and very often of a narrow reef—perhaps half a mile in breadth—clothed with luxuriant vegetation, bordered by a narrow beach of snowy whiteness, and forming an arc, the convexity of which is towards the prevailing wind, whilst a straight line of reef not generally rising above the reach of the tide, forms the chord of the arc. There is generally a navigable passage through the reef into the enclosed lagoon, the waters of which are still and beautifully transparent, and the depth of water close to the precipitous sides of the reef is almost always very great. The passages through the reefs surrounding the larger volcanic islands are often opposite to the mouths of streams; but even where this is not the case, there is a strong current in these channels from the flux and reflux of the tides. Islets bearing a few cocoa-nut trees often appear at intervals in the line of a low coral reef, and very generally mark the sides of passages through it. When a reef has reached the surface of the water, sand, shells, fragments of coral, and other substances, begin to accumulate, and cocoa-nut trees often grow where the waves still wash their roots. Further accumulations from the ocean, with decayed leaves, stems, &c., gradually convert the reef into fertile land. Many C. I. of considerable extent and population, are nowhere more than a few feet above the level of the sea.

Sometimes a volcanic upheaval seems to have taken place after the coral was formed, and this is supposed to have been the origin of the islands—comparatively few in number—called *Crystal Islands*, composed of coral rock, more or less modified by the action



of air, water, and other agents. Islands of this class sometimes rise to an elevation of 500 feet, and often exhibit precipitous cliffs, and contain extensive caverns. They do not exhibit, however, the picturesque beauty of the volcanic islands, nor the soft and gentle loveliness which often characterizes the true C. I.

Coral reefs sometimes include within their circuit more islands than one (as in cut). Reefs also sometimes extend to a great length in a straight line, generally parallel to a coast. There is such a reef on the east coast of Australia, extending not less than 350 miles, without being broken by a channel. For the interesting theory of Mr. Murray, opposed to Darwin's and founded on the *Challenger* observations, see a paper read by him in the Royal Society of Edinburgh in 1880 (of which an abstract is given in *Nature* for that year).

CORAL RAG, a group of the Oxford or Middle Oolite (q. v.), consisting of continuous beds of petrified corals of very variable thickness, interstratified with beds of oolitic limestone. These strata occur in the northern districts of Berkshire and Wilts, and again, with the same characteristics, in Yorkshire, while in the intermediate district the whole group seems to disappear. It attains to a maximum thickness of 190 feet. The corals retain the position in which they grew at the bottom of the sea; they sometimes form masses fifteen feet thick. The characteristic genera are *Isastræa*, *Thamnastræa*, and *Thecosmilia*. With them are associated the remains of mollusca and echinodermata.

CORAL SEA, so called from the substance of its numerous reefs, is that section of the Pacific which stretches between Australia on the west and the New Hebrides on the east. Its general depth must be very considerable, for soundings of 2150 fathoms, or nearly 2½ miles, have been obtained in lat. 13° S., and long. 162° E.

CO'RALLINE (*Corallina* and *Corallinaceæ*), a genus and family of marine *Algæ*, of the sub-order *Ceramiaceæ*, remarkable for rigidity, which is mostly owing to a calcareous incrùstation. When the calcareous matter is removed by a weak acid, the resemblance to other *Ceramiaceæ* becomes very apparent. The common C. (*C. officinalis*), extremely abundant on the British coasts, at first appears as a thin, round, shelly, purplish patch, on a smooth rock, the shell of a mollusc, or the frond of a seaweed, gradually enlarges, and usually sends up a frond of jointed branching filaments, in a bushy tuft, an object of great beauty in the rock-pools.

Although, as its name imports, this C. was once *officinal*, it has no medicinal virtues. Some of the corallines expand into leafy lobes, usually fan-shaped. Corallines are most abundant in tropical seas, and there display their greatest beauty.

The name C. is often popularly given to zoophytes of the class *Anthozoa*, and genera *Sertularia*, *Thuiarea*, *Antennularia*, *Plumularia*, *Laomedea*, *Campanularta*, &c., having branching polypidoms and hydraform polypes, of which the British coasts produce many small but extremely beautiful species.

CO'RANACH, CORANICH, CRONACH, &c., a funeral dirge, formerly in use among the Irish and Scottish Celts. The word is probably derived from the Gaelic *cornh-rànaich*, a crying together. 'The cries (coranich) are called by the Irish the Ulagohne and Hululu, two words extremely expressive of the sound uttered on these occasions (funerals); and being of Celtic stock, etymologists would swear to be the origin of the *ololugon* of the Greeks, and *ululatus* of the Latins'—Pennant's *Tour*.

The C. seems to be identical with the Irish *caóine*, generally

written and pronounced *keen*, a dirge for the dead, 'according to certain loud and mournful notes and verses,' wherein the pedigree, property, the good and great deeds of the deceased, and the manner of his death are recounted, in order to excite sorrow or revenge in the hearers, and to show them the loss they have sustained.

The word, in one or other of its forms, occurs in the writings of many of the ancient Scottish authors:

'Cryand for you the cairfull corrinoch.'
Sir D. Lindsay.

'Cryand the corynoch on hie.'
Battle of Harlaw.

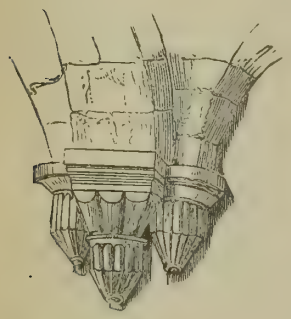
'Be he the correnoch had done shout.'
Dunbar.

The C. has long since fallen into disuse among the Highlanders. The funeral lament performed on the bagpipes, which may be considered as an instrumental C., lingered on till the latter half of the 18th century.

For specimens of the C., see Sir Walter Scott's *Lady of the Lake*, and accompanying notes; Crofton Croker's *Researches in the South of Ireland;* and *Blackwood's Magazine*, vols. xiii. and xxiii.

CORA'TO, a large town in Southern Italy, 25 miles west of Bari, is situated on a fertile plain. Pop. (1881) 30,428. It is an ugly, dirty town, with a fine church.

CO'RBEL (Fr. *corbeille*, a basket). In architecture, this term, adhering originally to its etymological meaning, signified an ornament in the form of a basket, like those sometimes set on the heads of caryatides. In Gothic architecture, to which it is now almost peculiar, it is applied to any kind of ornamented projection used for supporting pillars or other superincumbent weights.



Corbel:
Kirkstall Abbey.

Corbel:
Duston, Northamptonshire.

Here also its form probably was at first that of a basket projecting from the wall, in which the end of the pillar was placed, and on which it rested. Latterly, the more ordinary form was that of a head, with the face looking outwards or downwards. In this form it is found in all the styles. A recumbent animal, again, is sometimes placed under the pillar, and there are a great variety of other forms. When any construction is carried out, so as to rest on corbels, and to project beyond the face of a wall, it is said to be *corbelled out*. See BRACKET, CANTALIVER, CONSOLE.

CO'RBIE, a heraldic term for a raven. See CORBIE-STEPS.

CO'RBIE-STEPS, or CROW'-STEPS (Fr. *corbeau*, Lat. *corvus*,

Fig. 1.

a crow). The word corbie or corby, though obsolete in English, except as a heraldic term, has retained its place in the Scottish dialect, and in architecture C. signify the succession of steps with which the gables of old houses are everywhere ornamented in Scotland. The fashion, like most of the other peculiarities of Scottish architecture, was no doubt borrowed, as was the term, from France. In the domestic buildings of Edinburgh, it is found in the highest degree of prevalence between 1620 and 1640. The notion, of course, was that the steps were for the use of the crows.

Fig. 2

This gable ornament is by no means peculiar to France, but is met with in Flanders, Holland, and all over Germany. Parker, in his *Glossary*, gives an illustration from Cologne; and the accompanying illustration, No. 1, represents the gable of a house in Nuremberg, which it will interest the student of Scottish domestic architecture to compare with the illustration No. 2, which is taken from a house in the Castle Wynd of Edinburgh.

CO'RCHORUS, a genus of plants of the natural order *Tiliaceæ*, having five sepals, five petals, numerous stamens, and a capsule; and containing a number of species, both shrubby and herbaceous, natives of the warm parts of the globe. *C. olitorius* is widely diffused in tropical countries, and is supposed to be a native of Asia, Africa, and America. It is an annual, with a smooth, more or less branching stem; varying in height from two to fourteen feet or upwards, according to soil and climate. It has smooth, stalked, alternate, oval, or ovatolanceolate leaves, and small yellow flowers, solitary or in pairs on foot-stalks. It is much used as a pot-herb, and is called JEWS' MALLOW, from being much cultivated by Jews in Syria and other parts of the East. It is still more valuable for the fibre of its inner bark, as is also *C. capsularis*, a species very similar, but distinguished by the want of transverse partitions in its capsule. Both are much cultivated in India, yielding the greater part of the JUTE (q. v.) of commerce, and of the fibre employed in making *Gunny Bags* (q. v.). *C. capsularis* being extensively cultivated in China, is sometimes called CHINESE HEMP.

The Japanese shrub, now very common in Britain, and still very generally known as *C. Japonicus*, was ranked in this genus when botanists were very imperfectly acquainted with it, but belongs to the genus *Kerria*, of the natural order *Rosaceæ*.

CO'RDAGE, a seaman's name for the running rigging of a ship, as distinguished from the standing rigging. The name is also given to the store of rope kept in reserve. See RIGGING, ROPE.

CORDAY D'ARMANS, MARIE ANNE CHARLOTTE, known as CHARLOTTE CORDAY, was born at St. Saturnin, in the department of Orne, in 1768. Though descended from a noble family, she early imbibed revolutionary principles, but was horrified at the monstrosities of the Jacobins; and her hatred of their acts was intensified by converse with a party of proscribed Girondists, who had fled to Normandy. She resolved to rid her country of one of the principals of the Jacobin faction, and with that view traveled to Paris. Whether to slay Robespierre or Marat, was an open question with her; but while she was debating the matter with herself, a demand of the latter for a hundred or two hundred thousand more victims for the guillotine, marked him out for her weapon. Twice she sought admission to Marat unsuccessfully, but on a third occasion (July 13, 1793), was admitted on the plea that she had important news from Caen to communicate. She found Marat in his bath, who, to some statement she made, declared that the Girondists who had fled to Normandy, some of whom were her own friends, would be guillotined in a few days. She no longer hesitated, but plunged her dagger into the monster's heart, who expired with a single groan. She was at once arrested, and brought before the Revolutionary Tribunal, where she boldly avowed and justified her act. She was of course condemned to the guillotine, and the sentence was carried into effect on the 17th July 1793. Her beauty added greatly to the interest which her sanguinary heroism inspired.

CORDELIERS ('cord-weavers') was the name applied, in France to the strictest branch of the Franciscan friars, on account

of their wearing a girdle of knotted cord. At one period, this order had no less than 284 male and 123 female convents. During the Revolution, the name was applied to the members of a political club which assembled in the chapel of a Franciscan monastery, and exercised (chiefly in Paris, however) great influence on the progress of the revolution. It was instituted in 1790. Its leaders were men of various opinions, including Danton, Hébert, Camille Desmoulins, and Marat. The C. were generally opposed to the Jacobins (q. v.); but it may be asserted that in these two clubs all the great popular movements of the revolution had their origin. In the session of the C., May 22, 1793, the insurrection which marked the close of the Reign of Terror was plotted. While the club was at the height of its influence, Camille Desmoulins commenced to issue his popular journal, *Le Vieux Cordelier*. Soon after the fall of Danton, the C. club lost its influence, and was an insignificant affair when it was closed by the Convention.

CO'RD-GRASS (*Spartina*), a genus of grasses having compound spikes, the spikelets arranged on one side; and having only one perfect floret, and very unequal glumes. One species, *S. stricta*, found in muddy salt-marshes on the east and south-east coasts of England, although remarkable for its extreme stiffness and rigidity of habit, is used for making ropes, on account of the toughness of its fibre.

CORDIA'CEÆ, a natural order of exogenous plants, closely allied to *Boragineæ*, from which it differs chiefly in its drupaceous 4—8 celled fruit. It consists of trees with rough leaves, chiefly natives of the tropics, although some are found in cool parts of South America. The fruits called Sebesten (q. v.), or Sebesten Plum, belong to this order, and to the genus *Cordia*; which also contains some valuable timber-trees, particularly the Spanish Elm, Prince Wood, or *Bois de Chypre* of the West Indies (*C. Gerasacanthus*). It is a dark-brown wood, faintly striped, tough, elastic, and fine grained.

CORDI'LLERAS (so in England: Spanish *Cordille'ra*). The word *Cordillera* literally signifies a chain, and is applied in Spanish America to a chain of mountains. The C. of South America are described under Andes. Those of Central America extend from the commencement of the Isthmus of Darien to the north of Mexico and California, and spread themselves, to speak generally, from sea to sea, presenting many diversities, and occupying the states of New Granada, Costa Rica, Nicaragua, Honduras, San Salvador, Guatemala, the Mexican Confederation, and New Mexico. They gradually increase in elevation from the Isthmus of Panama, where at one point they are only 260 feet high, until, in Mexico, they reach a height of more than 17,000 feet, and form magnificent plateaux.

CO'RDON, in military operations, is a line of sentries enclosing or guarding any particular space of ground, to prevent the passage of persons other than those belonging to the army. The sentries are placed within sight of each other. If intended to guard against contagious diseases it is called a *C. Sanitaire*.

CO'RDOVA, or CO'RDOBA, a city of Spain, capital of the province of Cordova, is situated in the midst of olives and palm-trees on the Guadalquiver, here crossed by a stone bridge of 16 arches, constructed by the Moors. Lat. 37° 52′ N., long. 4° 49′ W. Its old Moorish walls and convent-crowned hill in the background give it quite an Oriental aspect; but its beauty, like most Oriental beauty, is merely external; inside, its streets are narrow, dark, and dirty, with a general appearance of decay. Many gardens are enclosed within the walls. Among the principal buildings is the cathedral, formerly a Mohammedan mosque, an immense structure dating from the 8th c., and generally regarded as the finest type of a Moslem temple in Europe. Internally, its columns composed of various colored marble, jasper, and porphyry, form a perfect grove, there being still some 850 remaining though at one time there was about half as many more. The bishop's palace, an old residence of the Moorish kings now used as stables, and several of the churches and convents, are also noteworthy. C. was at one time celebrated for its manufacture of Cordovan (q. v.), but that has now greatly declined. Its silversmiths and filigree workers have still a good reputation; and there are manufactures of paper, silken fabrics, hats, &c. Its inhabitants are proud, above even the pride of Spaniards. Pop. 49,900. C. is a very ancient place, having been founded by the Romans as Corduba, 152 B.C. Cæsar 45 B.C., put 22,000 of its inhabitants to death for having sided with Pompey. Taken by the Goths in the 6th c., it soon after fell into the hands of the Moors, and became the capital of the Moorish empire in Spain. From the 9th c. to the 12th c., it was one of the greatest centers of commerce in the world, and is said to have contained a million inhabitants. It was taken by Ferdinand III. of Castile in 1236, and never afterwards regained its prosperity. In modern times, C. was taken and plundered by the French under Dupont in 1808. C. is the birthplace of the two Senecas, the poet Lucan, and the astronomer Averroes. The province of Cordova has an area of 5159 square miles, and a pop. (1877) of 385,582. See Andalusia.

CORDOVA, the capital of a state of the same name in the Argentine Confederation (q. v.), is situated on the Rio Primero, a tributary of the Parana, in lat. 31° 26′ S., and long. 63° 55′ W. It was founded by the conquerors of Tucuman in 1573. It has a cathedral and several churches, with a population of 28,523. The state of which C. is capital is situated near the center of the Confederation, and contains about 57,275 square miles, with a population, in 1869, of 210,508, who occupy chiefly its western section. Cattle, sheep, and goats are numerous; and the soil is much fitter for maize and fruits than for wheat. The surface is mostly mountainous; and the ranges, which here and there are 2500 feet above the sea, are interspersed with barren flats of stone and sand.

CO'RDOVAN, a species of leather prepared from goat-skins. It was originally, and at one time exclusively, manufactured by the Moors of Cordova, and hence its name. The best C. still comes from the Levant. It is used in bookbinding, and in the finer kinds of boot and shoe making.

CORDYLINE. See Ti.

CORE'A, a peninsular kingdom of Eastern Asia, tributary to China; lat. 34° 40′ to 42° 30′ N., and long. 125° to 129° E., with an area estimated at 91,000 square miles. It is bounded E. by the Sea of Japan; S. by the Yellow Sea; W. by the Yellow Sea and Gulf of Pechili; and N. by the rivers Ya-lu and Tu-mên, which separate C. from Chinese and Russian Mantchuria respectively. These rivers take their rise from the eastern and western slopes of the vast desert mountain-tract of Ch'ang Peh Shan. Other considerable rivers are the P'ing Jang, discharging into the Yellow Sea in lat. 39°; and the Han, also flowing west, near the mouth of which is the capital, Séoul or Saul (Chinese, Wang King). All accounts represent the country as mountainous throughout, densely wooded in some districts, with valleys moderately fertile. The climate, which in the north is glacial, is elsewhere like that of Japan. There is ice and snow everywhere in winter. The rainfall of C. is excessive.

There is good reason to connect the people with the Tungusic stock that has peopled the whole of Northern Asia. The features of the Coreans are more pronouncedly Mongolian than those of the Japanese, whom they most resemble. The language, differing widely from both Chinese and Japanese, resembles the latter in its polysyllabic form and alphabet of 27 letters, and has affinity with the existing Mongolian tongue. The native alphabet and writing is almost disused; the Chinese character is everywhere known. The religion of C., like its other official institutions, is based on that of China; the Chinese state gods are everywhere worshiped; Buddhism and Taoism have their votaries; and the literati profess the Confucian Ethics.

The monarchy is a despotism limited by the existence of privileged ranks and hereditary nobles. The officials are selected. The life of the Coreans is very primitive; the chief articles of food are inferior kinds of rice and grain. Agriculture is very backward. A little tobacco, cotton, and silk is produced. The principal fabrics are of coarse hemp. The only products bartered with the Chinese are paper and ginseng. Mineral treasures abound; small quantities of gold, silver, iron, copper, and lead are mined; and the Coreans are skilful in working metals. The pop. is variously estimated at from 7,000,000 to 13,000,000.

C. has steadfastly maintained a policy of strict isolation towards all outsiders, even towards the Chinese, with whom there is no intercourse save on occasion of the annual embassy, which is accompanied by a few privileged traders, and of the periodical fairs at the 'Gate-town,' near the city of Fêng-hwang, in Mantchuria. The Chinese dislike to everything foreign is strengthened in the case of C. by traditions of ancient enmity between China and Ch'ao-sien, as C. was called in the 2d century B.C. The Mongol conquerors of China reduced C. also; but the Ming dynasty restored the Corean sovereign with the title of Kaoli-Wang (from which word Kaoli, through the Japanese form Ku-rai, comes the name Corea). Strange to say, the seeds of Christianity were sown in C. in 1592 by the invading army, composed chiefly of Christian converts, of the Japanese usurper, Taicosama. Hamel, a Dutch sailor, was wrecked here, and detained for thirteen years; from his narrative it was that, till very recently, most of our scanty knowledge of C. was obtained. In 1784, Jesuit missionaries found their way into C., and had great success amongst the people. From 1835 till 1866, several intrepid and devoted French missionaries contrived to find shelter; and in spite of incessant persecutions, the Christian community continued rather to increase, rising again, in 1852, to 11,000 souls. The massacre of nine missionaries, in 1866, led to an invasion of C. by a small French force, but without success. Nor did two successive American expeditions, provoked by an attack on an American vessel, succeed in contributing at all to break down the barriers that have so long separated the Coreans from the rest of the world. Japan

which claims sovereign right in C., obtained, in 1876, leave to trade with several Corean ports. The Russians have long been suspected of waiting for an opportunity to seize an admirable harbor, Port Lazareff, just within the Corean frontier: and moved by fear of Russian aggression, the Chinese agreed, by treaty with the United States, in 1882, to open four Corean ports to foreign commerce. Shortly after this a bloody rebellion broke out in C. It has of late been denied that C. is dependent on China; but the truth is, that though it is, and acts as a sovereign state as to laws, administration, and the treaties it has made with Japan, it does from time to time send tribute to Pekin, and each new sovereign is recognized by the Emperor of China. See *Journeys in North China*, by Rev. A. Williamson (1870); *C., The Hermit Nation*, by W. E. Griffis (1882); *C., Ancient and Modern*, by Rev. John Ross (1880); and *A Forbidden Land*, by E. Oppert (1880).

CORE'GONUS, a genus of fishes of the family *Salmonidæ*, having the first dorsal fin further forward than the ventrals, and higher than it is long, the scales large, the teeth either minute or wanting. The species are numerous, and some of them inhabit the sea, others fresh water. To this genus belong the Gwyniad of the lakes of Wales and Cumberland, the Powan of Loch Lomond, the Pollan of the lakes of Ireland, &c. From their herring-like appearance, the Gwyniad and Powan are often called *Fresh-water Herring*. Some of the species found in the lakes and rivers of North America are also known as *Herring Salmon;* but a more valuable species, regarded as one of the finest of all fish, is the WHITE FISH (*C. sapidus* or *albus*) of North America. Other species are found in the rivers and lakes of Europe, even to the North Cape, in those of Siberia, &c.

CORE'LLI, ARCA'NGELO, surnamed *Il Divino*, an Italian musical composer, was born at Fusignano in the Bolognese, in 1653. He visited Paris and Germany as a violin-player, but ultimately settled at Rome. His compositions, including concertos, sonatas, minor pieces for the violin, mark an epoch in chamber music, and had great influence on later composers, as Bach. He died in 1713.

CORENTY'N, a river of Guiana in South America; rises in lat. 1° N., having its head-waters 25 miles to the east of those of the Essequibo. With a generally northerly course, it separates the Dutch and British portions of the country; and at its mouth, in lat. 6° N. and long. 57° W., it forms an estuary of 25 miles in width. It is navigable for boats about 150 miles upwards, measured by its windings; and at a point still higher, it was found to be 900 yards across.

CORFE CASTLE, a village in the middle of Purbeck isle or peninsula, in the south of Dorsetshire, 24 m. E.S.E. of Dorchester. In the vicinity are stone and marble quarries, and clay-works for the potteries. Pop. of parish (1871) 1806. A castle, giving its name to the village, stands on the neighboring hill. It seems to have been founded in the 10th c., and was long one of the strongest fortresses in the kingdom. Here King Edward the martyr was murdered by his stepmother, Elfrida, about 980, and King John, during his disputes with his barons, kept his regalia here for safety. Here also, in 1642, Lady Bankes defended the castle for six weeks against Charles I. It was dismantled by Fairfax in 1645.

CO'RFU, the most northerly of the Ionian Islands (q.v.), in lat. 38° 40′—39° 40′ N., long. 19° 10′—20° E. It has a length of about 36 miles, with a breadth varying from 3 or 4 to 20 miles. Area, 427 square miles. Pop. (1879) 106,109. Like the rest of the Ionian Islands, it is mountainous, and the mountains are generally naked and dry, the highest summit, Pandokrátora, being between 3000 and 4000 feet above the sea. The valleys, however, are very fertile, and yield olive-oil, wine, honey, oranges, figs, &c. Salt is also produced in some quantity.

The climate is generally mild and healthy. The principal town, Corfu, underwent great improvements during the British protectorate, and is copiously supplied with water. It is situated on an elevation, has some good streets and a fine esplanade. The town, with about 17,000 inhabitants and a considerable trade, is the seat of an archbishop of the Greek Church, and of a Latin bishop. The principal institutions are the penitentiary, the lunatic asylum, the infirmary, foundling hospital, &c. The University, founded by Lord Guildford in 1823, now represented by a lyceum, was suppressed when (in 1864) the Ionian Islands were incorporated with the kingdom of Greece. At the incorporation it was stipulated that Corfu and Paxo were to enjoy perpetual neutrality. The language spoken is considered the softest of the modern Greek dialects—The ancient name of the island of C. was *Corcyra*. It is said to have been occupied first by the Phæacians, and then by the Liburnians; but the accounts of it are somewhat mythical until its settlement by the Corinthians about 734 B.C., and through its commerce it soon after required a considerable importance. It soon quarrelled with the mother-country, and after many vicissitudes of fortune, passed under the dominion of the Romans about 229 B.C.

CORIA'NDER (*Coriandrum sativum*), an annual plant of the natural order *Umbelliferæ*, with branching stem, 1—2 feet high, the lower leaves bipinnate, the upper leaves more compound, and globose fruit. It is a native of the south of Europe and of the east, and has long been cultivated for the sake of its fruit; and has thus become naturalized in some parts of England, although its fruit (*C. seed*) is much less used in Britain than in Germany, and some other European countries. The whole plant, when fresh, has a very offensive smell; but the ripe and perfectly dry fruit has an agreeable aromatic smell and a sweetish aromatic taste. It is used in medicine as a carminative, and as a corrective of certain purgatives; also in domestic economy as an aromatic, being very often mixed with bread in the north of Europe; spirituous liquors are flavored with it; and confectioners cover it with sugar, to make a well-known kind of comfit. In the south of England, it is common to sow C. and caraway together, the C. yielding a crop in the first year, and the caraway in years following. C. delights in a rich soil, and is much cultivated and used in India.

CORIGLIA'NO, a town of Italy, in the province of Cosenza, about 4 miles from the Gulf of Taranto, beautifully situated on a hill, round which it is built in the form of an amphitheater, a fine old castle crowning the summit. The base of the eminence is clad with lemon and orange groves, amid which rise some elegant villas; the whole rendering C. one of the most agreeable places in the Calabrias. It has extensive liquorice manufactories, and a trade in wine and fruits. Pop. 10,600.

CORI'NGA, a maritime town in the collectorate of Godavery and province of Madras, stands on the south side of the estuary of a river of its own name, one of the branches of the Godavery. Its harbor is breasted by a bar, which at spring-tide shows a depth of 12 or 14 feet. Besides having a considerable general trade, it is the best place on the coast for the building and repairing of small vessels. It has been twice destroyed by inundations of the sea. In May 1787, during the north-east monsoon, the tide overwhelmed the city and the adjacent country, drowning about 15,000 people; and again in 1832, a similar deluge occurred, leaving behind it, besides the more ordinary traces of its power, several ships lying high and dry in fields in the neighborhood. Pop. (1871) 5649.

CORI'NNA, a Greek lyric poetess, famous alike for her beauty and genius, was born at Tanagra, in Bœotia. The date of her birth is not known, but she flourished about 500 B.C. She lived principally at Thebes, and hence is sometimes called a Theban. Ælian states that on five different occasions she vanquished her contemporary, Pindar, in a poetic contest, but Pausanias alludes to only *one* victory of hers. Her townsmen showed their appreciation of her genius by placing a statue of her in their gymnasium. She was surnamed *Muia* ('the Fly'), probably on account of the tenderness and softness of her poems. Of her numerous poems, which were composed in the Æolic dialect, only a few fragments remain, which have been published by Schneidewin, in his *Delectus Poetarum Græcorum* (Gött. 1839), and by Bergk, in his *Lyric Poetæ Græci* (Leip. 1843).

CO'RINTH (originally called *Ephyre*), a famous city of antiquity situated on the Isthmus connecting the northern division of Greece, or Hellas proper, with the Peloponnesus. Its citadel was the Acrocorinthus, an isolated hill 1886 feet high, separated from the Oneian range on the north of the isthmus by a ravine, and forming, in the opinion of Colonel Mure, the most gigantic natural citadel in Europe, neither the Acropolis of Athens nor the fortress of Gibraltar being able even remotely to compete with it. At the northern foot of this hill lay the city of C., on a broad level rock nearly 200 feet above the level of the isthmus. It was probably founded by the Phœnicians, who had various settlements on the Grecian coast, and who could hardly have failed to notice the extraordinary maritime advantages of its situation. According to its legendary history, however, it was founded by Sisyphus, the Æolian, about 1350 B.C. It was then conquered by the Heracleidæ, who ruled as an oligarchy for twelve generations, when they were expelled by Cypselus, the father of Periander, with the help of the populace, 657 B.C.

After a period of 77 years, the Spartans—the great enemies of democracy in Greece—established again a sort of aristocratic government, and C. now figures in history as the close ally of Sparta. In the Peloponnesian war, it at first furnished the greater part of the fleet employed against the Athenians, but afterwards became jealous of the Lacedæmonian power, and was induced to league with other Grecian states against it, 395 B.C. The war which ensued is known as the *Corinthian War*, and lasted till the peace of Antalcidas, 387 B.C. In the strife which broke out between Thebes and Sparta, C. remained faithful to the latter. After the battle of Chæroneia, 338 B.C., in which the liberties of Greece were crushed by the Macedonians, it was garrisoned and held by the latter.

Subsequently, it was the center of the Achæan league formed against the Romans, and in revenge was utterly destroyed (146 B.C.) by L. Mummius, the Roman general. For a whole century it continued in ruins. In 46 B.C., Julius Cæsar rebuilt it, and made it the capital of Achaia; and although it never again attained its former importance, it became both prosperous and powerful. St. Paul planted a Christian church here, to which he also addressed two epistles. Pausanias, who visited it in the 2d c. A.D., states that it then contained many public buildings. From the Western emperors it passed into the hands of the Venetians. In 1458 A.D. it was conquered by the Turks under Mohammed II., recovered by the Venetians in 1687, and retaken by the Turks in 1715,,who held it till 1823. Reduced to ashes in the revolutionary war, and again utterly destroyed by an earthquake in 1858, C. was gradually rebuilt in a more convenient position near the shore of the Gulf of C. Its pop. is about 2000.

Ancient C. was surrounded by walls which included the Acrocorinthus, and had two harbors—*Lechæum*, on the Crisæan Bay (now the Gulf of Lepanto), opening into the Adriatic, and Cenchreæ, on the Saronic Gulf (now the Gulf of Athens), opening into the Ægean. The former was connected with the city by two parallel walls. The vast wealth of its merchants was the bane of Corinth. It became notorious as the most licentious city in all Greece, and was the favorite resort of courtezans. The patron goddess of the city was Aphrodite, in whose temple, on the Acrocorinthus, were kept more than a thousand 'sacred female slaves' (*hierodouloe*) for the use of strangers. C., however, has better claims to remembrance. The art of painting is said to have been invented here, and at the time of its capture by the Romans, it possessed some of the finest pictures in Greece. Among these, was the picture of Bacchus, by Aristides, for which Attalus offered 600,000 sesterces. Architecture, statuary, and bronze-work also flourished, and earlier, during the reign of Periander, poetry was cultivated, Arion having either invented or improved the dithyramb in Corinth. Afterwards, however, no attention was paid to literature by the inhabitants, and it has been noticed that 'among the illustrious writers of Greece not a single Corinthian appears.'

CORINTH, GULF OF, or GULF OF LEPA'NTO. An arm of the Mediterranean extending from west to east through the center of Greece, from the Ionian to within about 5 miles of the Ægean Sea, thus almost dividing the kingdom into two parts, the Morea forming the southern portion. Its greatest length is about 75 miles, with an average breadth of 15 miles. The outline of the coast is exceedingly varied, and the scenery is everywhere as attractive as it is rich in contrast. The narrow neck of land, separating the Gulfs of C. and Egina, and uniting the Morea to Attica, is called the ISTHMUS of Corinth. It is variously estimated, accordingly as it is measured from different points, at from 10 to 20 miles in length, and its breadth varies from 4 to 8 miles. The project of cutting through this isthmus was early entertained, and attempted by Nero without success. This scheme took practical shape in 1882, when the cutting of a canal four miles in length from the G. of C. to the Bay of Ægina was commenced with much ceremony by the king and queen of Greece. A strong wall, flanked with towers, was anciently built across the isthmus. The celebrated Isthmian games were contested upon this tract.

CORI'NTHIAN O'RDER. See COLUMN.

CORINTHIANS, EPISTLES TO THE, were written by St. Paul, 57 or 58 A.D. The first was composed at Ephesus; the second, according to general opinion, at Philippi, but this is doubtful. The genuineness of both is all but universally recognized. From the contents of 1 Cor., chap. 5, verse 9, it has been concluded by many theologians that Paul must have written a previous epistle, now lost.

CORIOLA'NUS, CAIUS or CNÆUS MARCIUS, a Roman patrician, surnamed, according to the half-fabulous legend, C., on account of his capture of the town of Corioli, belonging to the Volsci (493 B.C.). Of a proud and haughty spirit, he was strongly opposed to the plebeians, whom he looked upon as the 'enemies' of his order; and on one occasion, during a time of famine, he argued in the senate against a gratuitous distribution of the corn which had arrived from Sicily, and insisted that the plebeian tribunes, lately instituted, should first be discharged from office. For this he was impeached, and banished. He took refuge among the Volscians, whom he aided in their war with the Romans. His victories at the head of his Volscian troops alarmed the Romans, who, on his approach to their city, sent a variety of deputations to plead with him. He was deaf to every entreaty. At last, the noblest matrons of Rome, headed by his old mother and his wife Volumnia, leading her two children, came to his tent. His burning desire to be revenged on those who had dishonored him was cooled by the tears of his relatives, and he led back the Volsci to their own territories, where he lived to an advanced age. Shakspeare has written a play on the subject, in which the character of C. is conceived in the grandest and most aristocratic style.

CORK (Span. *corcho*, from Lat. *cortex*) is the unusually developed *epiphlœum* (see BARK) of the bark of the C.-tree or C.-OAK (*Quercus suber*), the *Alcornoque* of the Spaniards, a species of Oak (q. v.), a native of the south of Europe and north of Africa. Spain and Portugal chiefly supply the world with C., and in these countries, the tree is often planted for the sake of the cork. The C.-tree is not of great size, generally 20—40 feet high, much branched, with ovate-oblong evergreen leaves, which are sometimes entire, and sometimes sharply serrated. The acorns are eatable, and resemble chestnuts in taste. The bark in trees or branches from three to five years old acquires a fungous appearance, new layers of cellular tissue being formed, and the outer parts cracking from distension, until they are finally thrown off in

Cork Tree.

large flakes, when a new formation of the same kind takes place. C. intended for the market is generally stripped off a year or two before it would naturally come away, and the process is repeated at intervals of six or eight years. The bark of young trees and branches is either useless or of very inferior quality; it is only after the third peeling that good C. is produced. The removal of the C., being not the removal of the whole bark, but only of external layers of spongy cellular tissue, all or greater part of which has ceased to have any true vitality, and has become an incumbrance to the tree, is so far from being injurious, that when done with proper care, it rather promotes the health of the tree, which continues to yield crops of C. for almost 150 years. In stripping off the C., longitudinal and transverse incisions are made to the proper depth, and each piece is then cut away from the tree by a curved knife with two handles. The pieces are soaked in water, pressed flat, dried, and superficially charred, to remove decayed parts and conceal blemishss, before they are packed in bales for the market. Besides the use of C. for stopping bottles, casks, &c., it is much used, on account of its lightness, for floats of nets, swimming-belts, &c.; and on account of its impermeability to water, and its being a slow conductor of heat, inner soles of shoes are made of it. All these uses are mentioned by Pliny; but the general employment of corks for glass bottles appears to date only from the 15th century. The *Spanish Black* used by painters is made by burning C. in close vessels, and the parings of C. are carefully kept by C.-cutters for this purpose. There are many other applications of this valuable substance in the arts, which cannot here be detailed.

The C.-tree is occasionally planted in the south of England, but the climate is not sufficiently warm.

The wood of some trees possesses the cellular sponginess, lightness, and elasticity of C. in such a degree as to be sometimes substituted for it in many of its uses, as that of the *Anona palustris* (Corkwood, or Alligator Apple) in the West Indies, &c.

CORK-CUTTING. The bark, after being cut into square pieces or sheets, is pressed, to remove its natural curvature and flatten it. If it is found that simple pressure has not flattened it sufficiently, it is heated on the convex side, and the contraction thus produced straightens it. It is then cut into slips, and these slips into squares, according to the required size of the corks. These are rounded by the cork-cutter by means of a broad sharp knife; the cork is held in the left hand, and rested against a block of wood, and the knife pushed forward, and at the same time its edge is made to describe a circular curve by a skilful turn of the wrist. The knife requires continual sharpening; the workman has a board before him on which the knife is rubbed on each side *after every cut*.

Many attempts have been made to cut corks by machinery. A patent C. company was established a few years since, but it failed. The chief difficulty in applying machines to this purpose arises

from the necessity of continually sharpening the knife or cutters, for it is a curious fact, that so soft a substance as cork blunts the tools used in cutting it far more rapidly than do the hardest or toughest of metals. A cork-cutter's knife requires sharpening every second, while the tool that is used for planing, turning, or boring steel will work continuously for hours without sharpening. In most of the machines, the corks, after being cut into squares of the required length, are made to revolve on grasping spindles; and cutters of various forms, such as revolving cutter-wheels, hollow cones with internal cutters, reciprocating blades, toothed cutters, &c., are brought to bear upon the revolving cork.

CORK, Rock. See Asbestus.

CORK, a city and parl. borough of Ireland, capital of the county of the same name, and a county in itself, on the Lee, 11 miles above its discharge into the sea, stands in the center of a picturesque valley. It is built in part on an island, formerly a swamp, which the word *Cork, Corcoch*, or *Corcagh* implies; in part, on the N. and S. slopes of the river-banks. The houses are generally of old red sandstone. Nine bridges cross the river to the central islands. There is a spacious public park, and a walk above a mile long, lined by noble elms, on the west of the city. There is also a handsome public cemetery. C. has a pleasant picturesqueness from its uneven ground, irregular streets, intersecting river, and overhanging heights. The chief buildings are St. Anne Shandon's Church, with a tower 170 feet high; several Catholic churches; 4 monasteries; 2 nunneries; the Bishop's Palace; and Queen's College, a fine Tudor-Gothic quadrangular building, opened in 1849. The banks of the Lee above and below C. are richly planted, and studded with villas.

The Lee is navigable to about a mile above the city, and on the improvement of the navigation the harbor commissioners have expended above £300,000 within the last 25 years. The extent of the quays is now above 4 miles, and ships of 600 tons reach them. C. harbor, noted for its size and safety, is a basin of 10 square miles, formed by the estuary of the Lee. It could contain the whole British navy, and has been the main source of the rise and progress of the city. The estuary contains several large isles, rising abruptly and high above the water, with narrow channels between them. The entrance is by a channel two miles by one, defended by batteries, on Spike, Hawlboline, and Rocky Islands, which are occupied by convict and ordinance depots, artillery barracks, and a powder magazine. On the shores of the estuary are the towns of Passage and Queenstown, formerly Cove of Cork. C. harbor is much frequented by wind-bound ships and ships waiting orders. In 1880, 2880 vessels, with a total tonnage of 728,556 tons, entered the port; and 2,526, of 649,722 tons cleared. The chief manufactures are leather, iron, gloves, ginghams, friezes, flour, malt liquors, and whiskey; iron-shipbuilding has been largely carried on since 1872. The chief exports are grain, provisions, butter, live-stock, and linen, valued at several millions sterling yearly. Pop. (1881) 78,361; (1871) 78,642; parl. bor., 100,518; of whom about $\frac{5}{6}$ths are Roman Catholics. C. returns 2 members to parliament.—C. grew up around an abbey founded in 600 by St. Finbar. The Danes in the 9th c. built the city walls. Dermod Maccarthy, king of Cork or Desmond, surrendered it to Henry II. in 1172. Cromwell besieged and took it in 1649, and Marlborough in 1690. James II. landed at C. in 1688. In C., William Penn, the founder, of Pennsylvania, became a Quaker, with several of the soldiers of the republican garrison.

CORK, a maritime county in Munster, the south-most and largest of the Irish counties. It is bounded on the N. by Limerick, E. by Tipperary and Waterford, S. by the Atlantic, W. by Kerry. Greatest length from E. to W., 110 miles; greatest breath, 70; average 34. Area, 1,849,683 acres, of which 431,456 were under crops in 1881. C. is hilly, with great variety of surface. The W. part is rocky, mountainous, wild and boggy; the E. and S., rich, fertile, and picturesque. The ranges run E. and W., except the Boghra Mountains, between the Lee and Blackwater. The coast is bold and rocky, and from its indentations, 250 miles long, the bays which run 3 to 25 miles inland, admitting large vessels. The chief bays are Bantry, Dunmanus, Clonakilty, Kinsale, Cork Harbor, and Youghal. There are many isles off the coast, the chief being Whiddy (in Bantry Bay), Bear, Innissherkin, Great Island, and Clear, which lies in lat. 51° 25′ N. and long. 9° 30′ W., and, with the exception of a rock 4 miles to the S.S.W., is the southmost point in Ireland.

In the W., C. is divided from Kerry by a range of Silurian clay-slate, running N.E. and N., the chief points being 1200 to 2200 feet high. This range sends offshoots to the east, which divide the county into the parallel basins of the three chief rivers of C., the Blackwater, Lee, and Bandon; the lower parts of these basins are well cultivated and productive. The basins of the Lee and Bandon consist of red and yellow Devonian sandstone, with some beds of lower carboniferous limestone. This limestone, as in other parts of Ireland, forms the largest lowland tracts and valleys of the county. The Blackwater basin also consists of Devonian strata, but with more limestone. Part of the Munster coal-field occupies 400 square miles in the N.W. of the county, with a cold, stiff, moory soil over it. The river-beds generally mark the limestone tracts. C. has many small lakes in the west. One of these lies at the source of the Lee, amid wild, picturesque scenery, with the ruins of a chapel on an islet frequented by pilgrims. The chief mineral productions are coal and iron, copper, (the mines of which are the richest in Ireland), limestone, fine dark-gray and also red marble rich in fossil shells, fullers' earth, brick-clay, marl. There is a thermal magnesia spring at Mallow. The climate is moist, but genial. The soils are calcareous, loamy, and moory. The dairies are extensive, and C. butter stands in high estimation. The cattle are small in size, but yield large quantities of milk. Of the land under crops in 1881, 24,597 acres were under wheat, 101,934 acres under oats, 22,260 acres under barley, bere, and rye, 68,717 acres under potatoes, 33,787 acres under turnips, 15,842 acres under other green crops, and 164,298 acres under meadow and clover. The live-stock in the same year consisted of 54,424 horses and mules, 11,194 asses, 386,215 cattle, 264,165 sheep, 144,856 pigs, 22,857 goats, and 1,115,567 head of poultry. The chief manufactures are linen, whisky, porter; and the chief exports provisions. Pop. (1841) 854,118; (1851) 653,180; (1871) 517,076; (1881) 495,607. C. county returns eight members to parliament—two for the county, two for C. city, and one each for Bandon, Mallow, Kinsale, and Youghal. In 1880 there were 102,087 pupils attending the national schools in C., of whom 96,909 were Roman Catholic, 4413 Protestant Episcopal, and 387 Presbyterian. The antiquities of C. are stone circles and altars, two round towers, circular earthworks or raths; many ruins of abbeys and churches, chiefly built by descendants of the English invaders under Henry II., and many ancient castles or square towers of great historical interest.

CORLEO'NE, a town of Sicily, in the province of Palermo, about 21 miles from the city of that name. It is situated on a hill near the source of the Belici, and is well built. Its principal public structures are convents and churches. Its inhabitants, about 15,350 in number, are chiefly engaged in agriculture.

CORM (Gr. *kormos*, a stump)—sometimes called a *solid bulb*—the short and bulb-like subterranean stem of many endogenous plants. It annually produces buds in the form of small corms, either from its summit or its side; and these gradually exhaust and destroy it. In functions, as in appearance, the C. resembles the Bulb (q. v.), but its structure is different; it does not consist chiefly of scales, as a bulb does, but of a solid axis covered only with thin membranes. Examples may be seen in the tulip, crocus, gladiolus, colchicum, and arum. When a C. produces young corms from its summit, as in the crocus, they approach in a few years the surface of the soil, however deeply they may at first have been planted.

CORMENIN, Louis Marie de la Haye, Vicomte de, a distinguished French jurist and publicist, was born at Paris, January 6, 1788. Educated for the law, he was, in 1810, appointed auditor of the Council of State, and drew up several of its most important reports. He was elected a deputy in 1828, and from that time until 1846, continued to be re-elected at every election, sometimes by as many as four departments at once. His extensive knowledge of jurisprudence, and of the practical affairs of government, and the clear and logical force with which he could present his ideas alike by speech and writing, soon secured him an immense influence in public affairs. After the revolution of 1848, C. had the honor of being elected to the Chamber by four departments, and was nominated president of the commission appointed to remodel the constitution; and in this capacity strongly advocated universal suffrage. He was appointed member of the Council of State reconstituted after the *coup d'état*. In 1855, he was elected a member of the Institut. Besides his numerous pamphlets, C. is author of *Etudes sur les Orateurs Parlementaires*, a work which has passed through nearly twenty editions; and of a valuable work on the law of France (*Droit Administratif*). After long silence, C. published in 1860 *Le Droit de Tonnage en Algérie*. He died at Paris, 6th May 1868.

CO'RMORANT (*Phalocrocorax*; Fr. *cormorant*; Ital. *corvo marino*; Bret. *morvran*, a sea-crow; Welsh, *mor*, sea, and *bran*, a crow), a genus of web-footed birds of the family *Pelecanidæ* or *Totipalmati*, having, like the rest of that family, the hind-toe united in a single membrane with the other toes; and also characterized by a bare dilactable membrane beneath the lower mandible, extending to the upper part of the throat, but not forming a great sac on the throat, as in the pelicans; a compressed bill, rounded above, and with a strong hook at the point of the upper mandible; the nostrils linear, and seemingly impervious to air; the claw of the middle toe serrated, apparently in order that it may be used in trimming the plumage; the wings of moderate length; the tail-feathers stiff and rigid, and used to aid in walking or climbing.

The species are distributed over the coasts of most parts of the

world; some of them occasionally ascending rivers in pursuit of fish, on which all of them exclusively live, and even visiting inland lakes. They are proverbial for their excessive voracity. They do not take their prey by diving when on wing, but pursue it by swimming and diving, using their wings in progress under water, and descend to a wonderful depth; the smaller of the two British species has been caught in a crab-pot fastened 120 feet under water. When the prey has been caught in a manner inconvenient

Cormorant.

for swallowing, they toss it in the air, and adroitly catch it as it descends. Some of the species frequent high rocks, others low islands, on which they make rude nests, chiefly of sea-weed; some perch and even build their nests on mangroves and other trees. Their eggs are covered with a calcareous incrustation. The flesh of all the species is dark and of a fishy taste, but is sometimes used as food, particularly that of young birds. The British species are the Common C. (*P. carbo*), which is mostly of a black color, but for a short time during the breeding-season exhibits a sprinkling of longish white, almost bristly feathers on the head and back of the neck; and the Green C. or Shag (*P. graculus*), which is of smaller size, and of a prevailing dark-green color. The Common C. is about 23 inches long. It is a very widely distributed species. It was formerly sometimes tamed in England, to be employed in catching fish, and is still trained to this use in China.

CORN (Ger. *Korn*) meant primarily any small, round, hard body, like a seed. This general meaning is still seen in its application to concretions on the feet. It is allied to the Lat. *granum*, grain; and to Ger. *Kern*, kernel. As usually applied, C. is a generic name for all seeds used in making bread, especially the seeds of cerealia. But it has also a specific sense, and denotes in any country that grain which furnishes the prevalent bread-stuff of the people. Thus, in England, C. means *wheat;* in America, it means *maize;* and in Scotland, *oats*.

CORN LAWS, the name popularly given to certain statutory enactments which had for their object a restriction of the trade in grain. The English C. L. date as far back as the year 1360, in the reign of Edward III. Before this period, there seems to have been a general rule carried into effect by the crown against the exportation of any grain; and the act of 1360 enacts the prohibition, but at the same time excepts Calais and Gascoigne, with any other places which the king may appoint by license, from its operation. In 1393, the arrangement was reversed, and the right to export was made general, unless to those places to which it was prohibited by royal proclamation. An act of 1436 permitted exportation when the price of wheat did not exceed 6*s*. 8*d*. per quarter. Hitherto, there seems to have been no prohibitions against importation; but in 1463, an act was passed prohibiting it so long as the price at home was below the 6*s*. 8*d*. at which there was free exportation.

The next change was in the reign of Henry VIII., when an act of 1534 prohibited all exportation except by license specially granted under the great seal. This act was not found to work well; and twenty years later, the previous arrangement was adopted of allowing exportation when the price had reached a certain point. The subsequent legislation for some time merely changed the price at which exportation might begin, generally enlarging it. After the Restoration, the policy of increasing the duties on importation, for the protection of agriculture and the landed interest at home, begins to be perceptible. At the same time, the effect of that event on the condition of Scotland and England towards each other forms a curious illustration of such fiscal regulations. Under the Protectorate, they were one country, with free intercommunion of trading privileges. Scotland was increasing in wealth under this arrangement; but the countries were separated by the restoration of Charles II., and became the same to each other as foreign nations. The English duties restricted the importation of grain from Scotland; and in 1663, the Scotch parliament, in retaliation, laid heavy duties on the importation of English and all other foreign grain. Had not the union of 1707 made the countries one again, England and Scotland would probably have continued a corn-law contest against each other, like the French provinces.

The agricultural interest continuing powerfully to modify this department of legislation, an act was passed in 1670, for virtually prohibiting the importation until home-price had reached 53*s*. 4*d*., and laying a heavy duty on it above that point. This law had, however, little effect in favor of the landed interest, from the circumstance that then, and for long afterwards, Britain was an exporting, not an importing country—that is to say, it generally produced more corn than its population required. A new device was adopted at the Revolution, and a bounty was awarded on exportation—that is, a sum was paid to the producer for what he exported, so that if the price in the foreign market might not induce him to send corn abroad, the bounty, in addition to that price, might. For upwards of a century, the numerous enactments in this department will be found to be a mere shifting, according to circumstances, of the incidence of the bounty on the one hand, and of the import duty on the other. In 1773, a permanent adjustment was supposed to be reached by Burke's act, which removed the bounty, and prohibited exportation when the price reached 44*s*., and allowed importation at a nominal duty of 6*d*., at a price of 48*s*. Afterwards, and especially during the great war of the French Revolution, it became usual to profess that the chief object of this kind of legislation was to have always a sufficient supply of grain at home for our own wants, and to render us entirely independent of foreign nations for the food of the people.

It was maintained that the bounty effected this object, since its tendency was to promote the production of more grain than was necessary at home, and it thus supplied a granary to be drawn upon in case of famine. It was otherwise, however, maintained, that the prohibiting, or, at all events, restraining the introduction of foreign grain, would give a much greater impulse to home production. Looking at it from the agricultural interest solely, this view was well founded; for, as the tendency of Britain to be an importing rather than an exporting country was increasing, the exportation, even with the encouragement of the bounty, was likely to be small. It could not, however, escape consideration, that to increase home production by a pressure on importation, was virtually to aggrandize the landed interest by a pressure on the food of the people. With these views, the price at which importation might begin was raised in 1804, and was again raised in 1814, when the bounty was abandoned as worthless for its purposes. There had been a tendency to what is called 'a sliding scale' in the duties on importation. This arrangement was brought into systematic shape by the act of 1814, and subsequently, by the celebrated act of 1828, it reached what was considered by its supporters a state of perfection.

Throughout these various changes there were not wanting writers and speakers who denounced the C. L., and agitated for their removal. But the public at large, though conscious that the laws were some way improper, or at variance with the principles of political economy, did not till the very last, earnestly unite in calling for repeal. There was a powerful party who defended the C. L., and represented with wonderful plausibility, that these restrictive statues were identified with the best interests of the country. Their arguments might thus be summed up: 1. Protection was necessary, in order to keep certain poor lands in cultivation. 2. It was desirable to cultivate as much land as possible, in order to improve the country. 3. If improvement by that means were to cease, we should be dependent on foreigners for a large portion of the food of the people. 4. Such dependence would be fraught with immense danger; in the event of war, supplies might be stopped, or our ports might be blockaded, the result being famine, disease, and civil war. 5. The advantage gained by protection enabled the landed proprietors and their tenants to encourage manufactures and trade; so much so, that if the C. L., were abolished, half the country shopkeepers would be ruined; that would be followed by the stoppage of many of the mills and factories; large numbers of the working-classes would be thrown idle; disturbances would ensue; capital would be withdrawn; and no one would venture to say what would be the final consequences. It cannot be uninstructive to put on record that these arguments exercised a commanding influence over the laboring-classes, the small-town shopkeepers, almost all the members of the learned professions, and a considerable section of both Houses of parliament.

Ignorance, prejudice, and timidity were united with selfishness in maintaining the C. L.; and in point of fact, those who endeavored to represent the impolicy of a restricted trade in corn, were generally set down as little better than mischief-makers. The most surprising thing of all was, that the statesmen who ultimately joined in condemning the C. L., could contemplate no other modification than an ascending and descending scale of duties, according as prices fell or rose in the market. About 1840, there was no term better known than that of the *sliding scale*. The ob-

ject of this device was to reduce the import duty as the price of grain increased, for the purpose of virtually prohibiting the importation when the price was low, and encouraging it when the price was high, so that at famine-prices grain might come in duty free. By the act of 1828, the price of 62*s.* a quarter on wheat was taken as the turning-point. At that price, the import duty was £1, 4*s.* 8*d.* For every shilling less in the price, a shilling was added to the duty. When the price rose above this point, a different gradation ruled, the duty decreasing by a larger ratio than the rise. Thus, when the price was 69*s.*, the duty was 15*s.* 8*d.*; and when it rose to 73*s.*, the duty sunk to its minimum of 1*s.* The effect of this fluctuation in rendering the trade a gambling one was, one would think, obvious, and yet it was not acknowledged until it had been proved by a series of ruinous instances. Thus, an importer who, when the price of grain was 73*s.* a quarter, bought a cargo, if the price sunk 4*s.* before he could accomplish a sale, had not only to sell at that reduced price, but with a further reduction of 14*s.* 8*d.* a quarter paid as duty. What was still more important, the supplies to this country being so capricious and irregular, foreign countries did not grow corn habitually for the British market. In 1843, Sir Robert Peel tried a modification of the sliding scale, which did not in the least degree mitigate the hostility to the C. L., the noxious nature of which was now beginning to be better understood. Roused by the addresses of Mr. Cobden, Mr. Bright, and other leaders of the ANTI-CORN-LAW LEAGUE (q. v.), the people poured in petitions to parliament; and at length, Sir Robert Peel, yielding to representations on the subject, and now avowedly a convert to FREE-TRADE (q. v.), carried a measure to put an end to the C. L. in 1846.

The results of the repeal are well known. Every evil prognostication has been falsified. The liberation of the trade in corn has not, however, lowered the price of bread to the extent that some persons anticipated. This is accounted for as follows: an increased demand in consequence of the population increasing in numbers, and also improving in means and taste; and the cost of freight and other charges virtually protect the home-grower to the extent of several shillings a quarter. The small registration duty of one shilling a quarter, maintained till 1869, was abolished in that year; since which time the importation of corn is absolutely free.

TOTAL AMOUNT OF WHEAT AND FLOUR, AND OTHER GRAIN AND MEAL IMPORTED IN 1844, 1849, 1854, AND 1859, DISTINGUISHING THE COUNTRIES WHENCE RECEIVED.

COUNTRIES.	1844.	1849.	1854.	1859.
	Quarters.	Quarters.	Quarters.	Quarters.
Russia, Northern Ports	97,143	340,633	168,847	1,020,461
" Southern Ports	104,292	572,735	539,856	1,384,030
Denmark and the Duchies	656,576	1,311,086	876,369	1,022,255
Prussia	981,374	1,354,691	728,974	1,011,048
Hause Towns	129,803	596,673	420,489	298,494
Other Parts of Germany	215,224	416,023	365,190	175,034
Holland	80,216	586,739	250,358	192,808
France	58,265	1,019,410	224,712	2,249,430
Spain	13	26,370	231,503	....
Italian States	96,727	406,034	117,947	197,041
Wallachia, Moldavia	....	325,128	147,090	705,290
Turkish Dominions, not otherwise specified	26,389	423,976	303,083	312,934
Egypt	96,047	392,727	588,969	674,257
British North America	258,784	181,622	84,757	82,499
United States	107,812	1,816,425	2,136,223	109,275
Other Countries	122,016	899,389	725,277	835,918
Total,	3,030,681	10,669,661	7,909,544	10,270,774

The substantial benefits arising from the repeal of the C. L. consist in the stimulus given to trade, the removal of apprehensions as to the effects of insufficient harvests, along with a certain modification and less fluctuation in price. The following tables will convey the best illustration of the effect of repeal of the corn laws:

Average Periods of Ten Years.	Average Amount of Wheat Imported.	Average Price of Wheat during each Period.	Average Total declared Value of all British Exports.
	Bushels.	*s.* *d.*	£.
1801 to 1810	600,946	81 5	40,737,970
1811 " 1820	458,578	84 11	41,506,794
1821 " 1830	534,992	58 3	36,600,536
1831 " 1840	907,638	56 10	45,249,037
1841 " 1850	2,877,999	53 3	57,412,494
1851 " 1859	4,547,311	54 9	103,253,189

Between the period 1801—1810 and 1841—1850, we find an increase in the value of British and Irish exports of £16,674,524. The value of the British imports of corn, grain, and meal, in 1877, was £63,536,322; in 1880, it was £62,857,269. Formerly Russia and France were the sources whence Great Britain was mainly supplied with its foreign stores of grain. But in recent years the imports of bread-stuffs (especially wheat) from the United States have enormously increased, so that now our chief supplies come thence; and the rivalry of the American grain-grower has become more and more formidable to the British farmer. In 1880, the imports of grain and flour from the United States amounted to 75,526,972 cwts., of the value of £35,596,192. The new wheat-growing districts of Canada also send us large quantities.

CORN AP'HIS, or WHEAT A'PHIS (*Aphis granaria*), a species of *Aphis* (q. v.), or Plant Louse, which is sometimes in-

Corn Aphis:—*a*, natural size.

jurious to corn-crops, appearing in great numbers on the ears, sucking the juices of the plant, and so impoverishing the grain. It infests wheat, barley, and oats. The male is green, the female dull orange.

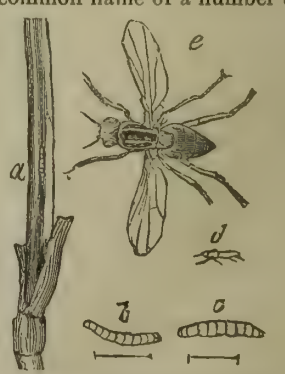
CORN BEE'TLE (*Crucujus testaceus*), a minute beetle, which inhabits granaries and mills, and of which the larva often does

Corn Beetle:
a, larva, natural size; *b*, larva, magnified; *c*, perfect insect, natural size; *d*, perfect insect, magnified.

much mischief, feeding, like the weevils, on grain, particularly on wheat. The perfect insect is of a bright fulvous color; the larva ochreous, with a forked tail.

CORN CRAKE. See CRAKE.

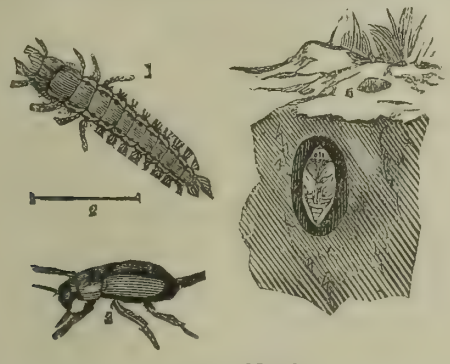
CORN FLY, the common name of a number of small dipterous



Corn Fly (*Chlorops tæniopus*);—*a*, a portion of a culm or stem of wheat with swollen joint, caused by larva of corn fly; *b*, larva; *c*, pupa; *d*, fly natural size; *e*, fly, magnified.

(two-winged) insects, of the large family *Muscides*, particularly of the genera *Chlorops* and *Oscinis*, which do great injury to corn crops. The most destructive in Britain is *Chlorops tæniopus*, a fly about a line and a half in length, of a pale-yellow color, with black stripes, which deposits its eggs between the leaves of young plants of wheat or barley. The maggots living on the juices of the plant produce the disease which, from the swelling of the joint, is called *gout;* and the plant, impoverished, either produces no ear, or an imperfect and partially shriveled one.

CORN GROUND BEETLE (*Zabrus gibbus*), an insect of the order *Coleoptera*, section *Pentamera*. It is about six lines in length, of a shining pitchy black color, with rusty jaws and legs, very broad and convex, the wings large, the antennæ short and slender. It burrows in the ground, climbs the stalks of wheat and



Corn Ground Beetle:
1, larva, magnified: 2, natural size of larva; 3, perfect insect, female, slightly magnified; 4, a cell containing pupa: 5, a burrow.

barley by night, and devours the ears. The larva is of a remarkable appearance, whitish, with brown head and thorax, and a brown stripe down the body, powerful jaws, six thoracic legs, and little tufts of hair along the sides of its elongated tapering abdomen. It burrows in the earth, and eats the stems of corn close to the surface of the ground.

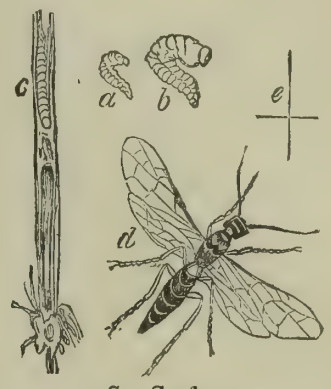
CORN SA'LAD, or LAMB'S LE'TTUCE (*Fedia* or *Valerianella*), a genus of plants belonging to the natural order *Valerianaceæ*, having a toothed calyx and 5-fid corolla, three stamens, and a 3-locular fruit, crowned with the calyx. The species are annual plants of humble growth, with repeatedly forked stems, and very small flowers, growing in cultivated grounds, &c. Several species, very closely resembling each other, are natives of Britain, and others are found on the continent of Europe. Some of them are frequently used as spring salads, and sometimes as a substitute for spinage, particularly the common C. S. (*F.* or *V. olitoria*), the most abundant species in Britain, the *Mâche* of the French, *Rapunzcher* of the Germans. It is a favorite salad in France and Germany, although it is mucilaginous, and wants pungency. The lower leaves are somewhat spoon-shaped, the upper leaves oblong. The plant is extremely easy of cultivation, and can be obtained in the very first days of spring, when vegetables are scarce. The VINEYARD SALAD of the Germans (*F.* or *V. carinata*), and ITALIAN C. S. (*F.* or *V. eriocarpa*), are sometimes preferred for their larger leaves and finer flavor.

Corn Salad:
b, a flower.

CORN MOTH (*Tinea granella*), a small species of moth of the same genus with the Clothes' Moths (q. v.). This moth is satiny and of a cream-white color; the superior wings marbled with gray, brown and black, and when at rest sloping like the roof of a house, their fringe turned up behind like a tail. It abounds in spring and summer, and lays its eggs either among stored grain or in sheaves in the field. The eggs are so small as to be invisible to the naked eye. The larva, or CORN WORM—which, for its voraciousness, is known as *the wolf*—eats into the grain, and attaches grains together by a web. It attacks indifferently any kind of grain; sometimes also books, articles of pasteboard, woollen stuffs, and even wood. Frequent turning of heaps of corn is resorted to for the destruction of the eggs and larvæ, and salt is for the same purpose mixed with corn; the floors, walls, ceilings, beams, &c., of granaries are scrubbed with hot water and soap, or washed with lime and water, sprinkled with vinegar, &c.; and lamps are employed to attract and kill the moths.—Another very troublesome moth, also called C. M., is *Butalis cerealella*, which is not yet known in Britain, but is found in some parts of Europe and America.

CORN RENT. See RENT, LEASE.

CORN SAW'FLY (*Cephus pygmaeus*), a species of Sawfly (q. v.) which sometimes does much mischief in cornfields, particularly to wheat or rye; the female, by means of her ovipositor, laying her eggs in the stems either below the first joint or just under the ear;

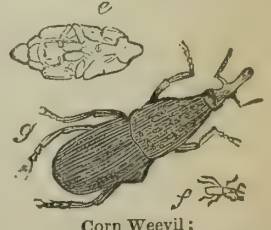


Corn Sawfly:
a, maggot, natural size; *b*, maggot, magnified: *c*, the maggot in its ear in the stem of the corn; *d*, female insect, magnified; *e*, female insect, natural size.

the larva consuming the inside of the stalk, sometimes perforating the joints, and at last cutting it through near the ground, and undergoing its transformation into the pupa state in the stump which remains. The C. S. is almost half an inch long, of a very slender form, shining black with some yellow markings; the larva is fat, tapering, wrinkled and yellow. The fly is often to be seen on the flowers of umbelliferous plants.

CORN THRIPS (*Thrips cerealium*), a minute insect, not quite a line long, often abundant on flowers, and which does much mischief to grain crops, particularly late-sown wheat, insinuating itself between the chaff and the immature grain, which it causes to shrivel; also at an earlier period causing the abortion of the ear, by puncturing the stalks above the joints and sucking the juice. The C. T. is of a shining pitchy black, the body long, the male wingless, the female having four narrow wings, which are fringed with long hairs; the larva is yellow, as is also the pupa, which is active. See THRIPS.

CORN WEE'VIL (*Calandra granaria*), a coleopterous insect of the family *Curculionidæ*, which although a small creature, not quite two lines long, is often extremely destructive to grain stored in granaries. It is much more common in the southern than in the northern parts of Europe. The perfect insect is of a dark chestnut or reddish pitchy color, with short oval wing-cases, but without wings, the thorax much marked with depressed dots, the head elongated into a proboscis, the antennæ bent at right angles. The female makes a little hole in a grain of corn, and deposits an egg in it, the larva feeds on the farina; and as a single female lays many eggs, and perfect insects are soon produced from them, the mischief, unless counteracted, extends very rapidly. To arrest it, however, has always been found extremely difficult; and the most successful method is said to be that of making a little separate heap of grain, which, being left unstirred, whilst the greater heap is stirred very frequently, soon becomes the refuge of the weevils, particularly if it is a heap of barley, of which they are fondest, although they will eat any grain, and there they are killed by boiling water.—Of the same genus are the Rice Weevil (*Calandra Oryzæ*), and a large South American insect (*C. palmarum*), an inch and a half long, the grub of which lives in the stems of



Corn Weevil:
e, pupa, magnified; *f*, insect, natural size; *g*, insect, magnified.

palms, and is eaten as a delicacy both by Indians and Creoles. For the above illustrations of corn insects we are indebted to Morton's excellent *Encyclopædia of Agriculture*. Blackie, London and Glasgow.

CORNA'CEÆ, a small natural order of exogenous plants, containing about 40 known species, chiefly trees and shrubs, with a few herbaceous plants. The leaves are simple, without stipules; the flowers in heads, umbels, or corymbs. The calyx is 4-lobed or 4-toothed; the petals 4, equal, oblong, broad at the base, inserted into the upper part of the tube of the calyx; the stamens 4, alternate with the petals; the ovary is adherent to the tube of the calyx, 2—3-celled, crowned by a disk; the ovules solitary; the style filiform; the stigma simple; the fruit is fleshy and drupe-like. The C. are natives of the temperate parts of the northern hemisphere. The fruits of some are eatable; the bark and leaves of some are medicinal; some are valued as ornamental plants. CORNEL, DOGWOOD, AUCUBA, and BENTHAMIA are examples.

CORNA'RO, LODOVICO, a Venetian nobleman, born 1467, is remembered on account of his instructive example of temperance. His constitution, naturally not strong, was greatly injured by intemperate eating and drinking, with other excesses, so that, when forty years of age, he appeared to have little hope of prolonged life. At this time he adopted strict rules of temperance both in meat and drink, which, co-operating with his general care of health and gentle exercises of various kinds, served to extend his life to nearly 100 years, as he died, according to the best authorities, in 1566. His old age was remarkably cheerful. To promote those habits which had proved so advantageous in his own case, he wrote, in his 83d year, his celebrated treatise *Discorsi della Vita Sobria* ('Essay on Temperate Living'), which was first published at Padua in 1558, and has been translated into all European languages. The best English translation is one bearing date 1779.

CO'RNBRASH, a member of the Lower Oolite, consists chiefly of a rubbly cream-colored lime-stone in thin layers, always nodular and concretionary, each fragment having a deep-red coating. Occasional beds of clay occur interstratified with the limestone. The whole thickness of the group rarely exceeds 15 feet. The C. is extremely rich in Echinodermata and Mollusca, with the exception of Cephalopoda, the abundant Oolite genus Belemnites being unaccountably wanting.

CO'RNËA, one of the coats of the eye; so called from its resemblance to horn (Lat. *cornu*). See EYE.

CORNEILLE, PIERRE, the creator of French tragedy, was born June 6, 1606, at Rouen, where his father was an advocate. He himself studied for the legal profession. A love adventure, in which he became the rival of a friend, first prompted C. to write verses, and *Mélite*, the comedy founded on this incident, was performed with success in 1629. It was quickly followed by other dramatic pieces: *Clitandre*, *La Veuve*, *La Galerie du Palais*, *La Suivante*, and *La Place Royale*—all so successful that a special theatrical company was formed for the performance of C.'s pieces. In 1635 appeared his *Médée*, a declamatory drama, written in imitation of Seneca. Cardinal Richelieu, who aspired to be the Mæcenas of the stage, kept in his pay a number of writers for whom he dictated plots, and wished to number C. among his retainers; but C. was so audacious as to alter the plan of a comedy, and thus lost the cardinal's favor. He now returned to his native place, where M. Chalon, once secretary to Maria de' Medici, suggested that he should turn his attention to tragedy. As the English drama was not known, or at least not relished at that time beyond the limits of England, C. acquired the Spanish language that he might be enabled to study the Spanish drama, the only other of any consequence in Europe. The result was the *Cid* (1636), which was received with enthusiastic applause. Cardinal Richelieu alone seemed to find no merit in this drama, and induced the Academy to publish a critique in some respects unfavorable.

In his next celebrated piece, *Horace* (1639), C. endeavored to vindicate his claim to creative genius, which had been questioned by his enemies; but *Cinna* (1639) has been regarded by some French critics as C.'s master-piece, though others might be disposed to award this honor to *Polyeucte* (1640). In the *Mort de Pompée* (1641), though there is something dignified in the style, it occasionally passes into bombast. The comedy of *Le Menteur* (1642), partly taken from Pedro de Roxas, has natural truth and humor. C. now seems to have exhausted his resources, and his later pieces are almost all forgotten. Of his thirty-three dramas, only a few have kept their place on the French stage. Nevertheless, his countrymen call him *Le grand Corneille*, although Voltaire, who edited an edition of his works, and Laharpe have expressed themselves in some respects unfavorably regarding his genius. The faults of conception in several of his pieces were pointed out by the sharp criticism of Lessing. A. W. Schlegel also spoke in such a way as to provoke hot replies from the wounded pride of the French littérateurs. C.'s chief merit lies in his dignity of style, and in a certain declamatory grandeur of sentiment, which his countrymen have been accustomed to consider truly epical, and which it is now impossible to convince them as nearly resembles rant as it does sublimity. C. died October 1, 1684. The best edition of his complete works was edited by Renouard (12 vols., 1817).—C.'s brother, THOMAS (born 1625—died 1709), also acquired a reputation as a dramatic writer.

Cornel:
a, a branch with leaves and fruit; *b*, a single flower.

CO'RNEL, or CORNE'LIAN CHERRY (*Cornus mas*), the *Cornus* of the ancients, a tree or shrub of 15—20 feet high, of the natural order *Cornaceæ*, a native of the middle and south of Europe, and of great part of Asia. It is not found wild in Britain, although it is common in shrubberies, and was formerly much cultivated as a fruit-tree, as it still is in Germany and other parts of Europe. It has oval leaves, and small yellow heads of flowers, which appear before the leaves in spring, and which abound in honey and are much frequented by bees. The fruit is oblong, a little larger than a sloe, shining, red, or rarely yellow or white.

It is late in ripening, and until quite ripe is very austere; but when perfectly mellow, has an agreeable vinous acid taste: it is either eaten as it comes from the tree, or is made into a preserve, which is said to be tonic, and useful in diarrhœa. When gathered unripe, it is pickled like olives. It was formerly also fermented for a beverage. In Turkey, it is still much used in making sherbet. The wood of the C. is extremely hard and tough, and well adapted for those purposes of joiners and turners to which the size of the tree will admit of its application. It is used for making mathematical instruments.—DWARF C. (*C. Suecica*), a native of mountain-pastures and bogs throughout the north of Europe and in Britain, is a plant about six inches high, with creeping root, sessile ovate leaves, each stem producing a single umbel of a few purple flowers, followed by small sweetish red fruit, which is tonic, and has the power of remarkably increasing the appetite, whence the plant has received a Gaelic name, signifying *Plant of Gluttony*.—Dogwood (q. v.) belongs to the same genus.

CORNELL UNIVERSITY, named from its founder, Ezra Cornell (1807—1874), possesses numerous well-appointed buildings, and more than 200 acres of university grounds. It is pleasantly situated on the outskirts of the town of Ithaca, New York, and was opened in 1868, on a thoroughly unsectarian basis. By its charter, no student can be admitted or excluded on account of any religious opinions. Students unable to defray the expense of their curriculum are required to provide for their support by manual labor on the farm or in the factory attached, for which they receive the current rate of wages. They also receive an allotment of 300 acres, the produce of which helps to supply the university table. Sage College is a boarding hall for female students, with a chapel attached for religious services. According to its charter, C. U. is included within the educational system of the State, and is visited by the regents of the New York University. Having, under an Act of Congress, been endowed with 989,000 acres in the west, C. U. is bound to comprise within its range of studies 'such branches as are related to agriculture and the mechanic arts,' and to educate, free of all fees, one student from each of the 128 assembly districts of the State; the students to be chosen by competition from the public schools and academies of New York. In 1880, there were over 50 professors and instructors, and near 450 students. Women are admitted on the same terms as the men, except that they must be seventeen years of age on entering.

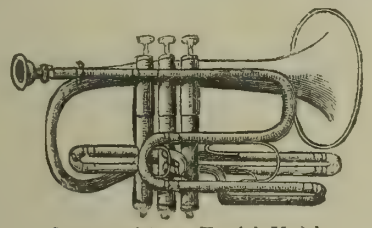
Besides three general courses, of four years each, in arts, literature, and science, the university gives special instruction and special degrees in agriculture, architecture, chemistry and physics, civil engineering, history and political science, ancient, European, and Asiatic languages, mathematics, mechanic arts, military science and tactics, natural history, philosophy, and letters.

CORNE'LIUS, PETER VON, one of the first masters of the modern German school of painting, was born at Düsseldorf, 23d September 1787, and studied under Langer in the academy of his native town. When only 19 years of age he painted some remarkable frescoes for the cupola of the old church of Neuss. Four years later, he gave still more unmistakable proofs of a cre-

ative fancy in his illustrations of Goethe's *Faust*, and the *Nibelungen Lied*. In 1811 he went to Rome. This journey exercised a profound influence on the whole of his future career. The great importance of the early masters became ever clearer to him as he studied their choicest productions. He gained a wide reputation, while at Rome, by two cartoons, 'Joseph's Interpretation of the Dream,' and Joseph's 'Recognition of his Brethren.' In 1819 he was called to Munich, and entered the service of the then crown-prince of Bavaria. Here he remained till 1841, and executed those grand works on which his fame mainly rests, and which may be divided into two classes, Pagan and Christian, the former of which comprises the large frescoes in the saloon of the Glyptothek, all illustrating stories of the Greek gods and heroes, as also representations of several Hesiodic myths, and of the various incidents of the Trojan war; while the latter, or Christian series, begun after the completion of the former in 1830, consists of frescoes on New Testament scenes, extending from the 'Incarnation' to the 'Judgment,' and decorate the 'Ludwig's Church' in Munich, which was built for the purpose of affording scope for the genius of Cornelius. The 'Judgment' is the largest fresco in the world, larger even than Michael Angelo's 'Judgment' in the Sixtine Gallery. In 1841, C. was invited by the king of Prussia to Berlin, where he was appointed director of the Berlin Academy. Among his productions in the Prussian capital are the frescoes for the Campo-Santo, or royal burial-place. Opinion is divided regarding the merits of Cornelius. By his own countrymen he is extremely admired; French critics, on the other hand, regard him as more a thinker than an artist, sacrificing to his conception both truth of color and expression. He is admitted to have been a profoundly creative genius, but *not* a painter. He formed, however, a numerous school, from which have gone forth many illustrious pupils; but he lived to see it losing hold on public sympathy. He died in the 80th year of his age, 6th March 1867.

CORNELIUS NEPOS. See NEPOS.

CO'RNET, a stop, or series of pipes, in an organ, intended to imitate the tone of an obsolete wind-instrument which has been superseded by the oboe.—The CORNET-A-PISTON, a modern



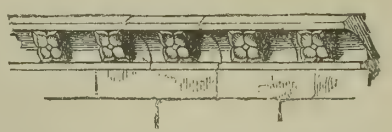
Cornet-a-piston.—Kœnig's Model.

wind-instrument of the trumpet kind, is generally made of brass, has two or three valves, and in brass bands takes the soprano and contralto parts. It was first introduced in France as an orchestral instrument. Its tones are less powerful, but far more easily manageable than those of the trumpet.

CORNET (Ital. *cornetta*, a small flag) was, until 1871, the lowest grade of commissioned-officer in the cavalry, equivalent to *ensign* in the infantry, his duty being to bear the standard. With the lieutenant, he assisted the captain in the daily duties connected with the troop to which he belonged. There were as many cornets in a cavalry regiment as there are troops. A C.'s commission used, in the days of 'purchase,' to cost £450; but much larger sums were habitually paid, varying according to the celebrity, or rather the fashionable character of the corps. The pay was 8*s*. per day, with 1*s*. or 1*s*. 6*d*. extra for field allowance. The half-pay varied from 2*s*. 6*d*. to 3*s*. 6*d*. The pay being utterly inconsistent with the price paid for the commission, none but wealthy men could enter the cavalry. In 1871, the rank was abolished, sub-lieutenants (who are merely probationary lieutenants) being substituted.

CORNE'TO, a town of Central Italy, about 12 miles north of Civita Vecchia, occupying a commanding eminence on the left bank of the Marta, and two or three miles from the Mediterranean, over which it has an extensive view. C. rose out of the ruins of the Etruscan city of *Tarquinii*, and is enriched by some of its monuments. It was erected into a city by Eugenius IV. in 1432; but the picturesque old battlemented walls and towers which surround it are said to belong to an earlier period. During the faction-wars of the Guelphs and Ghibellines, this city maintained a firm allegiance to the popes. Pop. 5000. The remains of Tarquinii (perhaps the most interesting in existence to the student of Etruscan history, as it is from the tombs here that most of our knowledge as to the games, costumes, and religious customs of this remarkable people has been derived) lie about a mile and a half from Corneto. The Necropolis of Tarquinii covered 16 square miles, and it has been estimated on high authority that it could not have contained less than 2,000,000 tombs. Of this vast number, some 2000 have been opened within recent years. Among the most noteworthy of these are the Grotta delle Iscrizioni, the Grotta delle Bighe, Grotta del Barone, Grotta Francesca, Grotta del Cardinale, Grotta del Triclinio, and Grotta della Querciola. Treasures from this mine of Etruscan wealth, as it may be called, enrich the British Museum, and other important collections in Britain and on the continent.

CO'RNICE. In classical architecture, the C. is the uppermost member of the entablature, surmounting the frieze. Each of the orders has its peculiar C.; but these, with their relation to the other portions of the entablature, will be better understood when



Cornice;—Ensham Church, Oxon, circa 1450.

explained in conjunction with that term. See ENTABLATURE. In the Gothic styles, the form of the C. varies greatly. 'In the Norman style,' says Parker, 'a plain face of parapet, slightly projecting from the wall, is frequently used as a C., and a row of blocks is often placed under it, sometimes plain, sometimes moulded or carved into heads and other ornaments, when it is called a corbel table.' These blocks have commonly a range of small arches over them. In some cases a small plain string is used as a cornice. The corbel table continued to be used as a C. in the

Corbel Table.

Early English style; but it was generally more ornamented than in the Norman, the arches being commonly trefoils and well moulded. The blocks are frequently ornamented with a head, or other figure characteristic of the style. Sometimes a range of horizontal mouldings is placed above the arches of the corbel table, and sometimes the C. consists of simple mouldings, without any corbel table.

The term C. is also used, in a general sense, to signify any horizontal moulded projection, terminating a building, or the component parts of a building. It is in this sense that we speak of the C. of a room.

CORNICHE. See RIVIERA.

CO'RNO, MONTÉ, or GRAN SA'SSO D'ITA'LIA, a mountain in Southern Italy, the culminating peak of the Appenines, in lat. 42° 27′ N., long. 13° 38′ E. It has an elevation of 9591 feet; and its summit is covered with snow at all seasons.

CORNS are small hard growths, resulting from an increase in the thickness of the cuticle or epidermis, which is generally caused by the irritation of some excessive pressure or friction on the part.

They occur most commonly on the toes as a result of tight shoes. Three varieties of C. are described, viz.—1. *Laminated Corns* or *Callosities*, in which the hardened cuticle is arranged in layers, frequently of a dark-brown color, from the effusion of blood in the deeper layers. 2. *Fibrous Corns* (clavi), which are not only fibrous in their early stages, but, as time goes on, sink into the skin, sometimes producing great pain. Frequently, a bursa, or small bag, is formed beneath, to protect the tender subjacent tissues, and if this bursa should inflame, matter speedily forms, and the pain and constitutional irritation become severe; at other times, the pressure may cause absorption of the ends of bones, and serious alterations in the condition of a joint. The duty of the chiropodist is to dislodge the imbedded peg of hard cuticle from its socket. Should he cut it across, the fibrous arrangement will present the appearance of 'roots,' a popular delusion of great value to itinerant corn-doctors. 3. *Soft C.* occur between the toes, and cause much annoyance; they are generally small, and being constantly bathed in perspiration, the cuticle does not harden, as in the other varieties. They sometimes give rise to painful ulcerations.

The treatment of C. consists in the removal of all undue pressure or friction, either by removing the shoe altogether, or protecting the corn by surrounding it with a border of some soft material, as Amadou, (q. v.) or soft leather; or the hardened cuticle may be softened by the application of some alkaline lotion, and then scraped or filed away: or it may be extracted, as before mentioned. A lotion of soda or potash is often found very useful.

The cuticle composing a soft corn should be clipped off with scissors, and a small piece of cotton-wool be placed between the toes. In all serious cases, application should be made to a respectable chiropodist.

C. affect horses as well as men. In the foot of the horse they occur in the angle between the bars and outer crust, and consist in a bruise of the sensitive secreting sole. Two forms of feet are especially subject to them—those with deep narrow slanting heels in which the sensitive sole becomes squeezed between the doubled up crust and the shoe; and wide flat feet which, by the senseless cutting away of the bars and outer crust, allow the delicate interior parts to be pressed with all the force of the animal's weight on the unyielding iron shoe. Scrum and blood are poured out, whilst the secreting parts being weak and irritable, produce a soft, scaly, unhealthy horn. C. constitute unsoundness; cause a short, careful, tripping gait; are the most frequent source of lameness amongst roadsters; abound in badly-shod horses, especially those with the kind of feet alluded to; and usually occur in the inside heels of the forefeet, these being more especially subjected to weight, and hence to pressure.

The discolored spot indicating the recent corn must be carefully cut into with a fine drawing-knife; any serum or blood is thus allowed free vent. If the bruise has been extensive, a poultice will have the twofold effect of allaying irritation, and relieving the sensitive parts by softening the hard unyielding horn. When the injury has been of some standing, and some soft faulty horn is secreted, a drop of diluted nitric acid may be applied. On no account must the bars or outer crust be removed; they are required for bearing weight, which may be further kept off the injured parts by the use of a bar-shoe. In horses subject to C., keep the feet soft by dressing with tar and oil or any suitable emollient; pare out the C. every fortnight; use a shoe with a wide web on the inside quarter, and nailed only on the outside; and, if the sole is thin and weak, employ leather pads.

CO'RNSTONE, a peculiar—often mottled—limestone of the Old Red Sandstone formation of Herefordshire, Shropshire, and South Wales.

CO'RNU AMMO'NIS. See AMMONITES.

CORNUCO'PIA (Lat. *cornu*, a horn, and *copia*, plenty). The horn of plenty—regarding the origin of which several fables are told by the ancient poets—is generally placed in the hands of emblematical figures of Plenty, Liberty, &c., who are represented as pouring from it an abundance of fruits, corn, &c. It is frequently used both in architecture and heraldry. On the arms of banks and other public institutions, it is often represented pouring forth coins.

CO'RNWALL, a maritime county, forming the south-west extremity of England, and the southmost county in the British Isles. It is a peninsular right-angled strip of land, with the apex in the south-west, and is bounded on the E. by Devonshire, with the Tamar between, on the N. and W. by the Atlantic, and on the S. by the English Channel. From its Devonshire boundary it runs south-west, narrowing to the Land's End, the westmost part of England in 5° 41′ 31″ W., it then bends north to Penzance, whence it sweeps round in a south-eastern direction to the Lizard Point, the southmost part of England, in 49° 57′ 30″ S. From thence it follows a north-eastern course to Plymouth Sound. Greatest length in a straight line from Welcomb to the Land's End, 81 miles; extreme breadth from Welcomb to Rame Head, 46 miles. Area, 1365 sq. miles, of which seven-eighths are arable, meadow, or pasture. The surface is irregular, with rapid ascents and descents. A ridge of rugged, bleak, moory hills, rising to the height of from 800 to 1300 feet, run south-west through the center of Cornwall. From this ridge the country slopes, and the streams flow on each side.

The hill valleys are longer and wider on the south than on the north side of this ridge, and some of them are picturesque with corn, wood, orchards, rivulets, and meadows. The coasts are bold and rocky, and indented with many headlands and bays. The chief indentations are Plymouth Harbor, Falmouth Harbor, one of the finest in Britain, and Mount's Bay between Lizard Point and Land's End. Twenty-four miles off the latter point are the Scilly Isles. On the north-west coast occur shifting sands, often in hills several hundred feet high. The chief rivers are the Tamar, which runs 59 miles along the east border, 19 miles being a tidal estuary, ending in the noble roadstead of Plymouth Sound; the Fal, which runs 20 miles south, 10 miles being tidal, and ends in the fine harbor of Carrick Road, near Falmouth; and the Allan or Camel, 29 miles long, 8 being navigable. Woods, meadows, arable land, and 140 parish churches, are said to have been submerged between Mount's Bay and the Scilly Isles. Old red sandstone, the 'killas' of the miner, covers above three-fourths of C., and is intersected by three large masses of granite in the interior of the county, with one around Land's End, and by porphyry veins and dikes, some being 50 or 80 fathoms thick, and also by limestone beds. The granite on the hills is often worn by the weather into the form of prismatic, cubical, or spheroidal blocks, piled in gigantic cairns. These blocks sometimes form Logging or Logan Stones. Copper and tin veins, generally 1 to 3 feet thick, but varying from the thickness of paper to 30 feet, and of unknown depth, run through the granite and sandstone, generally from east to west. Tin also occurs in the gravel; and lead, silver, cobalt, and antimony veins in the sandstone. Lizard Point consists of mica-slate, with soapstone veins, and chinastone; and the country around, of serpentine, hornblende, and diallage rocks. Chinastone, or decomposed felspar of granite, is found near Launceston, and is a chief ingredient in retorts and crucibles made in Staffordshire. In 1880, C. had 38 copper mines, 5 lead mines, and 73 tin mines, producing 2004 tons of copper, 570 tons of lead, and about 12,000 tons of black tin. Of iron ore, 15,865 tons were produced. C. yields $\frac{1}{3}$ of the copper and $\frac{9}{10}$ths of the tin raised in the British Isles. The great mining district extends from Dartmoor, in Devon, to Land's End, the veins and lodes chiefly occurring in granite, or killas.

The climate is mild, especially in winter, but damp, with almost daily rain. Snow rarely lies above a few days. South-west winds prevail for nine months in the year, and furious gales are frequent. Some plants of the south of Europe, as the myrtle, tamarisk, and balm of Gilead, flourish in the open air; but fruits do not ripen well. The soil is light, gravelly, or slaty. The land is generally barren in the mining tracts, but fruitful in the valleys and on the coast. The chief crops are barley, wheat, oats, and potatoes; but harvest is generally later than in the inland counties. Near Penzance, however, two crops of potatoes are got yearly. C. is far more a mining than an agricultural county. The pilchard-fishery is very profitable, and employs a large number of people from July to September.

The only exports are mining produce and fish. Landed property is much divided. The total area of C. is 873,600 acres, or 1365 square miles. The population was 362,343 in 1871, and 329,484 in 1881. About 30,000 persons are employed in the mines. For electoral purposes, C. is divided into an eastern and a western division, each of which returns two members to parliament. C. has ancient British antiquities, such as rude, upright stone blocks, single and in lines, circles, barrows, and cromlechs. Many Roman coins, &c., have been found. There are many Saxon camps and earth-works. C. and the Scilly Isles were the Cassiterides, or tin isles of the Phœnicians and Greeks. Vortigern made C. a kingdom in 446 A.D. The West Saxon kings subdued it in 650. The Saxons and Danes overran it in the 9th and 10th centuries. C. has remains of ancient castles and monasteries. It was erected into a duchy in 1329, in favor of the Black Prince, eldest son of Edward III., who, with the succeeding princes of Wales, had immense revenues from the county. The dukedom is still held by the Prince of Wales, who derives from it a revenue of £80,000, and appoints the sheriffs. The Cornish tongue, a Celtic dialect, became extinct only in the present century.

CORNWALLIS, CAROLINE FRANCES, was born on the 12th July 1786, and was daughter of a clergyman in Kent. She acquired a thorough knowledge of Latin and Greek, and made herself conversant with nearly every study which occupies thoughtful men—with philosophy, theology, history, natural science, social science, politics, and even law. From an early age she carried on a correspondence on such subjects with many eminent persons; and a valuable selection from her *Letters* has been published. Her first work, *Philosophical Theories and Philosophical Experience, by a Pariah*, appeared in 1842. It was the first of a series of 20 'Small Books on Great Subjects,' nearly all of which were written by her. The subjects discussed were very various—the Connection of Physiology and Intellectual Science, Ragged Schools, Grammar, Criminal Law, Chemistry and Geology, Greek Philosophy, and the History and Influence of Christian Opinions. The works in which the last-mentioned subject was treated—*The State of Man before the Coming of Christ* (1 vol.), and *The State of Man after the Coming of Christ* (3 vols.)—were so judiciously written, that, though presenting a system of thought and belief entirely different from our orthodox Christian teaching, they were favorably received by many of every religious party. The series as a whole attracted much attention in this country, and still more in America. Miss C. also published in 1847, *Pericles, A Tale of Athens;* and in 1853, a prize essay on Juvenile Delinquency. She died near Tunbridge Wells, 8th January 1858. See her *Letters and Remains* (1864).

CORNWA'LLIS, CHARLES, MARQUIS, an English general and statesman, son of the first Earl Cornwallis, was born December 31, 1738, and was educated at Eton and Cambridge. He served as aide-de-camp to the Marquis of Granby in the Seven Years' War; in 1776 was made a colonel, and four years later, governor of the Tower of London. Though personally opposed to the war in America, he accompanied his regiment thither, and with an inferior force gained victories over General Gates at Camden in August 1780, and over General Greene at Guilford, March 1781. In the

same year, however, he was forced to surrender with all his troops at York Town, Virginia. This disaster proved the ruin of the British cause in America, and was the occasion of much dissatisfaction, resulting in a change of ministers at home. C., however, who was high in favor with the king, escaped censure. In 1786 C. was appointed governor-general of India and commander-in-chief, and in this double capacity distinguished himself by his victories over Tippoo Saib, and by his unwearying efforts to promote the welfare of the natives. His measures, however, were far from answering the purposes he intended. He returned from India in 1793, when he was raised to the rank of Marquis. Appointed lord-lieutenant of Ireland in 1798 during the time of the Rebellion, he succeeded in putting it down, and in establishing order in a manner that gained him the good-will of the Irish people. As plenipotentiary to France, he negotiated the peace of Amiens. Reappointed governor-general of India in 1804, he died at Ghazipore, in the province of Benares, in Oct. 1805, on his way to assume the command of the army in the Upper Provinces. As a statesman or warrior, C.'s talents did not rise much above respectable mediocrity, but he was upright, diligent, and humane in a more than ordinary degree.

CORO'LLA, in Botany, the inner floral envelope of the greater number of phanerogamous plants; the second of those whorls of modified leaves which form the flower (q. v.). It is in the C. that fine colors and the greatest delicacy and beauty of the flower are in general chiefly displayed. The modified leaves of which it is composed are called *petals*, and are very various in form and number. They are also in very many plants united into a tube at the base, when the C. is said to be *monopetalous;* and this union often extends through their whole length, leaving their number to be discerned merely in the teeth in which the C. (bell-shaped, funnel-shaped, tubular, &c.) terminates. The petals of a flower are either similar when the C. is said to be *regular*, or they differ in form, often very widely, when it is called *irregular*. They not unfrequently assume remarkable and even grotesque forms.

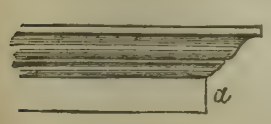
Many petals have appendages of various kinds, as *scales*, *nectaries*, *spurs*, *coronæ* or *crowns*, &c. Petals often consist of a *limb*, or expanded portion, and a *claw*, the narrower part, which is covered by the calyx, and by which the petal is attached, but sometimes the claw is wanting or obsolete, sometimes it is united with the tube of the calyx, so that the petals appear to rise out of the calyx. See CALYX and PERIANTH.

CO'ROLLARY, a proposition the truth of which appears so clearly from the proof of another proposition as not to require separate demonstration.

COROMA'NDEL COAST, often vaguely taken as the whole of the west shore of the Bay of Bengal, extends, in its proper acceptation, from Point Calimere, in lat. 10° 17′ N., long. 79° 56′ E., to Gondegam, in lat. 15° 20′ N., long. 80° 10′ E. It is pretty nearly co-extensive with the districts of Tanjore, Arcot, Chingleput, and Nellore, comprising, along with Madras and Pondicherry, the grand battle-field of last century between England and France in India. With various estuaries and inlets, it is yet commercially of very little value, not presenting a single safe place of refuge for large vessels. So shallow, moreover, is the water for a considerable distance from the land, that ships of any size are obliged to lie several miles off; while the intermediate space, or at least that belt of it that is nearest the beach, presents a surf in which no ordinary boat can live—the only safe craft being the native catamaran (q. v.).

CORO'NA, or CROWN, in Botany, an appendage of the corolla in some flowers; sometimes assuming the appearance of an interior corolla very different from the true corolla, and either divided into parts resembling petals, or consisting only of one piece, and surrounding the organs of fructification like a monopetalous corolla; sometimes assuming very peculiar forms. It is often difficult to determine whether the C. is properly to be regarded as belonging to the row of petals, or to that of stamens. The C. was included by Linnæus under the very comprehensive term nectary. A familiar example may be seen in *Narcissus;* forms very different may be seen in *Stapelia*, and other genera of the natural order *Asclepiadaceæ*.

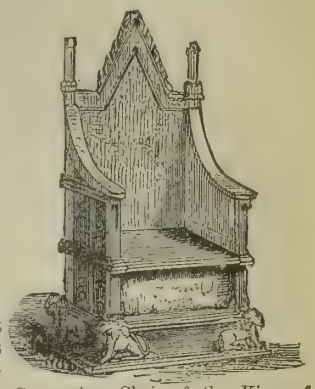
CORONA (Lat. a crown), in Architecture, the drip, or lower member of the projecting part of a classical cornice. See ENTABLATURE. The term C. is also applied to the apse or semicircular termination of the choir, especially by ecclesiastical writers. Hence we hear of 'Becket's crown,' at Canterbury. C. is also applied in ecclesiastical nomenclature, to a chandelier, in the form of a crown or circlet, suspended from the roof of a church, or from the vaulting of the nave or chapels, to hold tapers which are lighted on solemn occasions.



a. the Corona.

CORONA BOREA'LIS, a small and bright constellation near Hercules.

CORONA'TION. The use of crowns in antiquity, as a mark either of honor or of rejoicing, will be explained under CROWN. It was, no doubt, as an adaptation of this general custom to a special use that the practice of placing a crown on the head of a monarch at the commencement of his reign was introduced. The practice is very ancient, as we may learn from the fact that Solomon and Ahaziah were crowned; and there is probably scarcely any country in which it has not been followed in one form or another. Generally it has been accompanied by what was regarded as the still more solemn rite of anointing with oil, a ceremony which, from the times of the ancient Hebrews to our own, has been peculiarly significant of consecration or devotion to the service of God. The term employed for C. in the Saxon chronicle, 'gehalgod,' is hallowed or consecrated; and it would seem that the ceremony as then performed at Kingston-on-Thames or Winchester, was in all essentials the same as that which now takes place in Westminster Abbey. A copy of the gospels is still in existence amongst the Cottonian MSS. in the British Museum, which is believed to be the identical copy on which the Saxon kings were sworn. Detailed accounts of many English coronations, from Richard I. downwards, have been preserved. The Scottish coronation stone, the *Lia Fail* or 'Stone of Destiny,' was said by tradition to have been the stone which Jacob used for a pillow, to have been brought to Ireland, and from Tara to Scotland, where it finally found a resting-place at Scone. Skene, in his monograph (1869), asserts it to have been originally quarried from the rocks near Scone. See *Chapters on Coronation* (1838).


Coronation Chair of the Kings of England, kept in Westminster Abbey.

Beneath the seat is the 'Stone of Destiny,' carried off from Scone by Edward I. in 1296.

CORONATION GULF, an inlet of the Arctic Ocean, forms the south-east part of the landlocked and isle-studded bay that receives the Coppermine.

CORONATION OATH. The form in which the limitations imposed on the monarch were defined by the nation and accepted by him, was probably from the first something equivalent to a coronation oath. Up to the period of the revolution, however, the C. O., like all the other guarantees for popular liberty, admitted of being tampered with; and there is in existence (Cottonian MS., Tib. E. viii.) a copy of the oath sworn by Henry VIII., interlined and altered with his own hand.

To obviate the possibility of such proceedings for the future, the existing C. O., altered only in consequence of the subsequent unions between England and Scotland, and Great Britain and Ireland, was fixed by stat. 1 Will. and Mary, st. 1, c. 6. It is to the following effect, and thus administered. The Archbishop of Canterbury demands of the king (or queen): 'Sir (or Madam), is your Majesty willing to take the oath?' and on the king answering, 'I am willing,' the archbishop ministereth these questions; and the king, having a copy of the printed Form and Order of the Coronation Service in his hands, answers each question severally, as follows:

Archb. Will you solemnly promise and swear to govern the people of this United Kingdom of Great Britain and Ireland, and the dominions thereto belonging, according to the statutes in parliament agreed on, and the respective laws and customs of the same?

King. I solemnly promise so to do.

Archb. Will you, to your power, cause law and justice, in mercy, to be executed in all your judgments?

King. I will.

Archb. Will you, to the utmost of your power, maintain the laws of God, the true profession of the Gospel, and the Protestant reformed religion, established by law? And will you maintain and preserve inviolably the settlement of the United Church of England and Ireland, and the doctrine, worship, discipline, and government thereof, as by law established within England and Ireland, and the territories thereunto belonging? And will you preserve to the bishops and clergy of England and Ireland, and to the churches there committed to their charge, all such rights and privileges as do, or shall appertain unto them, or any of them?

King. All this I promise to do.

The sovereign then goes to the altar, and, laying his hand upon the Gospels, takes the following oath: 'The things which I have heretofore promised, I will perform and keep, so help me God.'

The sovereign then kisses the book, and signs the oath.

The passage of the oath in which the sovereign guarantees the privileges of the Church of England, is framed in conformity with the 'Act for Securing the Church of England as by Law Established,' which is declared to be a fundamental and essential part of the Treaty of Union, and which was inserted accordingly in the Act by which the Treaty of Union was finally ratified. The passage in the act which provides for the security of the Church of Scotland was framed in conformity with an 'Overture for an act for security of the Church'—of which a copy will be found in the Appendix to Defoe's *History of the Union*, p. 617. It is to the effect that, 'after the decease of her present Majesty (whom God long preserve), the sovereign succeeding to her in the royal government of this kingdom shall, in all time coming (not at the coronation), *at his or her accession to the crown, swear and subscribe* that they shall maintain and preserve the foresaid settlement of the true Protestant religion, with the government, worship, and discipline of this Church, as above (that is, by the previously recited act, 1 Will. and Mary, c. 5) established, inviolably.' The security of the Church of Scotland is thus provided for, by what may be called an accession oath, even during the period which must intervene between the accession of the sovereign and his coronation. The oath has not yet been altered to suit the disestablishment of the Irish Church.

CORONE'LLA, a genus of non-venomous serpents of the family *Colubridæ*, of a small size, having a somewhat compressed and generally pentagonal body, and rather long conical tail. They inhabit the warm and temperate parts of the world. One species, *C. lævis*, is found in the center and south of Europe.

CO'RONER (Lat. *coronator*, *corona*, a crown), a very ancient officer, in England, at the common law. He is mentioned in a charter of King Athelstan, 905 A.D.; and the office, like much of the common law, is acknowledged to be of Saxon origin. The name is derived from the fact, that the C. has chiefly to do with pleas of the crown. In this light, the Lord Chief-Justice of the Queen's Bench is the principal C. in the kingdom, and may exercise jurisdiction in that capacity in any part of England. There are, however, particular coroners for every place in England, and in some counties, three or four, or even more. They were formerly paid by fees on each inquest, but now (23 and 24 Vict. c. 116) by salary paid out of the county rate.

The C. is chosen for life, and the election rests with the freeholders of the county or district. A C. may, however, be dismissed by the Lord Chancellor for inability or misbehavior in his office. By the statute of Westminster the first (3 Edw. I. c. 10), it was enacted that none should be chosen but lawful and discreet knights; and in the time of Edward III., there is an instance of a man being removed from the office because he was merely a merchant. Subsequently, it was thought sufficient if a man had lands enough to entitle him to be made a knight; and Blackstone complains that in his time it had come to be sought for the perquisites, and not for the honor of serving the country. This motive has now ceased. The C. is now usually a professional man, frequently an attorney or a medical man.

The office of C. is to some extent the only one in England charged with the investigation of crime. Where the C. cannot act, there is no authority to examine witnesses until a suspected person has been actually charged or accused before a magistrate. But even the C.'s duties are very limited, and little is added to the statute 3 Edw. I. The C. can inquire only into the causes of violent or sudden death, and into these only when the body has been found. When such a death happens, it is the duty of the constable to give notice of it to the C., who then summons a jury from the body of the county for the purpose of making an inquisition into the matter. The C. presides over the inquisition, and the court thus constituted is a court of record. The jury consists of twelve men at least, who are sworn and charged by the C.; and the verdict must be of twelve. By 6 and 7 Vict. c. 12, it has been enacted that the inquest shall be held before the C. in whose district the body shall be 'lying dead.' If any be found guilty by such inquisition of murder or other homicide, the C. is to commit them to prison for further trial, and is also to make inquiry concerning their lands, goods, and chattels (which are forfeited thereby), if not otherwise known; and he must, moreover, certify the whole of this inquisition under his own seal and the seals of the jurors, together with the evidence thereon, to the Court of Queen's Bench or the next assizes. The accused may thereupon be put on his trial without other indictment. By 6 and 7 Will. IV. c. 89, the C. is empowered to summon, and by 1 Vict. c. 68 to pay, medical witnesses, in place of referring them for payment to the church-wardens. The sums allowed are one guinea for a simple examination, and two guineas if a *post-mortem* examination of the body has been made. By 6 and 7 Vict. c. 83, coroners are empowered to appoint deputies in case of absence from illness or other reasonable cause. 9 and 10 Vict. c. 37 regulates the duties of the C. and the expenses of inquests in Ireland.

Another branch of the C.'s office is to inquire concerning shipwrecks and treasure-trove; but this has been nearly superseded by the provisions of the Merchant Shipping Act, 1854. He is a conservator of the king's peace, in which capacity he is mentioned in one of the oldest treatises on the common law (*Mirror*, c. 1, s. 3). As such, he may cause felons to be apprehended, whether an inquisition has found them guilty or not. The C. has likewise ministerial functions as the sheriff's substitute, in executing process in suits in which the sheriff is related either to the plaintiff or defendant. Latterly, the office of C. has been the subject of consideration, with a view to certain reforms of administration. In many cases, it is alleged that the C. makes a job of his office, trumps up cases, and acts vexatiously at variance with the warrants of magistrates. Coroners or crowners, as they were also called in England, are mentioned in many old Scottish statutes; and there is no doubt that the office, as well as that of alderman and mayor, existed in those parts of the country that were peopled by persons of Teutonic race. But it was abolished or fell into desuetude, probably in consequence of the succession war and the French connection; and in Scotland the duties are now chiefly performed by the officer appointed by the crown, styled the Procurator-fiscal (q. v.).

CO'RONET. See CROWN.

COROT, JEAN BAPTISTE CAMILLE (1796—1875), a noted landscape-painter, the son of a milliner in Paris, and educated in the Lyceum of Rouen. After studying landscape-painting under Michellon and Victor Bertin, he went, in 1826, to Italy, where the landscape-painter Aligny exercised an influence on him long traceable in his works. His 'Vue prise à Narni,' and 'Campagne de Rome,' sent in 1827 to the Paris Exhibition, displayed a selection and grouping of natural objects at variance with the realistic style that was then coming into vogue, and though he continued persistently appealing to the visitors of art exhibitions in Paris by 'heroic' and 'idyllic' landscapes, he obtained little recognition for thirty years. Not till he was 60 years old did he come to be a pet of the day, and see his pictures mount up to ten and twenty times their former value. With all their careless and sketchy execution, C.'s pictures evince true artistic qualities. His predilection is for shadowy scenes, for vernal and autumnal vapors, for meadows and bushy trees wrapped in a dull atmosphere. His works, therefore, lose hardly any of their effect in Français's excellent lithographs. Among his pictures in the Luxembourg Museum of Paris are the *Dance of the Nymphs*, *Marseilles*, and a *Sunset in the Tyrol*. *Dante* and *Hagar in the Desert* he bequeathed to the Louvre Gallery.

His *Mornings* and *Evenings*, his *Rains* and *Fogs*, scattered in private collections, are to be counted by the hundred. He has had a number of imitators, 'Impressionists,' as they are called, who, however, lose themselves completely in the vague and formless.

CO'RPORAL (more properly *Caporal*, from the Italian *capo di escadra*) is, so far as concerns the British army at the present day, the grade next below non-commissioned officers. When the regiment is formed as a corps, he has no function different from the private soldier. In barracks or camp, however, he exercises certain disciplinary control over the privates. At present, in the British army, there are 32 corporals to each regiment of cavalry, and 40 for each infantry battalion. They receive pay varying from 1*s.* 3*d.* to 2*s.* 5*d.* per day. The lance-C. is an assistant C., who remains, however, on private's pay; he wears one *Chevron* (q. v.) on his arm, and two when he rises to the rank of corporal.

On shipboard, there is a ship's corporal, a petty-officer under the master-at-arms; to aid in teaching the seamen the use of small-arms, to guard against the smuggling of spirits on board, to extinguish the fires and lights at a given signal, and to keep order below at night.

CORPORAL (Lat. *corpus*, a body, because of the belief that the bread and wine are the body and blood of our Saviour), a name given to the cloth with which the minister covers what is left of the consecrated elements in the Lord's Supper until the service is concluded. It is also called the *Pall*, and its use is of the highest antiquity.

CORPORAL PUNISHMENTS. See FLOGGING.

CORPORA'TION. This, in England, is either aggregate or sole. A C. aggregate is a society of persons authorized by law to act as one person, and to perpetuate its existence by the admission of new members. Without such legal authority, the acts of the society would be regarded only as the acts of the individuals, and the property of the society would descend to the heirs of the individual members. A C. sole consists of one person, and his successors, who are by law invested with the same capacities as a C. aggregate. The sovereign is a C. sole, and so is a bishop and the vicar of a parish, for these in the eye of the law never die, and each successive holder of the office takes the property belonging

to it, neither by conveyance nor by ordinary succession, but is vested in it by his mere holding of the office.

A C. could formerly be established only by charter from the crown or act of parliament, unless, indeed, it existed by immemorial prescription; but of late years the exigencies of commerce have led to the passing of various enactments, by compliance with which any society of persons may acquire for themselves the character of a corporation. The particulars of these will be considered under the title JOINT-STOCK COMPANIES. A C. always receives a corporate name, by which it sues and is sued, and it must possess a common seal, the affixing of which is the only competent way of affixing the signature of the corporation. The majority of the members of a C. are entitled to act in its name, and may, by a by-law, even delegate—except in the case of municipal corporations—the power of acting in its name to a certain number of its members. For the acts of the C., none of its members are personally liable. A C. may hold lands—subject to the statutes of Mortmain (q. v.)—and may be possessed, if a C. aggregate, of chattels; but a C. sole has not this privilege, unless it be the representative of a number of persons for whose benefit the chattels are held. But no C. can be either a trustee-proper or an executor.

Corporations, whether aggregate or sole, are divided into ecclesiastical and lay, and the lay are subdivided into civil and eleemosynary. The ecclesiastical are such as are composed wholly of clergymen, in their ecclesiastical capacity, and are chiefly for the purpose of holding ecclesiastical property. Civil corporations include municipal corporations, the universities, the colleges of physicians and surgeons, learned societies, and many trading companies incorporated. Eleemosynary corporations are for the administration of funds for charitable and pious purposes, such as hospitals, the colleges in universities, &c. An important consequence of these distinctions, is the effect it has on the right of *visiting* a C., or exercising a legal superintendence over its proceedings. The crown is the visitor of the archbishops, each archbishop is the visitor of his suffragan bishops, and each bishop is the visitor of all the ecclesiastical corporations in his diocese. Civil corporations have no visitor, but the Court of Queen's Bench is the authority entitled to restrain and direct them. Eleemosynary corporations are visited by the founder and his heirs, or such persons as the founder appointed to be visitors; and in default of such persons, or of the founder's heirs, the Court of Chancery acts as visitor. Hospitals, if of ecclesiastical nature, are, however, subject to the visitation of the bishop.

A C. may be dissolved by the death of all its members, or of such number as leaves not enough to make new elections in the way the charter requires; by forfeiture of the charter, through breach of its conditions; by surrender of the charter; or by act of parliament. In all such cases, the lands of the C. revert to their several donors, and the debts due by or to the C. are extinguished.

Municipal corporations, formerly dependent on special charter alone, are now made uniform, and regulated by the 5 and 6 Will. IV. c. 76, and some subsequent acts. See MUNICIPAL CORPORATION.

As to public corporations in Scotland, see BURGH, TOWN COUNCIL, FRIENDLY SOCIETIES; and as to private corporations for trading purposes, see BANK, LIABILITY (limited), PARTNERSHIP.

CORPS D'ARMÉE, in the military system of the greater continental European states, is an organization of the forces in the time of peace. The whole military strength is divided into several corps, each complete in itself as an army, with everything needful for service, staff and artillery park included. The English army is now distributed into eight army corps, stationed in eight territorial centers. The French army had in 1879 nineteen *corps d'armée;* which have been increased in strength by the recent military reorganization. Germany had in the same year eighteen *corps d'armée.* In the Austrian service, the normal number of *corps d'armée* is thirteen. The military strength of Russia, as finally settled in 1876, is distributed over fourteen military districts.

CO'RPSE-CANDLE. See CANDLE.

CO'RPUS CHRI'STI, or BE'NET COLLEGE, Cambridge, was founded by two guilds or fraternities of townspeople—the guild of Corpus Christi, who had their prayers at St. Benedict Church; and the guild of the Blessed Virgin, who prayed at St. Mary's. These were united in 1352, and a small college erected by them. Archbishop Parker added largely to the endowments of this college, and bequeathed to it his valuable manuscripts, amongst which are the only authentic manuscript copies of the Thirty-nine Articles of the Church of England. Of the 12 fellows, all except 4 must take holy orders. There are thirty-one scholarships, some of considerable value, given to the students who most distinguish themselves at the annual examinations. Among the eminent men of this college were Hugh Latimer, Archbishops Parker and Tennison, Fletcher the dramatist, and Gough the antiquary.

CORPUS CHRISTI, Oxford. This college was founded in 1516 by Richard Fox, Bishop of Westminster, under a license from King Henry VIII. The statutes were issued in 1517. The foundation consisted of 20 fellows and 20 scholars; of whom the fellows were to be elected from the scholars, while the scholars were to be elected from certain specified counties. Two peculiarities marked this foundation. First, the usual rules of life and discipline were enforced with peculiar severity; and, second, the object of the college was expressly connected with the studies of the age. Classical literature was for the first time distinctly mentioned. The subjects of the lectures were enjoined to be, not the old routine of divinity and the two philosophies, but divinity, humanity, and Greek.

Incessant industry in these pursuits was inculcated by the founder, and the fellows were even forbidden to accept the proctorship, lest the avocations of that office should interfere with their proper duties. The object and the stringency of these regulations called forth the celebrated encomium of Erasmus, that what Colossus was to Rhodes, what the Mausoleum was to Caria, that C. C. College would be to the kingdom of Great Britain. This prediction has hardly been fulfilled. The rules of the founder have been gradually set aside by acts of parliament, by custom, and by injunctions of the visitor. Of the three university lectureships contemplated by the founder, one was never founded at all, and the other two were merged in the college fellowships and tutorships. And, lastly, the college has suffered greatly from the severe restrictions imposed by statute upon the elections to fellowships. In virtue of the powers conferred by 17 and 18 Vict. c. 81, important changes have been effected by the college working in harmony with the commissioners. Both fellows and scholars are now elected without any restrictions as to place of birth. The fellowships are still 20 in number, value rather more than £300 a year. The college is now one of considerable eminence. Two of the fellowships are permanently attached to the two professorships of Latin and Jurisprudence, the professors being admitted honorary fellows of Corpus, and each receiving from its revenues a sum of £600 a year. The scholarships are 24 in number, tenable for five years, and of the annual value of £80, with rooms rent free; besides seven exhibitions recently instituted to be competed for annually by the commoners of the college. There are 22 benefices in the gift of this college; and in the year 1881, there were about 280 names on the college books.

CORPUS CHRISTI FE'STIVAL, the most splendid festival of the Roman Catholic Church. It was instituted in 1264, in honor of the Consecrated Host, and with a view to its adoration, by Pope Urban IV., who appointed for its celebration the Thursday after the festival of the Trinity, and promised to all the penitent who took part in it, indulgence for a period of from forty to one hundred days. The festival is chiefly distinguished by magnificent processions. In France, it is known as the *Fête Dieu.*

CORPUS DELI'CTI, a criminal law term used in Scotland to signify the body or substance of the charge. Before a conviction can take place, the fact libelled must be proved—e. g., before a man can be convicted of murder, it must be clearly made out that there was a murder; and it is this fact that is called the corpus delicti. See CRIMINAL LAW.

CO'RPUSCLES, BLOOD. See BLOOD.

CORRE'CTION, HOUSE OF, a prison for the reformation of petty offenders. See PRISON, REFORMATORY.

CORRECTION OF THE PRESS. This is one of the most important of the many operations that every piece of printed matter must undergo before it is put into the hands of the reading public; and in every considerable printing establishment, it forms a special department executed by one or more functionaries, technically called 'Readers.' The immediate object of a corrector of the press, or 'reader,' is to observe and mark every error and oversight of the compositor, with a view to make the printed sheet a perfect copy of the author's manuscript. This is on the supposition that the manuscript itself is quite correct, which is seldom the case; and therefore the duty of a good reader extends to seeing that there are no inconsistencies in orthography, punctuation, abbreviations, &c., and in many cases to the verification of quotations, dates, and proper names. The duty of securing consistency in spelling and punctuation is especially important in the case of works on which several writers are employed, such as newspapers and encyclopædias. The corrector has also to direct his attention to the numbering of the pages; to the arrangement of chapters, paragraphs, and notes; to running titles, &c. It is part of his business to observe the mechanical defects of the work—defective types, turned letters, inequalities of spacing between words, sentences, and lines, crooked lines, and to secure symmetry in verses, tables, mathematical operations, and such like. In almost all cases, two proofs are taken, and in difficult works, such as those in foreign languages, tables, &c., even more. Lastly follows the revision, in which little more is done than seeing that the com-

positor has made all the corrections marked on the last proof. It is usual for the writer or author to reserve the correction of the second proof for himself.

In printing regular volumes, one sheet is usually corrected at a time; but where extensive alterations, omissions, or additions are likely to be made by writer or editor, it is more convenient to take the proofs on long slips, before division into pages. The corrections to be made are marked on the margin; and for this purpose an established set of signs or short-hand is used, understood by all printers, and which it is often useful to know. The following specimen of a proof exhibits the application of most of these signs:

WILLIAM FALCONER.

William Falconer was the son of a ~~ϕ~~ barber in Edinburgh, ~~ϕ~~nd was born in 1730. He had very few advantages of education, and went to sea in early life in the merchant service. He afterwards became mate of a vessel that wrecked in the Levant and was saved with only two of his crew: this catastrophe formed the subject of his poem entitled "The Shipwreck, on which his reputation as a writer chiefly rests. Early in 1769, his "*Marine Dictionary*" appeared, which has been highly spoken of by those capable of estimating its merits.

In this ~~seam~~ year, he embarked on the AURORA but the vessel was never heard of after she passed the Cape; the poet of the Shipwreck is therefore supposed to have perish'd by the same disaster he had ~~himself~~ so graphically described. ¶ The subject of the "Shipwreck" and its authors fate demand our interest and sympathy. If we pay respect to the ingenious scholar who can produce agreeable verses in leisure and retirement, how much more interest must we take in the "shipboy on the high and giddy mast', cherishing the hour which he may casually snatch from danger and fatigue.

refined visions of fancy at

1. Alteration of type. 2. Small caps. One line is drawn under the word for *italics*, two for SMALL CAPITALS, three for CAPITALS. 3. A word or letter to be deleted. 4. A wrong letter. A line is drawn through the wrong letter, and the proper one written in the margin. After every mark of correction a line | should be drawn, to prevent its being confounded with any other in the same line. 5. A turned letter. 6. Letter or words to be inserted. 7. A word or letter to be transposed. Where letters only are to be transposed, it is better to strike them out, and write them in their proper sequence in the margin, like a correction. 8. Change to italics. 9. Period, or close of sentence. 10. A space or quadrat sticking up. 11. The manner in which the apostrophe, inverted commas, the star and other references, and superior letters and figures, are marked. 12. Indicates a broken letter. 13. A letter of a wrong fount. 14. Roman type. 15. The space to be removed and the letters closed up. 16. A space wanted. This mark is also used when the spacing is insufficient. 17. Denotes slip of a letter, either up or down, and is to be straightened. 18. No new paragraph; the lines to be run on. 19. Directs a capital letter or word to be made small. 20. A new paragraph. This should be avoided as much as possible, as it causes great trouble and expense. 21. When letters or lines do not stand even. 22. Em-dash; hyphen. 23. Denotes that the lines do not range. 24. Lead to be taken out. 25. Lead to be put in. 26. Bad spacing between the words. 27. A word struck out, and afterwards approved of (Lat. *stet*, let it stand).

The thankless and monotonous business of a corrector or reader is more difficult than the unintiated would believe. It requires extensive and varied knowledge, accurate acquaintance with the art of typography, and above all, a peculiar sharpness of eye, which, without losing the sense and connection of the whole, takes in at the same time each separate word and letter. After the invention of printing, the C. of the P. was executed by the publisher himself, or at least was entrusted to men of ability and learning, and often men of name. Robert Stephen (1526—1559), and Plantin (1555—1589), had recourse to publicity, hung out the successive sheets of their publications, and promised a reward to any one who would point out a typographical error. Some editions of particular works are held in high estimation from the care with which the press had been corrected. Among the most famous are those that issued from the press of Aldus Manutius in Venice, of which we may mention the works of Petrarch (1514), corrected by Pietro Bembo; Aristotle (1551—1553, 6 vols.), corrected by the famous Greek scholar, J. B. Camotius; Lactantius (1515), and Suetonius (1516), corrected by J. B. Egnatius; Plato (1513), Athenæus (1514), and Gregory Nazianzene (1516), corrected by Marcus Massurus. The first edition of Homer was printed by Nerlius in Florence (1484, 2 vols.), corrected by Demetr. Chalkondylas. Robert Stephen of Paris himself corrected the numerous works that issued from his press; and Erasmus had a great name as a corrector.

CORRE'GGIO, ANTONIO ALLEGRI, a celebrated Italian painter, called C. from the place of his birth, a small town near Modena, now called Reggio. He was born in the year 1493—1494, and his father, a tradesman of some property, had him carefully educated, and instructed in the rudiments of art, by an uncle, Lorenzo Allegri, a painter of small merit. How much he owed to his teacher is uncertain. He was the first among the moderns who displayed that grace and general beauty and softness of effect, the combined excellences of design and color with taste and expression, for which he is still unrivalled. His chiaroscuro is perfect. Almost before he had seen the great masters, he became a master in a style all his own; and was the founder, or rather his imitators for him, of what is called by some the Lombard, by others the Parma school of painting. On first beholding, at Bologna, Raphael's glorious picture of St. Cecilia, he is said to have exclaimed: 'Anch, io sono pittore' ('I, too, am a painter'). But this story is doubted.

There was long a tradition that C. lived in indigence, unaided but by his own genius; and it is remarkable that Vasari, who lived at the same time, in his *Lives of the Painters*, records only vague rumors regarding C.'s life; and that Annibale Caracci, fifty years after his death, writes: 'I rage and weep to think of the fate of this poor Antonio, so great a man—if, indeed, he were not rather an angel in the flesh.' This belief, so prevalent in his own day, now refuted by recent researches, proves how retired and simple must have been his life. That he was in high estimation in his later days, is proved by his signature being found affixed to the deed of marriage of the Lord of Correggio, celebrated in 1533. C. died in the following year, March 5, 1534, in his 41st year, and is buried in the Franciscan convent of Correggio.

At the age of 18, C. painted an altar-piece, the 'Madonna di San Francesco,' now in the Dresden Gallery, which is rich in pictures by C.; the most famous of which are the 'Notte' (Night), lightened only by the celestial splendor beaming from the head of the infant Saviour—Vasari calls it 'quite wonderful'—and the famous 'Magdalen,' one of the most admired pictures in the world. For the cupola of the church San Giovanni at Parma, he painted an 'Ascension' in fresco, and over the high-altar a 'Coronation of the Virgin,' now only known through copies and engravings. He also decorated elaborately in fresco the cathedral there, for which he received 1000 ducats, worth about £3500. In the Louvre are two pictures—the 'Marriage of St. Catharine' and the 'Antiope;' in the Florence Gallery, three—one the 'Madonna on her knees adoring the Infant;' in the Naples Gallery, three—one a lovely Madonna, called, from its oriental character, 'La Zingarella' (the Gypsy), said to be a likeness of C.'s wife; at Vienna, two; at Berlin, three; at Parma, five—the most celebrated is the 'St. Jerome;' and in the British National Gallery, a Madonna, known as the 'Vierge au Panier,' the 'Education of Cupid,' and the famous 'Ecce Homo,' purchased by the British Government for £11,500.

CORRE'GGIO, a town of Northern Italy, midway between Parma and Modena; pop. 2700. It is the birthplace of the painter surnamed Corregio (q. v.).

CORRE'GIDOR is the name given in Spain to the principal magistrate of a town. He is appointed by the king. The C. is also a Portuguese functionary, but, unlike his Spanish brother, does not possess the double power of governing and administering justice, but only the latter.

CORRELA'TION OF PHYSICAL FORCES. See FORCE.

CORRÈZE, a department of France, formed out of part of the old province of Limousin, and taking its name from an affluent of the Vezère—the Corrèze, which traverses the department from north-east to south-west. C. extends between lat. 44° 55′ and 45° 40′ N., and long. 1° 13′ and 2° 22′ E.; its total area is nearly 2300 square miles, and its population, in 1881, 311,478. The chief

rivers of C. are the Dordogne, the Vezère, and the Corrèze. The surface of the department is mountainous, especially in the north and east, where it is broken in upon by offsets from the Auvergne mountains, which, in some parts, attain a height of 4000 feet above the sea. The lower slopes are clad with forests, but the district is in general sterile. In the south and south-west, however, the soil yields wheat, oats, barley, rye, maize, &c. Wine is also produced, but of poor quality. The rural population are poor, badly housed and fed; their food consisting, to a great extent, of chesnuts, which are very abundant. Minerals, particularly coal, iron, lead, alabaster, and granite of various colors, are found in considerable quantities. The department is divided into the three arrondissements of Tulle, Brive, and Ussel. Tulle is the chief town.

CO'RRIB, Lough, a lake, the third in size in Ireland, in the north of Galway. It is of very irregular shape, 27 miles long from N.W. to S.E., and 1 to 6 broad, with an area of 68 square miles. It is between 28 and 31 feet above the sea-level. From its south end, 4 miles north of Galway, it discharges its surplus waters by Galway River into Galway Bay. It receives the waters of Lough Mask, at its north end, through the Pigeon Hole and other caves, as well as those of the Clare and other smaller rivers. On its sides are metamorphic rocks, carboniferous limestone, and marble. Near it are many monumental heaps and so-called Druid circles. It contains many islets, and to the west are mountains 3000 feet high.

CO'RRIDOR is a gallery or passage running (It. *correre*, Sp. *correr*, to run) or leading to several rooms, each of which has a door opening into it. Spacious corridors are necessary in all public buildings, such as hospitals, prisons, &c.

CORRIENTÉS (in English, *currents*) is a name of various application in Spanish America. Besides indicating several capes in Cuba, Mexico, and New Granada, it is more conspicuously connected with one of the States of the Argentine Confederation and with the capital of the same. 1. C., the city, stands in lat. 27° 27′ S., and long. 58° 46′ W., near the confluence of the Parana and the Paraguay. It takes its name from the rapids, which are said to be as decidedly a turning-point in the climate of the country as in the navigation of the river. Pop. 11,000. 2. C., the province, lies between Entre Rios on the south, and the republic of Paraguay on the north, having the Parana on the north and west. Lat. 27°—30° S., and long. 57°—59° W. Area about 60,000 sq. miles; pop. (1869) 129,023. The north is undulating and fertile; and the south, besides being generally swampy, is partly covered by Lake Thara. The products are maize, cotton, sugar, indigo, tobacco, and a species of silk.

CORRIEVRE'KIN, or CORRYBRE'CHTAN, or Gulf of Brechan, a whirlpool or dangerous passage a mile broad, off the west coast of Argyleshire, in the strait between Scarba and Jura isles. It is occasioned by the meeting of tides (often running 12 or 14 miles an hour) from the north and west, in the narrow passage into the Sound of Jura, round a pyrmidal rock, which rises with rapid slope from a considerable depth to some fathoms from the surface. This rock forces the water in various directions. In stormy weather, at flow-tide, vast openings form in the water, immense bodies of water tumble headlong as over a precipice, then rebounding from the abyss, dash together and rise in spray to a great height. The noise is heard over the isles around. The water is smooth for half an hour in slack-water.

CORRO'SIVE SU'BLIMATE, the popular name of Bichloride of Mercury (q. v.).

CO'RRUGATED IRON (Lat. *ruga*, a wrinkle). Common sheet-iron, and what is improperly called 'galvanized iron' (i. e., sheet-iron coated with zinc by immersion in a bath of the fused metal), have of late been made available for many useful purposes, by virtue of the great additional strength imparted to the sheets by corrugation, which is merely an application to metallic substances of the old contrivance of 'goffering or crimping,' by means of which the frills of the olden time were made to keep their shape.

The sheets of metals are passed between rollers, the surfaces of which are formed into rounded grooves and ridges, the ridges of one roller filling the grooves of the other. The metal in passing between these is compressed into a waving form, or corrugated.

It will be easily understood that a piece of sheet-metal, of given size and thickness, if rolled up to form a tube, will resist a much greater bending strain than when flat. Now the curves of the corrugation may be regarded as a series of half-tubes, and the additional strength is due to the application of the same principle. See Strength of Materials. Walls and roofs of temporary buildings are now extensively made of this material. Railway sheds, emigrants' houses, temporary churches, store-rooms, and sheds for dockyards, &c., are among the common applications. Mr. Francis, of New York, has applied the principle to the construction of light boats, the strength of which, and their power of resisting violent blows, such as boats are subject to on landing through a surge, is said to be remarkably great. On this account, they are proposed to be used for life-boats, ships' boats, &c. They are made by stamping the metal in enormous dies, of the shape and size of the boat, and grooved for the required corrugations. Small boats thus constructed require no internal bracings, the requisite rigidity and strength being given entirely by the corrugations.

CORRU'PT PE'RJURY. See Perjury.

CORRUPT PRACTICES ACT. The laws relating to bribery, treating, and undue influence at elections of members of parliament, were consolidated and amended by 17 and 18 Vict. c. 102 (10th August, 1854), which was continued and amended by 21 and 22 Vict. c. 87 (2d August 1858). Both of these statutes were further continued till 10th August, 1860, by 22 and 23 Vict. c. 48, to 1861, to 1879, &c. New statutes were passed in 1863, 1867, 1868, 1880, and other years; indeed, additional legislation on this very troublesome subject has been attempted in almost every session of parliament. See Parliament.

CORRU'PTION OF BLOOD. See Treason.

CORRUPTION OF JUDGES. See Judge.

CO'RSAC (*Canis* or *Cynalopex Corsac*), an animal of the dog family (*Canidæ*), found in the deserts of Tartary and in India. In size, it resembles a small fox, but is more slender in body and limbs; it has long and pointed ears, a bushy tail, and is of a reddish or yellowish color; the form of the head resembles that of the fox. It lives in large communities, burrows, prowls during the day and not during the night like foxes, and is believed to feed chiefly on birds and their eggs, but not to object even to insect food. There are several Asiatic species closely allied to this.

CO'RSAIR (Ital. *corso*, a race), a pirate or sea-robber, but generally limited in its application to the pirates who in former times sailed from Algiers, Tunis, Tripoli, and the ports of Marocco, and were the terror of merchantmen in the Mediterranean and the neighboring parts of the Atlantic Ocean.

CO'RSICA, an island in the Mediterranean, separated from the island of Sardinia by the strait of Bonifacio on the south, and situated in lat. 41° 20′—43° N., and long. 8° 30′—9° 30′ E. It forms the French department of Corse, and has an area of 3350 square miles, with a population, in 1881, of 258,440. The greater portion of the island is occupied by ranges of rugged mountains, the highest being Monte Rotondo (ancient *Mons Aureus*), 9068 feet high, and covered with perpetual snow. There are several rivers in the island, the largest of which, having their source in Monte Rotondo, are the Tavignano (ancient *Rhotanus*) and the Golo (ancient *Tavola*). They flow into the sea on the east coast; the Gola is navigable for boats. Several small rivers, most of which are dry in summer, flow westward into the sea. The soil is generally fertile in the valleys, yielding all kinds of cereals, and much wine is produced. Olive, orange, fig, almond, and other fruit-trees flourish; fruit forming a considerable item in the exports. But C. is chiefly celebrated on account of its magnificent forests of oak, pine, chestnut, beech, larch, cork, &c. Many of the pines are upward of 120 feet high, and are much used for masts in the French navy. The chestnut forests are particularly fine, and the fruit serves as an important article of food for the inhabitants. Prickly-pear, arbutus, myrtle, &c., abound. Iron, lead, black manganese, antimony, marble, and granite of beautiful quality, are found on the island, but these sources of wealth are not developed. Sheep of a peculiar black breed, with four, and occasionally six horns, goats, and pigs are numerous, and the rearing of cattle is carried on to a great extent. Tunny, pilchard, and anchovy abound along the coast. C. is divided into the five arrondissements of Ajaccio, Bastia, Calvi, Corte, and Sartene. Ajaccio is the capital. The language spoken in C. is a corrupt Italian. The Corsicans are great *improvisatori;* valor, love of freedom, and desire of revenge are their principal characteristics.

In early times C. was known as *Cyrnos*, although its native name is said by some historians to have been the same as that it now bears. As early as 564 B.C., a colony of Phocæans had founded a city on its east coast. After successive changes of Carthaginian, Roman, Vandal, Greek, and Gothic rulers, it came in the 8th c. into the hands of the Saracens, who held it until the beginning of the 11th c., when it fell under the dominion of Pisa. It afterwards passed to the Genoese, who held it until 1755, when the Corsicans under General Paoli made themselves in great part independent. The French, to whom the Geonese surrendered the claims they themselves could not maintain, captured it in 1768; since which time, with slight intermission, it has remained in the possession of France.

CO'RSLET was the body-covering of pikemen. The C. was made chiefly of leather, and was pistol-proof.

CO'RSNED, or morsel of execration, was a piece of cheese or bread made use of in early times with a view to ascertain whether persons suspected of any crime were guilty or innocent. The C., according to Blackstone, 'was consecrated with a form of exor-

cism, desiring of the Almighty that it might cause convulsions and paleness, and find no passage, if the man was really guilty, but might turn to health and nourishment if he was innocent.' In this mode of divination, barley-bread appears to have had the preference. It was one of the many forms of ordeal (q. v.)

CO'RSO (literally, course or running) is an Italian word used to express not only the racing of horses (without riders), but also the slow driving in procession of handsome equipages through the principal streets of a town, such as almost always takes place in Italy on festivals. This custom has given a name to many streets in almost all the larger towns of Italy. The best known of these is the C. in Rome, which is the scene of the celebrated diversions of the Carnival.

CORT, CORNELIS, a famous Dutch engraver, was born at Hoorn in 1536. In 1572, he went to Venice, and was hospitably received there by Titian. Being less of a painter than of an engraver, he seems very soon to have been employed by the great Venetian colorist for the reproduction in copper-plate of some of his master-pieces; and it appears he did it so well, that he afterwards engraved for Tintoretto and other Venetian masters. C. next settled at Rome, where he erected an engraving school, and had among his pupils Agostino Caracci, and from this school sprang the most excellent Italian and Venetian engravers. C.'s works had a favorable influence on the graver's art in the Netherlands. He died at Rome in 1578. His engravings, considering his short life of 42 years, are very numerous amounting to more than 150.

CO'RTÉS, is the name given in Spain and Portugal to the assembly of representatives of the nation. As one district of Spain after another was recovered by the Christian princes from the Moors, there arose in each a corporation composed of the different 'States' or orders of the population, limiting the power of the princes. From the union of several of these territories were formed the two leading kingdoms of Castile and Aragon, having each its C., representing the clergy, the nobility, and the cities. In Aragon, the C. appointed a judge, *el justicia*, who decided disputes between the king and his subjects, and confined the royal power within constitutional limits. In Castile the rights of the burghers were less extensive than in Aragon, but in both states the king was dependent on the Cortes. After the union of Castile and Aragon under Ferdinand and Isabella, the crown succeeded in making itself less dependent on the C., whose power and privileges were gradually encroached upon, until at last they were seldom assembled except to do homage or to sanction an arrangement as to the succession to the throne.

After 1713 they did not meet till 1789, on the accession of Charles IV. In 1809, the C., as composed in 1789, was assembled by the Junta, and framed a new constitution, called the Constitution of 1812, which, however, was set aside at the restoration. Endless attempts at restoration and modification of the Spanish C. have since been made, without any happy result. See SPAIN.

The history of the Portuguese C. is very similar to that of the Spanish. In 1826, Dom Pedro promulgated a new constitution after the model of the French, calling the C. again into life, and abdicating at the same time in favor of his daughter, Maria de Gloria. This constitution was set aside during the usurpation of Dom Miguel, but was finally restored in 1842.

CO'RTÉS, HERNAN, the daring conqueror of Mexico, was born in 1485, at Medellin, a village of Estremadura, Spain. He was educated for the law, but afterwards adopted the profession of arms; and in 1511 distinguished himself under Diego-Velasquez in the expedition against Cuba. In 1518 the conquest of Mexico was intrusted to him by Velasquez, who was then governor of Cuba; but the latter had no sooner granted him the commission than he wished to revoke it, fearful that his dashing and sagacious lieutenant would deprive him of all the glory of the enterprise. C., however, maintained his command in defiance of the governor. Never, perhaps, was an enterprise so great undertaken with so little regard for its difficulties and dangers. A force of between 600 and 700 men, only thirteen of whom were musketeers, with only ten field-pieces and two or three smaller pieces of cannon, were all the means at C.'s disposal to effect the conquest of the then extensive empire of Mexico, when, early in 1519, he landed on its shores. Sailing up the river Tabasco, C. captured the town of that name, the prowess of the Spaniards occasioning great terror to the Tabascans, who made liberal presents to the white men, and volunteered all the information about Mexico in their power. Arriving off the coast of San Juan de Ulloa, C. was here visited by some Mexican chiefs, with whom he entered into negotiation regarding a visit to Montezuma, who then ruled with nearly absolute sway over Mexico. Montezuma sent C. rich presents, but objected to his visiting the capital. But C. had resolved upon seeing the emperor in his palace, and was not to be daunted by opposition. Having founded the town of Vera Cruz, and burnt his ships, so that his troops could not return, and must therefore conquer or perish, C., with a force reduced to 400 Spaniards on foot and 15 horse, but with a considerable number of Indian followers, lent him by dissatisfied chiefs dependent on Montezuma, marched upon the capital. Overcoming the Tlascalans, a brave people, on the way, who after became his firm allies, and taking fearful vengeance on the city of Cholula, where, by Montezuma's orders, a treacherous attempt was made to massacre his troops, C. on the 8th November 1519 reached the city of Mexico with his little band, and was received with great pomp by the emperor in person.

The Spaniards were regarded as those descendants of the sun who, according to a current prophecy, were to come from the east and subvert the Aztec empire—a tradition that was worth a good many soldiers to Cortes. An attack on C.'s colony at Vera Cruz by one of Montezuma's generals, however, proved the mortality of the Spaniards, and would have been the ruin of them but for the decisiveness of C., who immediately seized the emperor, and carrying him to the Spanish quarter, forced him to surrender the offending general and three other chiefs, whom he caused to be burnt in front of the palace, and ere long compelled him formally to cede his empire to Spain. One has nothing but astonishment for this man, whose daring acts in the capital city of the empire, containing, it is calculated, 300,000 inhabitants, had nothing but 400 Spaniards, and a few thousand Indians, whom he had recently conquered, to support them. Meanwhile Velasquez, enraged at C.'s success, sent an army of about 1000 men, well provided with artillery, to compel his surrender. C. unexpectedly met and overpowered this force, and secured its allegiance. But in his absence the Mexicans had risen in the capital, and C. was finally driven out with much loss. During the disturbance, Montezuma, who was still kept a prisoner, appeared on a terrace with a view of pacifying his people; but he was wounded by a stone, an indignity against his kingly person which he took so much to heart that he died in a few days. C. now retired to Tlascala, to recruit his fatigued and wounded men; and receiving reinforcements, he speedily subjugated all Anahuac to the east of the Mexican valley, and soon marched again on the city of Mexico, which he succeeded in capturing (August 16, 1521) after a siege of four months ended by a murderous assault of two days. Famine had assisted the Spanish arms, so that of the vast population only about 40,000 remained when the Spaniards entered the city, which lay in ruins, 'like some huge churchyard with the corpses disinterred and the tombstones scattered about.' Mexico was now completely subjugated, for though some attempts at revolt were afterwards made, they were soon crushed by C., who had been nominated governor and captain-general of the country by Charles V. In 1528, C. returned to Spain, to meet some calumnies against him, and was received with great distinction. On his return to Mexico in 1530, however, he was divested of his civil rank. At his own expense he fitted out several expeditions, one of which discovered California. In 1540 he came again to Spain, but was coldly received at court, from which he soon retired, and died at Seville, December, 1547.

CORTO'NA, a town of Central Italy, about 50 miles south-east of Florence. It is beautifully situated amid vineyards on a hill rising from the fertile valley of the Chiana, and commanding a view of the lake of Perugia (anc. *lacus Trasimenus*). The city is of fabulous antiquity, older, it is said, than Troy; and the Cyclopean walls, erected by the Pelasgians—which in many parts remain unchanged—prove, if not a history quite as old as tradition affirms, at all events one second in remoteness to few places in Italy. It was one of the most powerful of the twelve cities forming the Etruscan League. By the Romans, who settled a colony here about the time of Sulla, it was called *Corythus*. After many vicissitudes during the middle ages, the town became subject to Florence in the 15th century. Besides the walls, there are several objects of Etruscan antiquity at Cortona. The modern town contains above 3900 inhabitants. Among the principal buildings are the cathedral, dating from the 10th or 11th c., with some fine paintings and monuments, the churches of Jesus, St. Francesco, and others. The Etruscan Academy has its seat here, the museum connected with which contains a multitude of Etruscan sarcophagi, vases, &c. C. has a trade in wine and olives, and fine marble is found in the vicinity.

CORU'ÑA (English, *Corunna*), a fortified seaport of Spain, situated on a small headland in the Atlantic, formed by the three bays of Betanzos, Coruña, and El Ferrol, about midway between Capes Finisterre and Ortegal, in lat. 43° 22′ N., long. 8° 23′ W. C., which is a thriving place, is built partly on the slope and partly at the foot of a hill, and is divided into the upper and lower towns, the former being the most ancient. The lower town, which was formerly inhabited chiefly by fishermen, is now more important that the upper. It is well built, chiefly of granite, and some of its streets are broad and well paved. There are few public buildings of any note in Coruña. A citadel defends the town, and the harbor, protected by forts, is safe and commodious. The commerce of C. is considerable, not merely with the Spanish

ports, but with England and America. There are manufactures of cigars, soap, starch, and cotton; and sardine fisheries. Pop. (1877) 33,735. C. dates its origin from the Phœnicians, from whom it was taken by the Romans in the 1st c. B.C. For Englishmen, great historical interest attaches to Coruña. Here, in 1386, John of Gaunt landed to claim the crown of Castile in right of his wife, daughter of Pedro the Cruel; in 1554, Philip II. embarked here for England to marry Queen Mary; and in 1588 the great Spanish Armada, which had been refitted at this port, set sail for the conquest of England. But C. is best known in connection with the death of Sir John Moore, who, as a fitting conclusion to his memorable retreat, with about 14,000 men defeated (January 16, 1809) on the heights of Elvina, behind C., 20,000 French under Soult. Moore, who was mortally wounded in the action, was buried on the ramparts in his military cloak. A monument, erected by the British government, marks the place of his burial.

CORU'NDUM, a mineral consisting essentially of mere alumina, yet of great specific gravity—about four times that of water—and of remarkable hardness, being inferior in this respect only to the diamond. Mineralogists regard the sapphire as a variety of C., and along with it the gems popularly known as Oriental Ruby, Oriental Topaz, Oriental Emerald, and Oriental Amethyst; but the name C. is more usually limited to the coarser varieties, to which it is applied by the natives of India. These, instead of exhibiting the brilliancy of gems, are in general of a dull and muddy appearance, and the crystals—which are usually six-sided prisms, and six-sided pyramids—are externally dull and rough. The color is various, often green, blue, or red, inclining to gray. The variety called *Adamantine Spar* is of a hair-brown color and adamantine lustre. Some corundums—known as *Asteria Sapphires* or *Star Sapphires*—when cut in a particular manner, exhibit an opalescent star of six rays. C. is found in many parts of the world, and has long been used in India for polishing all gems except the diamond, which is too hard for it, and also for polishing the stones used in temples and other buildings. Emery (q. v.), so well known as a polishing substance, is a variety of corundum.

CORVEI (*Corbeia nova*), a Benedictine abbey on the Weser, near Höxter, the oldest and most famous in early Saxony, founded in the beginning of the 9th century. It was a colony from the monastery of the same name in Picardy, then part of the country of the West Franks. It received rich endowments; was the center of great agricultural improvement and prosperity during the earlier part of the middle ages; and the seat of a school, founded by Ansgar, the Apostle of the North, which flourished greatly in the 9th and 10th centuries, and was next in reputation to Fulda. Its abbots were numbered amongst the spiritual princes of the German empire. In 1794 it was made a bishopric by Pius VI. Its territory then extended to about 22 square miles, with 10,000 inhabitants. In 1803 it was annexed to Nassau, from which it was transferred in 1807 to Westphalia, and in 1815 to Prussia. In 1822 the lands belonging to the ancient abbey passed into the hands of Count Victor Amadeus von Hessen-Rheinfels-Rothenburg, which were formed into a mediate principality of the Germanic empire. The church of the abbey is built in the Gothic style, very magnificently adorned in the interior, and contains a multitude of monuments of successive dynasties. The library and archives of the cloister, which contained many valuable records of the early ages of German history, have all been destroyed—the authenticity of the *Chronicon Corbejense*, an alleged record of this abbey from its foundation to the end of the 12th c., being doubtful.

CORVE'TTE, is a flush-decked vessel, ship-rigged, but without a quarter-deck, and having only one tier of guns.

Corvette (20 guns).

CO'RVIDÆ, a family of birds of the order *Insessores*, tribe *Conirostres*, having a strong bill, compressed towards the point, and covered at the base with stiff, bristly feathers, which advance so far as to conceal the nostrils. The plumage is dense, soft, and lustrous, very generally dark, but sometimes of gay colors, more particularly in the tropical species. The birds of this family are widely diffused over the world. They are generally birds of strong and rapid flight; some of them are solitary, some gregarious in their habits; some reside in woods, some in moors and wastes, some on sea-coasts, &c. They are very omniverous. They are also remarkable for their intelligence, their prying curiosity, and their disposition to pilfer and secrete glittering articles. Besides the crows, raven, rook, and jackdaw, which belong to the genus *Corvus*, the magpie, jay, chough, and nut-cracker are included among the C. of Britain.

CO'RVO, the most northerly of the Azores, is the smallest among the inhabited islands of the group. It measures only 6 miles by 3, the latitude of its southern point being 39° 42′ N. It is of volcanic origin, and has, in an exhausted crater, a small lake 1277 feet above the sea. With a fertile soil and a delicious climate, C. contains barely 1000 inhabitants, and these generally poor.

CO'RWEN, a town in north Wales, in the north-east of Merionethshire, situated on the right bank of the Dee, 10 miles west of Llangollen. It is sheltered by a rock at the foot of the Berwyn mountains. Pop. of parish (1871), 2464. Here the Welsh under Owen Gwynedd defeated Henry II., and afterwards under Owen Glyndwr defeated Henry IV.

CORYDA'LIS. See FUMARIACEÆ.

CORYGAU'M, an insignificant village in the presidency of Bombay, is historically interesting in connection with the final subjugation of the Peishwa of the Mahrattas. On 1st January 1818, it was defended for nine hours by a mere handful of men under Captain Staunton against a native force numbering at least 3000 infantry aud about 20,000 cavalry, the struggle terminating in the repulse of the assailants after terrible slaughter. C. stands 16 miles to the north-east of Poona, in lat. 18° 39′ N. and long. 74° 8′ E.

CORYLA'CEÆ. See CUPULIFERÆ.

CO'RYLUS. See HAZEL.

CO'RYMB, in Botany, a form of *indefinite* and *centripetal* inflorescence, in which the flowers are arranged as in a raceme (q. v.), but the lower flower-stalks are elongated so as to bring the flowers almost to the level of those of the upper. The C. is a very common form of inflorescence.

CORYMBI'FERÆ. See COMPOSITÆ.

CORY'MBUS (Gr. *korumbos*), the particular mode of dressing the hair among the Greeks, with which the statues of Venus have rendered us familiar. The hair was often covered with a sort of open ornamental work.

CO'RYPHA. See FAN PALM, GEBANG PALM, and TALIPAT PALM.

CORYPHÆ'US (from Gr. *koruphe*, a summit), the leader of the chorus in Ancient Greece. The name is now used to signify those of the highest distinction in any art or science. In the Italian Opera the choir-leader is called the *corifeo;* in French, *coryphée*.

CO'RYPHENE (*Coryphæna*), a genus of fishes of the family *Scomberidæ*, to which the name DOLPHIN, properly belonging to a genus of *Cetacea*, has by some mistake been popularly transferred. The coryphenes are remarkable for the beauty and metallic brilliancy of their colors, which delight the spectator as they are seen gliding with extreme rapidity near the surface of the water, gleaming in the light of the sun; and the changes of which, as they lie dying on the shore or on the deck of a vessel, have acquired a peculiar poetic celebrity. They have an elongated compressed body, covered with small scales, the head rising in a sharp crest, the mouth large. They are natives of the seas of warm climates, and some species are found in the Mediterranean, among which is *C. hippuris*, the largest known, attaining a length of five feet. This and some of the other species are often seen playing around ships; and great interest is occasionally awakened by their pursuit of shoals of flying-fish. In this chase, a C. may be seen to dart completely out of the water, making a leap of ten yards or more. Captain Basil Hall likens the velocity to that of a cannon-ball. The C. is often caught by sailors, with a glittering bit of metal instead of a bait,

COS (more anciently, Meropis), an island of the Grecian Archipelago belonging to Asiatic Turkey. Its modern name is Stanko or Stanchio. C. has a length of 23 miles, with a breadth of 5, and a population of from 20,000 to 30,000, the half of whom are Greeks; the other half being Turks and Jews, who congregate in the towns. On the eastern side of the island a range of hills extends along the coast, from Cape Fonka on the north, to Point Korkilo on the south; but with this exception, C. consists mostly of delightful and fertile plains, which are well cultivated. South of these plains, on which stands the principal town, of the same name as the island, rises a high mountain range, which, from its jagged summit, is called Mount Prion—the 'sawing' mount or sierra. There are many mineral

springs on the island. The exports consist principally of raisins, lemons, salt, and grain. They amount annually to about £50,000. The chief imports are oil, soap, butter, butcher-meat, and English manufactures. The climate in general is pretty healthy. Many ancient Greek remains are scattered over the island. The chief town, Comopolis or Cos, is situated on the north-east coast. It is built on the ruins of the ancient city of the same name; and in the center of the chief street is a gigantic palm-tree, said to have stood there before the Christian era. To the north-west is an old fortress of the knights of St. John. The harbor is small, with only about 6 feet of water in it. The inhabitants are employed chiefly in agriculture. Modern Greek is the language spoken. In early times, C. was sacred to the worship of Æsculapius. It was the birthplace of Ptolemy Philadelphus, of the painter Apelles, and the physician Hippocrates.

COSCINO'MANCY, a species of divination practised from the earliest times by means of a sieve (Gr. *koskinon*) and a pair of shears or forceps. It appears to have been chiefly employed for the discovery of thieves. The sieve was supported or suspended by means of the shears, in some way not easily understood; a certain mystical form of words was then used, and the names of the suspected persons being mentioned in succession, at the name of the thief the sieve moved or turned round.

COSE'NZA, a town of Italy, capital of the province of the same name, about lat. 39° 20′ N., long. 16° 15′ E. It is situated 12 miles east of the Mediterranean, in a mountain-enclosed valley at the confluence of the Crati and the Busento, the waters dividing the town into two parts. The lower town is much affected by malaria arising from the river marshes, but the upper town is tolerably healthy. It is the residence of the principal families, and contains some handsome buildings, including a cathedral, and an unusually fine court-house. The streets generally are narrow and crooked. C. has considerable industry, the principal articles of manufacture being silk, earthen-ware, and cutlery. Pop. (1881) 16,686.

Anciently, C., called *Consentia*, was a city of the Brutii. It was captured by the Carthaginian general, Himilco, and was forced to surrender (204 B.C.) to the Romans, who afterwards colonized it. Alaric the Goth died here 410 A.D., and is buried in the bed of the Busento. Area of province (formerly called Calabria Citra), 3000 sq. m.; pop. (1881) 451,271.

CO-SINE, CO-TANGENT, &c. See TRIGONOMETRY.

CO'SMAS, surnamed *Indicopleustes*, a merchant of Alexandria, who lived in the middle of the 6th c., and after having traveled much, returned to Egypt, where he spent the evening of his days in monastic retirement, and wrote a 'Christian Topography' in 12 vols., in the Greek language, containing much information about many countries, and particularly about India. An attempt to reconcile everything to his notions of the meaning of the Bible has led him into many errors. The work (which, among other things, gives the first account of the *Monumentum Adulitanum*, see ADULE) has been edited by Montfaucon in the *Nova Collectio Patrum Græcorum*, vol. ii. (Par. 1707). C. wrote also a description of the plants and animals of India, which was published by Thevenot in his *Relations de Divers Voyages Curieux*, vol. i. (Par. 1666).

COSME'TICS (Gr. *kosmeo*, I adorn) are chemical preparations employed for improving the appearance of the skin and hair. Several of the C. in use are comparatively harmless, such as perfumed starch and chalk; whilst others, such as *pearl white* (the subnitrate of bismuth), are more or less poisonous, and dangerous to use. At all times the employment of C. is not to be commended, as the minute particles tend to fill up and clog the pores of the skin, and prevent the free passage of gases and vapors, which is so essential to the preservation of any animal organ in a thorough state of health.

COSMO DE' MEDICI. See MEDICI.

COSMO'GONY (Gr. *kosmos*, the universe, *gonè*, generation) is the (so-called) science of the formation of the universe. It is thus distinguished from cosmography, which is the science of the parts of the universe as we behold it (a science embodied in the work of Humboldt, entitled *Cosmos*), and from cosmology, which reasons on the actual and permanent state of the world as it is. Geogony, which confines itself to the formation of the earth, and speculative geology, are but subdivisions of cosmogony.

Cosmogonists proper may be divided into two classes—the Theistical, and the Pantheistical. According to Theistic C., the world of matter and order sprang at once into existence at the Omnific fiat. The chief speculations from this point of view, have of late been regarding the *date*, if the expression may be used, of the world's formation, and looking to the facts of geology and astronomy, the precise condition of the cosmos when evoked; how much, in short, of the evolution, since the date, is attributable to the operation of secondary causes. The Pantheists hold the universe, on the other hand, to be the very body and being of Deity, and as such to have been from all eternity. God is all things, and all things are God—a conclusion reached from pure *à priori* reasoning, and that seems to exclude all further inquiry.

Men of science in modern times, stopping short of an actual C. or genesis of the world, have pushed their inquiries into the order of development of its present state, which they, or at least some of them, aver to have taken place from the first by the divine power exercised in the manner of natural law. They assume the existence of matter; and with them there is no proper beginning of things, but an eternal round, under fixed laws of growth and decay.

In cosmogonical speculations, heat, air, atoms with rotatory motions, numbers—all in turn have had the honor of being recognized as the fountain and causes of things. Latterly, there has been a tendency to dynamical hypotheses, not only of the formation of our own rotating globe, but of our system, and of all similar systems in space. Of these, the chief is that of Laplace, founded on observation of the mutual relations of the planets, their common direction in rotation and evolution, their general conformity to one plane, &c.; taken in connection with such facts as the rings of Saturn and the fundamental unity of the asteroids. Thus arose the NEBULAR THEORY (q.v.), which at one time had a support from Sir William Herschel's observations on the *nebulæ;* of which, however, the discoveries by Lord Rosse's telescope in a great measure deprived it. Following up this view of a formation of the globes by natural causes, there have been speculations as to the commencement and progress of organic life upon them by similar means: these are to be found in the *Philosophie Zoologique* of Lamarck; the *Vestiges of the Natural History of Creation;* and in the work of Charles Darwin on the *Origin of Species by a Principle of Natural Selection*; all of which involve great differences of view among themselves, though all meeting in one point—an assimilation of the processes of creation to the ordinary natural course of things presumed to be arranged and conducted by the Deity.

CO'SMOS. See COSMOGONY.

COSNE, a town of France, in the department of Nièvre, and on the right bank of the Loire, here crossed by a suspension bridge. It has iron manufactures. Pop. (1876) 5711.

CO'SSACKS (Russ. *Kasak*), a race whose origin is hardly less disputed than that of their name. The latter has been variously derived from words meaning, in radically distinct languages, 'an armed man, a sabre, a rover, a goat, a promontory, a coat, a cassock, and a district in Circassia.' The C. are by some held to be Tatars, by more to be of nearly pure Russian stock. The most probable view is that they are a people of very mixed origin. Slavonic settlers seem to have mingled with Tatar and Circassian tribes in the regions to the south of Poland and Muscovy, in the Ukraine and on the lower Don; and to have given to the new race, first heard of as Cossacks in the 10th century, a predominantly Russian character.

On the conquest of Red Russia by Poland, numerous Russian refugees fled to the Cossack country; and more on the Tatar conquest of Muscovy. The numbers of the C. were also recruited from time to time by adventurers or fugitives from Poland, Hungary, Walachia, and elsewhere; but in physique, as in language and religion, the C. have always been mainly Russian. They distinguished themselves in war against Turks and Tatars, and were known as a powerful military confederacy in the 15th century. The kings of Poland and the czars of Muscovy employed them largely to defend their frontiers, especially against nomadic neighbors; but the connection between the C. and their lords paramount was always very elastic, and was frequently repudiated to suit the convenience of either party. The C. are still the outposts of Russian authority towards Siberia, Central Asia, and the Caucasus. Living near, or as 'free Cossacks' amongst, hostile peoples, the C. developed their peculiar military organization—either forming a cordon of military settlements along the confines of occupied territory, or as isolated camps in the nomad country beyond. Agriculture they eschewed; self-reliance and readiness at all times for defence or assault were their chief characteristics; though such of them as inhabited the banks of the Don and Dnieper, and their islands, became and still are skilful boatmen and fishers. Their political constitution was completely democratical; all offices were elective for one year only; and every Cossack might be chosen to any post, including the supreme one of Attaman or Hetman. This organization they have in great measure retained, though the office of Hetman was abolished by the Emperor Nicholas, except as a title hereditary in the imperial family. There have been two main branches of the C.—the Malo-Russian and the Don C. To the first belonged the Zaporogian C., those dwelling near the *Porogi* or falls of the Dnieper. From them again are descended the Tschernomerian C., those of the Kuban Valley and of Azov. From the Don C. spring those of the Volga or of Astrakhan, of the Terek Valley, of Orenburg, of the Ural, and of Siberia. They furnish a large and valuable contingent of light cavalry to the Russian army, and are very patient

of fatigue, hunger, thirst, and cold. The Don C. give name to a province with an area of nearly 60,000 square miles, and a population of over a million inhabitants (of whom 20,000 are Kalmucks). Though the C. have generally been represented in the west of Europe as little better than fierce savages, they have left a very favorable impression on those who have dwelt amongst them. Jonas Hanway found them in 1743 'a civilized, and a very gallant as well as sober people;' and many more recent travelers agree in asserting that the C. are in intelligence, cleanliness, refinement, and enterprise greatly the superiors of the average Russians. See Springer, *Die Kosacken* (1877), Wallace Mackenzie's *Russia* (1877), and an article in the *Geographical Magazine* for 1878.

COSSIMBAZA'R (*Cossim's market*), stands on the Bhagirathi, which is the first or most westerly offset of the Ganges, and is the river port of Moorshedabad. It was once famous for its silk manufactures. Pop. about 4000.

CO'SSUS. See GOAT-MOTH.

COSTA, ISAAC DA, an eminent poet and religious writer, was born at Amsterdam, January 14, 1798. His parents were Portuguese Jews, who had settled in Holland. The first aspiration of his poetical genius having been shown by his Hebrew teacher to Bilderdijk, the latter expressed himself favorably regarding it, and a warm and lasting friendship sprang up between him and Costa. In his twentieth year, C. acquired the degree of doctor at law; and shortly after, having embraced Christianity, was baptized. This subjected him to considerable persecution, which, however, subsided as his genius gradually gained recognition. The most interesting of his writings to the British public are probably his translation of Byron's *Cain*, his *Israel and the Gentiles*, and *Harmony of the Gospels*, the last two of which has been translated into English As a public lecturer, C. specially excelled. His *Battle of Nieuwpoort*, the last of his poems, is one of his masterpieces. He died April 28, 1860.

COSTA, SIR MICHAEL, a very popular musician and composer, was born at Naples, February, 1810. As he early showed a decided talent for music, he was sent to the Conservatoire in his native city for education, where he greatly distinguished himself. In 1828, his fame, though he was then but 18, having reached England, he was invited to take part in the Birmingham Musical Festival, an invitation he complied with; and he was so well received in this country that he resolved to settle in it. In 1830 he was appointed conductor of the music in the Italian Opera, London, an office which, in 1847, he resigned for a similar one in the Royal Italian Opera, Covent Garden. His great work, the oratorio *Eli*, produced at the Birmingham festival of 1855, raised him to a high rank as a composer. *Naaman*, first sung in Birmingham in 1864, was a great success. He was knighted by Queen Victoria in 1869; and, in the same year, received the Royal order of Frederick from the king of Würtemberg, in token of his Majesty's admiration of *Eli*, performed under the composer's direction at Stuttgart the previous November. C. is the author of several ballets, and of some operas, the most successful of which was *Don Carlos*.

CO'STA RI'CA, the most south-easterly state of Central America. It occupies the entire breadth from sea to sea between Nicaragua on the one side and New Granada on the other, stretching in N. lat. from 8° to 10° 40′, and in W. long. from 83° to 85°. With an area of 26,000 square miles, it is estimated to contain (1880) 185,000 inhabitants. The country is generally mountainous—more so on the north-east than on the south-west—with many volcanoes, the temperature becoming mild and salubrious in proportion to the elevation. It yields gold and silver, tobacco, sarsaparilla, indigo, sugar, cocoa, and dye-woods.

The principal staples, however, of foreign trade are coffee, hides, and cedar. These are exported chiefly from Punta Arenas, on the Gulf of Nicoya, an inlet of the Pacific Ocean. The other places of any note are San José, the capital, and the cities of Cantago, Alajuela, Eredia, Estrella, and Esparsa. The government is republican, the president being elected every four years. A notorious fillibuster, William Walker, put Costa Rica, some years ago, to much trouble commercially and politically. Estimated revenue in 1880–81, £475,000. In 1880, the imports amounted to £600,000, the exports to £750,000. The exports consist chiefly of coffee, of which upwards of 24,000,000 lbs. were exported in 1880. A railway from the Atlantic to the Pacific, by way of San José, is being constructed.

COSTE'LLO, LOUISA STUART, a voluminous English authoress, was born in 1815. Her first production, at least of any note, was *Specimens of the Early Poetry of France* (1835), but it was as a tourist she gained the greatest popularity. The works in which she describes her traveling-trips are—*A Summer amongst the Bocages and the Vines* (1840); *A Pilgrimage to Auvergne*, &c. (1842); *Béarn and the Pyrenees* (1844); *The Falls, Lakes, and Mountains of North Wales* (1845); and *A Tour to and from Venice by the Vaudois and the Tyrol* (1846). Miss C. also wrote several novels, the principal of which are *The Queen-mother* (1841), and *Jacques Cœur, the French Argonaut* (1847). In 1853, she published a work of a professedly historical character, entitled *Memoirs of Mary, the Young Duchess of Burgundy;* and in 1855, another of the same kind, *Anne of Brittany*. Miss C. wrote in a very pleasant and picturesque style. She died in 1870.

CO'STER, LAURENS JANSZOON, according to the Dutch, the inventor of printing, was born at Haarlem about the year 1370. The time of the invention ascribed to him must have fallen between the years 1420 and 1426. C., at first for his own amusement and the instruction of his grandchildren, cut letters out of the bark of the beech-tree, which he inverted, and employed to print short sentences. Afterwards, he discovered a more glutinous kind of ink, which did not spread in using, and succeeded in printing with it entire pages with cuts and characters. He also replaced his wooden types by types cast out of metal, at first using lead for this purpose, but afterwards pewter, which he found harder and more suitable. C., for a time, worked in secret, because, he being a sacristan, his art, if known, would have brought him into unpleasant collision with the manuscript-writing clergy, whose productions he tried to imitate, even to the abbreviations; thus his name did not appear on the productions of his press. As custom increased, C. had to take apprentices; and one of them, a German, Johann, making use of the confusion occasioned by C.'s death in 1439, is said to have purloined the greater part of his master's types and matrices, and to have fled to Mainz, where he brought the hidden art to light. This Johann was probably Johann Gänsfleisch, a member of the Gutenberg family.

Such, at least, is the history of the invention of printing as given by the Dutch, and which they support by the testimony of Hadrianus Junius, the historian of the states of Holland, who, in his account of the discovery, states that, at the time he wrote, C.'s descendants were in possession of drinking-cups made out of the remains of the types which C. had used. Moreover, a celebrated printer of Cologne, Ulrich Zell, deceased about the year 1500, is said to have declared 'that Gutenberg, *his master*, had derived his art from Holland, after the model of a *Donatus* printed there.' Now, a Donatus of C.'s time still exists; it was produced in 1740 by Johannes Enschedé, also a celebrated printer of Haarlem; and no sooner had his discovery been made known in Meerman's *Origines Typographicæ*, than fragments of the same work appeared in such quantities, that no one could any more aver that this early monument of imperfect typography, mostly printed from indisputably Dutch types, had been struck off from Gutenberg's press. Gutenberg's works even now, are models of impression; those ascribed to C., *at first printed on one side only*, are the first proofs of a beginner. Then, all the characters of the oldest Dutch printed books resemble the Dutch handwriting of the first half of the 15th c., a proof of the independent nature of the attempts towards imitating manuscripts for sale. Other evidences are given by the Dutch that C. was the true inventor of printing; the most eminent advocates of his claims being Meerman, Koning, Scheltema, Van Westreenen van Tiellandt, De Vries, Schinkel, Noordziek, Ebert, Leon de Laborde, Paul Lacroix, and Bernard. Yet the most thorough going assault on the claims of C. and of Haarlem, as being founded on local legends, was made in 1870 by a Netherlander, A. von der Linde. In the townhouse of Haarlem, the typographical remnants of the productions ascribed to C. are preserved. See PRINTING; and for the German account of the invention, GUTENBERG. As for C. his memory still is held in due honor by the town of his birth; the site of his house is still pointed out with pride; and monuments to his memory have been erected.

CO'STMARY (i. e., *cost*, or aromatic plant, of the Virgin Mary), or ALE-COST (*Balsamiti vulgaris*), a perennial plant of the natural order *Compositæ*, sub-order *Corymbiferæ*, a native of the south of Europe, which has long been cultivated in gardens in Britain for the agreeable fragrance of the leaves. The root-leaves are ovate, of a grayish color, on long footstalks; the stem is 2—3 feet high; the stem-leaves have no footstalk; the small heads of flowers are in loose corymbs, deep yellow. The leaves were formerly put into ale and negus, and are still used by the French in salads.

COSTRO'MA. KOSTROMA.

COSTS, the technical name in English law for the expenses incurred in legal proceedings. As a general rule, the C. of the successful party are paid by the loser, but the rule is subject to important exceptions. 1. A party suing or defending *in formâ pauperis* (to entitle him to which privilege he must swear that he is not worth £5), does not pay C., though he is entitled to receive them if successful. 2. In actions in which the plaintiff recovers damages under 40*s*., he is, in certain cases, not entitled to C., unless the presiding judge certifies that he ought to have them; and in all other cases, he is not entitled to them, if the presiding judge certifies that he ought not to have them. 3. A plaintiff who might have brought his action in the county court, is not entitled to C. if he sues in the higher courts, and recovers not more than £5

in certain actions, or £20 in others, unless the judge who tries the case certifies that it was proper the action should have been brought in the higher court. 4. A party who is successful in the main, and therefore entitled to the 'general costs,' may be unsuccessful upon some minor point, and therefore bound to pay the C. which belong properly to it. 5. A party who has tendered the amount recovered, and who pays the amount into court, and pleads the tender, is not bound to pay costs. 6. The payment of money into court in the course of an action relieves the party paying from C. of subsequent proceedings, if no greater amount be ultimately recovered.

C. formerly used to be given neither to nor against the crown, either in its fiscal, public, or private capacity; but by 18 and 19 Vict. c. 90, and 23 and 24 Vict. c. 34, the crown is now entitled to C., and bound to pay C. in the same way as a private suitor.

C. are taxed (i. e., the items allowed or disallowed) by the officer of the court appointed for the purpose under the name of the master. When so ascertained, they are, if in favor of the plaintiff, included in the amount for which judgment is given, if it be in his favor, and recovered as part of it. If they are in favor of the defendant, they are recovered as a judgment in his favor; and any party may have, if he chooses, his own attorney's or solicitor's bill taxed by the same officer before paying it, or even after payment in certain cases.

In criminal cases, the prosecutor's C. may be allowed by the judge, and in that case are paid out of the county rates, the county being reimbursed by the Treasury.

In Chancery suits, C. are, in the discretion of the court, given as a general rule to the successful party; but when the suit was properly instituted, and was of the nature of an administrative suit, C. are often given out of the estate.

C., in Scotland, are called Expenses (q. v.). See also AUDITOR OF THE COURT OF SESSION.

COSTU'ME (Ital. *costume;* Fr. *coustume, coutume,* from Lat. *consuetudo,* use and wont) is another form of the word custom, and, in its wider sense, signifies the external appearance which the life of a people presents at a particular epoch of its history. In its narrower and more usual sense, C. signifies the customary modes of clothing and adorning the person, in any particular age or country. In this sense, it includes the prevailing fashion in jewelry, weapons, and other personal equipments. In both senses, C. plays an important part in art. The poet, more especially the narrative or epic poet, is compelled to resort to it as a means of carrying his reader back into the age which he describes. Homer has it constantly in view in narrating the exploits of his heroes. Amongst modern romance writers, Sir Walter Scott has introduced the fashion of perhaps an excessive attention to mere external costume. But it is in art as presented to the eye, that C. becomes indispensable, and the loose and general treatment of it which is permitted to the novelist or the poet, is forbidden to the painter, the sculptor, and the player. How sorely the sculptor has been tried by the wigs and breeches of former generations, by the trousers, straps, hats, and other monstrosities of our own, no one who has seen a statue of Frederick the Great, or of the late Sir Robert Peel, can require to be told. Two means, not of solving but of escaping from the difficulty, have been largely resorted to: the one consists in departing from the modern dress altogether, and reverting to the ancient toga; the other, in wrapping up the figure, as far as possible, in a cloak. The first of these devices is neither more nor less than a deliberate violation of what artists regard as the laws of C., by which they conceive themselves bound to represent every object with its appropriate accessories; the second, besides being very often open in a lesser degree to the same objection, has the further disadvantage of accomplishing its object very imperfectly. The wisest course for the artist is boldly to face the difficulty. That he may do so successfully, many of the works of Rauch, Tieck, Thorwaldsen, Schadow, and others abundantly testify. In the earlier stages of art, an excessive attention to C. may generally be remarked, which though useless, and sometimes hurtful to artistic effect, has proved of the greatest value for historical purposes. The tendency of the earlier schools of art to exhibit C. with an almost painful accuracy and minuteness, is exhibited in the works of the older masters, both of the Italian and German schools. Even during the period of the highest bloom of Italian art, the medieval custom of representing historical, sacred, and ideal characters in the C. peculiar to the time and country of the artist, was in a great measure adhered to. From Paul Veronese, Tintoretto, and others, we may learn the aspect which a marriage-feast in the palace of a Venetian or Florentine grandee presented, but can form little conception of the C. of that simpler festivity in Cana of Galilee, or of that supper still less sensuous in Jerusalem, which they profess to represent. In the hands of the greater masters, these scenes assumed an ideal character; and in the works of Michael Angelo, Leonardo, and Raphael, C., though still exhibiting something of a native trace, rises into the highest regions of poetical conception. The effort to avoid anachronisms by a previous historical and antiquarian study of the subject, belongs, indeed, almost entirely to the modern European schools of art, and many painters of late have devoted themselves to it to such an extent as almost to forget that it is a means, and not an end, except, indeed, to a mere painter of clothes.

But it is in theatrical representations that attention to C., particularly in its narrower sense, becomes most imperative. When the stage, in Western Europe, commenced in the religious mysteries of the middle ages, the dress adopted was that which belonged to the time and the country. To this dress some fantastical object was generally added to indicate the character intended to be personated. In this position matters remained during the time of Shakspeare in England, of Lope de Vega and Calderon in Spain, and even of Corneille, Racine, and Molière in France. Whether a Greek, a Roman, an Assyrian, or a Turk was represented, the ordinary court-dress of the time was adhered to, and the turban, the helmet, or the laurel crown was placed on the top of the peruke or the powdered hair. In like manner, shepherdesses and peasant-girls had their hair dressed in turrets like feudal keeps, and long white kid-gloves which covered their hands and arms to to the elbow. Towards the middle of the 18th c., a reform was introduced by the famous actress Clarion, who acted Electra without hairpowder; but Talma was the first who introduced a C. really true to history. Garrick followed in the footsteps of the great Frenchman, though both he and Siddons, during their earlier period, personated the characters of Shakspeare in what has been called the rococo C.—knee-breeches and periwigs. Schlegel's *Hermann,* and Goethe's *Götz von Berlichingen,* were the first plays which were given in Germany with historical costume.

CO'STUS, or COSTUS ARA'BICUS, an aromatic much esteemed by the ancients, and concerning which great doubt long existed, but which seems now to be ascertained to be the dried root of *Auclandia Costus,* a plant of the natural order *Compositæ,* sub-order *Cynarocephalæ.* It is a native of the moist open slopes surrounding the valley of Cashmere. The roots are there burned as incense. They have a strong aromatic pungent odor, and are employed in protecting bales of shawls from moths.

CO'SWAY, RICHARD, a very noted painter in his day, was born at Tiverton, Devonshire, in 1740. He early displayed a taste for painting, and between his 14th and 24th year carried off five premiums from the Society of Arts. As a miniature-painter, he was particularly famous, and gained all the patronage of the nobility of his time. His works, in fact, were the fashion, and all attempts at rivalry were useless. Many of them were distinguished by great delicacy, correctness, and beauty, and his drawings were not unworthy of a place beside some of the old masters. The immense sums of money he made enabled him to live in the most sumptuous style, and to give musical-parties (his wife on such occasions being the principal performer), so far surpassing all other efforts of the kind that they formed a feature of the time, and were attended by all the rank, fashion, and intellect of that day. C. died in 1821.

COT, on shipboard, is an officer's hammock. It is made of canvas, in the form of a kind of chest, six feet long, two and a half wide, and one deep. This receptacle is kept out at full length by means of a square wooden frame. The bed or mattress is placed within the C.; and the arrangement is more comfortable than that of a sailor's hammock; but both are alike slung from the rafters or beams of the cabin.

COTE-D'OR, a department in the east of France, formed of part of the old province of Burgundy, in lat. 46° 55′—48° 10′ N., long. 4° 2′—5° 30′ E. It has an area of 3350 square miles, with a population, in 1881, of 380,548. The surface is in general rather elevated, and is traversed by a chain of hills forming the connecting-link between the Cevennes and the Vosges. A portion of that range, called the Côte-d'Or ('golden slope'), receives its name (which it gives to the department) on account of the excellence of the wines produced on its declivities. See BURGUNDY WINES. A great part of the department is covered with forests. The valleys and plains are fertile, and there is good pasture-land; but agriculture is in a backward state. C. is watered by the Seine, which rises in the north-west, and by several of its affluents; by the Saone, and by the Arroux, a tributary of the Loire. By means of canals, C. has water-communication with the German Ocean, Mediterranean, English Channel, and Bay of Biscay. The climate is temperate; iron, coal, marble, gypsum, and lithographic stones are found, the first in large quantities. C. is divided into four arrondissements; viz., Beaune, Châtillon-sur-Seine, Dijon, and Semur, with Dijon for a capital.

COTES, ROGER, a scientific man of much promise, was born at Burbage, near Leicester, July 10, 1682; but death cut him off on the high-road to fame ere he had attained his thirty-fourth year; not, however, before he had left some marks of his presence in the history of exact science. He was the author of the admirable pref-

ace explaining the Newtonian philosophy, and answering objections to gravitation, which was prefixed to the second edition (1713) of Newton's *Principia*. Various mathematical papers of his own, tending greatly to the development of logarithms, were published after his death. Short as his lifewas, his influence on mathematics is clearly traceable. He was held in the highest esteem by the scholars and scientific men of his time; and Sir Isaac Newton is asserted to have said of him that, had he lived, 'we should have known something.'

COTES-DU-NORD (northern coasts), a department in the northwest of France, forming a part of Bretagne, and bounded N. by the English Channel, in which are several small islands belonging to C.; lat. 48° 3′—48° 57′ N., long. 1° 53′—3° 35′ W.; area, 2650 sq. m.; pop. (1881) 619,632. The Armoric Hills, called also the Montagnes Noires, and the Menez Mountains, cross the department from east to west. They have a breadth of about sixteen miles, and consist chiefly of granite and clay-slate. These formations give a rude and broken aspect to the coast. The chief rivers, which are short but navigable, are the Rance, Gouet, Trieux, Guer, and Arguenon.

The southern district has the advantage of a considerable length of the canal between Nantes and Brest. Though a great portion of the south and the higher plains is occupied by heath and woods, there are, here and there, fertile spots; and in the north the influence of the neighboring sea is favorable to vegetation. The cultivation of flax and hemp, with pasturage and iron-mining, supply employment in the mountainous districts; while in the sheltered valleys and on the coast-levels all European kinds of grain, with pears and apples and other fruits, are produced; and maize is cultivated, but does not always ripen. The coasts are well supplied with various kinds of fish. The department is divided into the five arrondissements of St. Brieuc, Dinan, Loudéac, Lannion, and Guingamp. The chief town is St. Brieuc.

CO'TESWOLD, or COTSWOLD HILLS, a range of oolitic and lias hills, running through the middle of Gloucestershire, from Chipping Camden in the north-east, by Cheltenham and Stroud, to near Bath in the south-west. They are parallel to the Avon and Severn and separate the lower Severn from the sources of the Thames. They are 45 miles long, and in some parts 8 broad, and cover 312 square miles, with an average height of 500 to 600 feet. The highest points are Cleave Hill, 1134 feet, and Broadway Hill, 1086 feet. The soil is a clayey loam, with gravel and stone-brash. The surface is generally bare, with little wood; corn, turnips, and sanfoin are grown, and coarse-woolled sheep fed on them. At Stroud, they are crossed by the Thames and Severn Canal, and the Swindon Junction Railway.

COTHEN, or KOTHEN, an ancient town in the duchy of Anhalt, on a tributary of the Saale. Sugar from beetroot is largely manufactured here; spirits are distilled; and there is a trade in wool and corn. Brown coal is found in the neighborhood. Pop. (1880) 16,155.

COTHU'RNUS. See BUSKIN.

COTICE, or COST, in Heraldry, one of the diminutives of the Bend (q. v.).

COTI'LLON (Fr., under-petticoat), the name of a brisk dance, of French origin, performed by eight persons. The quadrille, which superseded it, is only a new variety of the cotillon.

COTINGA (*Ampelis*), a genus of birds of the family *Ampelidæ*, or Chatterers (q. v.), having a rather feeble and deeply-cleft bill, and feeding both on insects and fruits. They are natives of South America, inhabit moist places, and are remarkable for the splendor of the plumage of the males during the breeding season. Azure and purple are then their prevalent colors. During the rest of the year, they are clothed in a tame gray or brown.

COTONEASTER, a genus of plants of the natural order *Rosaceæ*, sub-order *Pomoceæ*, having polygamous flowers; a top-shaped calyx, with five short teeth; five small, erect petals; erect, short stamens; and a top-shaped fruit, the nuts of which adhere to the inside of the calyx, but do not cohere in the center. The species are pretty numerous, shrubs or small trees; some of them evergreen; with simple undivided leaves, more or less woolly beneath; small flowers in lateral cymes; and small fruit not agreeable to the palate, but the bright color of which, and its remaining on the tree in winter, make them very ornamental. *C. vulgaris* is a deciduous species, a native of hills in Europe and Siberia, and said to be found wild in a single locality in Wales. *C. tomentosa* is also found in the Alps. Most of the species are natives of mountainous parts of Asia; they are sufficiently hardy for the climate of Britain, and have become among the most common of our ornamental shrubs. Some of them, as *C. rotundifolia* and *C. microphylla*—both from the north of India—are much used for covering walls.

COTOPA'XI, the loftiest active volcano in the world, is in Ecuador, in the eastern chain of the Andes, and about fifty miles south of the equator. Humboldt gave the height at 18,880 feet; Reiss, the first to ascend it (in 1872) found it to be 19,500 feet above the sea. The valley at its foot, however, is itself 9000 feet high. The upper part of C., a perfect cone of 4400 feet, is entirely covered with snow, save that the verge of the crater is a bare parapet of rock. Whymper, who ascended in 1880 to the edge of the crater, gives the height as 19,600 feet. Below the snow is a well-marked barren belt covered with lichens and shrubs, below which again is forest. Smoke issues from the summit; sounds as of explosions are occasionally heard; and above, a fiery glow is often visible by night. Lava rarely flows even during eruptions, but flame, smoke, and immense volumes of ashes are then ejected; and when the heat melts large masses of the snow lying on the sides, destructive floods are occasioned in the valleys beneath. The first eruption recorded was in 1533. Others followed in 1698, 1743, 1744, and 1768, the most terrible of all. On the latter occasion ashes were carried 130 miles distance, and thickly covered an extensive area. C. was quiet till 1851. In 1854, 1855, and 1856 there have again been eruptions of more or less violence.

COTRO'NÉ, a town of Italy, in the province of Catanzaro, built on a point of land projecting into the sea, in lat. 39° 7′ N., long. 17° 10′ E. It is almost surrounded by the Esaro (ancient Æsarus), which here has its embouchure. C. is very strongly fortified. Its streets are dark and narrow, and its port of no importance; pop. above 7000. C., however, possesses interest from its antiquity and its historic associations. It owes its origin to a colony of Achæans, as far back as 710 B.C., its ancient name being Croton or Crotona. It soon became prosperous, wealthy, and powerful. Its walls measured 12 miles in circumference, and the territory over which it extended its sway was considerable. Its inhabitants were celebrated for athletic exercises, and they carried off most of the prizes at the Olympic games. Milo was its most renowned athlete. Pythagoras settled here about the middle of the 6th c. B.C.; but the influence which, by means of a league of his formation, he exercised, became obnoxious to the citizens, and he was expelled. About 510 B.C., C. sent forth an army of above 100,000 men to fight the Sybarites, who were utterly defeated, and their city destroyed. The war with Pyrrhus completely ruined the importance of C., and in the 2d c. B.C. it had sunk so low, that a colony of Romans had to be sent to recruit its well-nigh exhausted population. It never afterwards recovered its prosperity. Some ruins belonging to the old, exist in the vicinity of the modern city, the most important of which is a Doric column, part of a once magnificent temple to Juno, on Cape Colonne or Nau (the Naus of the ancients).

COTTA, the name of a very old German publishing-house, established at Tübingen in 1649, and still one of the most flourishing in Germany. The family came from Italy about the beginning of the 15th century. Its most prominent member was Joh. Friedr., Freiherr von C., a meritorious theologian of the 18th century.

JOH. FRIEDR., FREIHERR VON C., one of the most eminent publishers that Germany ever produced, was born at Stuttgart, 27th April 1764. He was educated at the university of Tübingen, and for some time practised as an advocate. In 1787, he undertook to conduct the family book-trade at Tübingen, and in 1795 he established the *Horen*, a literary journal, under the editorship of Schiller. In the same year, he commenced two larger periodicals, the *Politischen Annalen*, and the *Jahrbücher der Baukunde*. In 1798, he established the *Allgemeine Zeitung*—still published at Augsburg—the *Almanach für Damen*, and other works of a similar kind. C. now began to publish the works of the illustrious modern authors of Germany, such as Goethe, Herder, Fichte, Schelling, Jean Paul, Tieck, Voss, Therese Huber, Matthisson, the Humboldts, Joh. von Müller, and Spittler.

Besides the periodicals already mentioned, C. established the *Morgenblatt* and the *Literaturblatt*, and carried on the *Kunstblatt*, founded by Schorn. In 1810, he went to live at Stuttgart. The nobility of his family, which dated far back, was confirmed in his person under the title of Freiherr C. von Cottendorf. In 1824, he introduced the first steam-press into Bavaria, and, shortly after, founded at Munich the Literary and Artistic Institute. He died 29th December 1832. C.'s political principles were liberal, but temperate. In the diet of Würtemberg, and afterwards as president of the Second Chamber, he was always the fearless defender of constitutional rights. In manners, C. was simple and pure; and although covered with titles and orders from different governments, he had neither the pride nor the selfishness of a hereditary patrician. The first Würtemberg proprietor who abolished servitude on his estates, C. also furthered the interests of his farmers by building model-farms, and by setting an example in all rural improvements.

CO'TTAGE, a small dwelling-house, detached from other buildings, and usually of one story in height. Originally applied to a humble order of dwellings in the country, the term C. now embraces a wide variety of structures, from the cottage *orné* of the

French, to the simple but not unattractive cabin in the English rural districts, and the mountain *chalet* of Switzerland. In England, where universal security enables the people to establish dwellings in retired and picturesque situations, the building of cottages has been brought to great perfection; and it may be said with truth, that in no country in the world are there to be seen such a variety of beautiful cottages, scrupulously clean and neat in the interior, and ornamental exteriorly with flowers, shrubs, and bright green lawns. The different styles in which this class of houses may be built, are well described in the elaborate work of J. C. Loudon, on *Cottage Architecture*. The subject of proper C. accommodation, as regards the laboring peasantry of England and Scotland, has lately engaged serious attention. See papers in the *Transactions of the National Association for the Promotion of Social Science*. The best methods of keeping cows, pigs, poultry, bees, &c., are ordinarily described under the comprehensive title of C. economy. See Cobbett's *Cottage Economy*, also *Chambers's Information for the People*.

CO'TTBUS, or KO'TTBUS, a town of Prussia, in the province of Brandenburg, situated on the Spree, about 70 miles south-east of Berlin. It is an ancient place, surrounded by walls, and it has an old castle with towers, a royal palace, a gymnasium, and manufactures of beer, woollens, linen, leather and tobacco. Pop. (1880) 25,584.

COTTIN, SOPHIE, a very popular French authoress, was born at Tonneins (Lot-et-Garonne) in 1773. Her maiden name was Ristaud. Educated at Bordeaux, she was married when only 17 to M. Cotton, a Parisian banker, who left her a widow at the age of 20. From an early period she had exhibited a love of literature; and to cheer the solitude of her affliction (for she had no children), she now betook herself to the composition of verses, and even ventured on a lengthy history. But it was in fiction she was destined to win unfading laurels. In 1798, appeared *Claire d'Albe;* in 1800, *Malvina;* in 1802, *Amélie Mansfield;* in 1805, *Mathilde;* and in 1806, *Elizabeth, ou les Exilés de Sibérie*, a work which has been translated into most European languages, and has always been extraordinarily popular with the young. Madame C. died 25th August 1807.

CO'TTON, an important vegetable fibre, extensively cultivated in various parts of the globe within the 35th parallels of latitude.

1. *Botanical and Commercial Classifications.*—C. is the produce of all the species of the genus *Gossypium*, which belongs to the natural order *Malvaceæ*, and is thus allied to Mallow, Hollyhock, Hibiscus, &c., the general resemblance to which is very apparent both in the foliage and flowers. The species are partly shrubs, partly herbaceous, and either perennial or annual; they are natives of the tropical parts of Asia, Africa, and America, but their cultivation has extended far into the temperate zones. They all have leaves with three to five lobes, which, in a very young state are often sprinkled with black points, and rather large flowers, which are mostly yellow, but sometimes in whole or in part purple; the flowers very soon fall off; they grow singly from the axils of the leaves, and are surrounded at the base by three large, heart-shaped, cut or toothed, involucral leaves or bracts, partially growing together as one. The fruit is a 3—5-celled capsule, springing open when ripe by 3—5 valves, and containing numerous seeds enveloped in C., which is generally white, but sometimes yellow, and issues elastically from the capsule after it has burst open. The figure represents a species of C. plant found in India, and shows the manner in which the C. escapes from the capsule. Some of the other kinds have the flowers larger in proportion, and the leaves divided into more numerous and much deeper and narrower lobes, but the general appearance of all is very similar.

Cotton (*Gossypium tricuspidatum*).

Difference of opinion exists amongst botanists as to the number of distinct species, and there are very many varieties in cultivation, the number of which, through climatic influences and other causes, is continually increasing; but there are certain leading peculiarities on account of which some botanists and practical farmers reduce all, at least of the cultivated kinds, to four primary species—viz., 1. *Gossypium Barbadense;* 2. *G. Herbaceum* or *Indicum;* 3. *G. Peruvianum;* and 4. *G. Arboreum*. The produce of the first species is the most valuable. The beautiful long-stapled silky wool known as 'Sea Island' is a variety, and is grown exclusively upon the islands and a portion of the mainland of Georgia, South Carolina, and Florida; the saline ingredients of the soil and atmosphere being indispensable elements of the growth. The plant bears a yellow flower, and the seeds are small, black, and quite smooth, and the wool is easily separated therefrom; but when sown far inland, away from the saline influences of the coast, the seeds increase in size, and become covered with innumerable short hairs. A large percentage of the crops raised in Alabama, Louisiana, Mississippi, Texas, &c., are also varieties of this species, though owing to climatic influences, the wool is shorter in staple, and less easily separated from the seeds than Sea Island. The commercial value of the latter kind varies from 1*s.* 5*d.* to 3*s.* per lb., rare specimens sometimes realizing 5*s.* or 6*s.* per lb. The better description of Egyptian cotton belong to *G. Barbadense*, and bring 1*s.* to 2*s.* 6*d.* per lb. in the Liverpool market. The short-staple varieties, known as New Orleans, Mobile, &c., sell at from 5*d.* to 10*d.*, extra qualities sometimes bringing 1*s.* per pound. *G. herbaceum* is found in India, China, Egypt, &c. The principal commercial varieties are those known as Surat, Madras, and short-stapled Egyptian. It is a small shrubby plant, bears a yellow flower, the seeds are covered with short grayish down, and the staple produced, though not long, is very fine. Its price varies from 3½*d.* to 9*d.* per lb. A variety is cultivated in the United States, and the C. known as nankeen is thought to belong to this species. *G. herbaceum* can be profitably cultivated in colder countries than any other species of C. plant. The third species is a native of South America, and the 'green seed' C. of the United States appears to be a variety. The stem reaches 10 to 15 feet in height, the flowers are yellow, and the capsules contain eight or ten black seeds firmly attached together in a cone-like mass. The wool is long and strong-stapled, and in value stands next in order to Sea Island and long-stapled Egyptian. Maranham, Bahia, and Maceio are varieties which sell in Liverpool at from 8*d.* to 1*s.* 2*d.* per lb. *G. arboreum* is found in India, China, &c., and, as its name imports, is a large tree-like plant. It bears a red flower, and produces a fine yellowish-white wool. Varieties of it have been long cultivated in the United States, and with the requisite soil and climate, are said to produce a wool somewhat resembling Sea Island.

2. *Cultivation.*—The plant is a very delicate organism, and requires a peculiar soil and climate for its due development. The method of cultivation is much the same in the various countries where the fibre is grown; but the most perfect system is that which obtains in the United States of America. Although the plant is not, strictly speaking, an annual, it is found more profitable to destroy the shrub, after the crop is gathered, and sow new seed every year. The preparation of the land takes place during the winter-months. After the ground has been thoroughly ploughed, and as soon as all symptoms of frost have disappeared, the soil is laid off into rows varying in width from 3 to 4 feet, according to the situation and quality of the soil. The seed is then sown along the center of the beds in a straight furrow made with a small plough or opener; but in some plantations the seed is sown in holes from 12 to 18 inches apart. The sowing commences in March, and generally continues through April; but sometimes, owing to late spring frosts, the planting is prolonged to May. The young shoot appears above ground in about eight to ten days, and is then and subsequently weeded and thinned. Blooming takes place about the beginning of June—in early seasons, towards the latter end of May; the average date is about June 5. As a general rule, C. is a dry-weather plant. For ploughing, the planter requires just sufficient rain to give the soil a moist and spongy texture. During the early stages of its growth, the crop flourishes best with a warm steamy sort of weather, with an occasional shower until blooming; too much rain being productive of weeds and wood at the expense of wool, whilst a severe drought produces a stunted plant, forced into too early maturity, and resulting in a small and light-stapled crop. A great deal, however, depends upon the position of the plantation; lands situated in hilly or upland districts obviously requiring more moisture than those lying in the plains and river-bottoms. From the date of blooming to the close of the picking season, warm dry weather is essential. Picking generally commences in August, occasionally in July, and continues until the occurrence of frost—about the end of October or beginning of November—puts a stop to the further growth of the plant. All the available hands of the plantation, young and old, are called into full employment during the harvest. The C. is gathered into baskets or bags suspended from the shoulders of the pickers, and when the crop has been secured, it is spread out and dried, and then separated from the seeds. The latter process was formerly performed by hand—a tedious operation, by which one hand could clean only a pound or so a day; but since the invention of the saw-gin, by Eli Whitney in 1793, the process of cleaning has been both rapid and effectual.

This machine is composed of a hopper, having one side formed of strong parallel wires placed so close together as to exclude the passage of the seeds from within. The wool is dragged through the apertures by means of circular-saws attached to a large roller, and made to revolve between the wires, the seeds sinking to the bottom of the hopper. This process is adopted only in cleaning the short-stapled varieties of American C., the seeds of which adhere so firmly to the wool as to require a considerable amount of force to separate them. The Sea Island variety is cleaned by being passed through two small rollers, which revolve in opposite directions, and easily throw off the hard smooth seeds. In India, though the saw and other machine-gins have been introduced in some districts, the wool is mostly cleaned by means of a primitive roller. Both descriptions of gins are used in Egypt and Brazil. The C. cleaned by the roller-gin, being uninjured thereby in staple, realizes the better price; but the deterioration caused by the saw-gin is compensated for by the greatly increased quantity cleaned; the latter turning out four or five times as much work as the former in an equal space of time, and thereby considerably reducing the expense of cleaning. The introduction of improved gins has very largely increased the production of cotton in Egypt and Brazil during the past fourteen years.

3. *Production and Distribution.*—The oldest C.-producing country is India, in which empire the plant has been grown and manufactured from time immemorial. Early mention is also made of it in the annals of Egypt, and it is believed to have a high antiquity in all parts of Africa. In the western world, it was found by Columbus, but was not so extensively cultivated as in the East; though during the past half-century the culture there has outstripped, both in quantity and quality, the produce of the Old World. Down to the commencement of the present century, the C. consumers of Europe were dependent upon the East and West Indies and the Levant for their raw material; but the inventive genius, superior farming, and greater energy of the planters of the Southern States of America, had, prior to the civil war, almost secured the monopoly of supplying the manufactures of Great Britain and the European continent with this valuable fibre. The average import of American cotton into Great Britain in 1858—1860 reached 79 per cent. of the entire arrivals; during the war the proportion fell to 3½ per cent.; but in 1871, it rose to 58 per cent. We will glance briefly at the history of the trade of the chief C.-growing countries.

United States.—The introduction of the plant is traced as far back as 1536, but the export trade did not commence until two and a half centuries later, the first shipment of importance being about 2000 lbs. in 1770. In 1791, the amount reached 189,316 lbs. In 1793, the invention of the saw-gin gave a new stimulus to the trade, and in 1800, the exports reached 17,789,803 lbs.; from which period the shipments have continued to increase, being over 124,000,000 lbs. in 1821, to 277,000,000 lbs. in 1831, 530,000,000 lbs. in 1841, 927,000,000 lbs. in 1851, and about 2,160,000,000 lbs. in 1860. Simultaneously with this rapid increase in production, there was, down to 1851, a gradual decline in the price of the wool, in consequence of improved processes of cultivation and cleaning, and the cheapening of carriage, &c.; the average price in Liverpool, in 1793, being 1*s.* 6*d.* per lb.; in 1801, 2*s.* 2*d.*; in 1811, 1*s.* 2*d.*; in 1821, 9½*d.*; in 1831, 6*d.*; in 1841, 6¼*d.*; in 1851, 5¾*d.* per lb.; from which period, however, the downward course was not only checked, but a movement in the opposite direction commenced, the average for 1856—1861 being 7*d.* per lb.; the low prices current having caused consumption to overtake production. The outbreak of the civil war in 1861, and its continuance until 1865, completely revolutionized the industry of the South. The abolition of slavery added materially to the cost of producing cotton; and this circumstance, along with the general rise which has taken place in values of all kinds during the past twelve or fifteen years has raised the price at which it will pay to sell American cotton in Liverpool to nearly 8*d.* per lb., against an average of 7*d.* per lb. for the five years ended with 1861. During the war, middling Orleans touched 2*s.* 7½*d.* per lb. In 1867 (December), there was a decline to 7⅜*d.*—every one expecting a return of old prices; within a few months there was a reaction to 1*s.* 1*d.* Since then the tendency has been downwards; the average for 1875 being 7⅜*d.*, against 8*d.* in 1874, and 9*d.* in 1873.

The following table is interesting as showing the wide fluctuations which have taken place in the exports of cotton from the United States during the 12 years ending in 1871 expressed in millions of lbs.

	Weight, lbs.	Average Price, cents.		Weight, lbs.	Average Price, cents.
1859—60.....	1767·6	10·85	1865—66....	650·6	43·24
1860—61.....	307·5	11·07	1866—67....	661.5	30·1
1861—62.....	5·0	23·30	1867—68....	784·3	19·2
1862—63.....	11·4	58·43	1868—69....	644·3	24·9
1863—64.....	10·8	83·43	1869—70....	900·4	23·4
1864—65.....	6·6	86·58	1870—71....	1462·9	14·8

In 1871—1872 there was a reduction to 933,000,000 lbs., owing to a failure of the crop. In 1874—1875 the weight exported was about 1,178,700,000 lbs.; in 1878–79, 1,628,400,000 lbs., and in 1879–80, 1,822,000,000 lbs.

STATEMENT OF THE PRODUCTION, DISTRIBUTION, AND AVERAGE PRICE OF FIFTY CROPS (1826—75) OF AMERICAN COTTON, ACTUAL AND PROPORTIONAL, IN AVERAGE PERIODS OF FIVE YEARS EACH (EXPRESSED IN THOUSANDS OF BALES).

Periods of Five Years.	Average Produce of							Average Total Crop.	Proportional Produce of							Average Exports to				Average Consumption of the U. S. (*N. of Virginia, only*).	Average Stock at close of Season.	Total Average Deliveries.	Proportional Distribution of Total Average Deliveries.				Average Price p. lb. of Whole Crop.	
	Georgia *via* Savannah.	S. Carolina *via* Charleston	N. Carolina and Virginia.	Florida *via* Apalachicola, &c.	Alabama *via* Mobile.	Louisiana, Miss. Ark., Tennessee, and Texas.			Georgia.	S. Carolina.	N. Carolina and Virginia	Florida.	Alabama.	Louisiana, &c.		Great Britain.	France.	Other Foreign Ports	Total.				Great Britain.	France.	Other Foreign Ports.	Consumption of United States.	Five Years.	In 1875
	000's omitted.																										c.	c.
1826—30	216	152	91	4	84	302		849	25¼	17¼	10⅜	¼	9⅞	35¾		539	173	46	758	114	35	872	61⅞	19⅞	5⅜	13	10⅛	9¾
1831—35	252	194	69	29	143	424		1111	22⅝	17½	6⅛	2⅜	12⅜	38⅜		674	202	41	916	193	56	1109	60⅝	18½	3⅜	17⅝	11⅝	9¾
1836—40	267	249	44	96	295	673		1624	16½	15⅝	2⅝	5⅞	18½	41⅜		966	308	88	1362	255	54	1617	59½	19	5½	15½	8⅞	7⅝
1841—45	246	314	28	141	421	874		2024	12½	15½	1⅜	7	20⅝	43⅞		1181	347	172	1700	325	91	2025	58⅜	17⅛	8½	16	5⅛	5⅛
1846—50	285	341	21	161	410	993		2211	12⅞	15½	1	7½	18½	44⅞		1180	308	229	1717	477	163	2194	53⅜	14	10⅝	21⅜	8¼	11
1851—55	338	449	42	168	508	1377		2882	11⅝	15½	1⅛	5⅞	17⅜	47¾		1595	387	323	2305	576	126	2881	55⅜	13½	11⅜	20	9⅝	8¾
1856—60	400	458	63	154	646	1900		3621	12⅝	11	1⅜	4½	17½	52½		1970	464	485	2919	678	119	3597	54⅜	12⅜	13⅞	18⅞	10⅜	10⅜
1866—70	371	192	188	56	314	1299		2430	15⅜	8	7⅜	2⅜	13	53⅝		1234	237	206	1677	798	95	2475	49⅞	9⅜	8¼	32¼	28	23⅜
1871—75	604	375	469	14	329	1939		3730	16½	10	12⅜	⅜	8¼	52		1898	261	507	2666	1062	85	3727	50⅞	7	13⅝	28½	—	—

The figures between 1861—1865 were disturbed by the war. Down to within a few years before the war, the bulk of the crops grown in the various states were shipped at the several ports of each state—Alabama C. at Mobile, Georgia C. at Savannah, and so on; but the more general introduction of railways has diverted a great deal of C. from the old channels. The increase under the head 'N. Carolina and Virginia' is owing almost entirely to this cause. One of the most remarkable features in the last line of the above table is the large proportionate increase in the consumption of the United States.

Cotton seed is remarkably rich in oil, now used for a variety of purposes. The crop of C. seed in the United States amounts to about 3,000,000 tons, or 180,000,000 bushels; in 1881, the oil-mills consumed 180,000 tons in the manufacture of C. seed oil, while less than half of the remainder was used for fertilizers, for seed, and for feeding stock (the balance being totally lost). C. seed cake or

meal is especially rich in nutritious matter for farm-stock, causing cattle to fatten rapidly, and producing very rich milk (though the butter is not improved). Boiled C. seed, with hay or straw, is admirable feeding. The oil is found to be admirable for culinary purposes, and is said to be equal to the best lard.

East Indies.—After the United States, the most extensive C. producing country is India. The plant is indigenous to the soil, and the culture and manufacture have existed from prehistoric times. A century ago, the western world was almost entirely dependent upon the east for its C. goods, but within the past one hundred years the order of things has been almost reversed. The mills of Lancashire are now in successful competition with the famed looms of India, and the natives of that vast empire find it cheaper to take our calicoes in exchange for their raw C., than it is to manufacture their own clothing. The first import of East Indian C. into Great Britain took place in 1783. The average receipts, from that year to 1792, were 65,550 lbs.; from 1793 to 1800, 2,223,039 lbs.; 1801 to 1810, 6,357,000 lbs.; 1811 to 1820, 24,016,805 lbs.; 1821 to 1830, 18,835,567 lbs.; 1841 to 1850, 79,815,403 lbs.; and 1851 to 1859, 23,017,310 lbs. In 1820, only 224 pounds-weight of C.-yarn, and 14,191,177 yards of goods, were exported to India; but in 1880, the figures, including shipments *viâ* Suez, were 44,000,000 lbs. yarn, and 1,670,000,000 yards of calico! It is impossible to ascertain the total amount of C. raised in India; but we may observe that the fibre is grown all over the peninsula, and is used for all purposes for which we employ C., flax, wool, and mostly hemp. The following figures will give the reader some idea of the extent of the export branch of the trade; they also show the marvelous expansion incidental to the American war.

WEIGHT AND VALUE OF COTTON EXPORTED FROM INDIA.

	lbs.	£		lbs.	£
1857,	319,653,524	4,437,949	1866,	803,150,424	35,587,389
1860,	345,953,569	5,637,624	1869,	691,196,905	19,778,924
1863,	473,678,421	18,779,040	1872,	809,246,087	21,272,430

Prior to the American war, the supply of C. from India was merely supplementary to that from the United States. With a small crop in America, prices advanced, and the imports from India increased; but with a large American yield, prices drooped, and the receipts from India fell off; the surplus produce finding its way to China, or being consumed in the interior. This is in a measure still the case (as is shown in the above figures), though not to the same extent as formerly. By the introduction of improved methods of cultivation, cleaning, &c., the quality of Indian C. has been greatly improved; and it is now much more generally used than it was twelve or fifteen years ago.

Brazil.—The C. trade of Brazil has undergone a most extraordinary development during the past ten years, owing to the impetus given to the cultivation of the plant during the American war, and to the general adoption of the saw-gin in place of the roller-gin; this substitution of the American gin has produced quantity at the expense of quality; but the demands of fine spinners have been met by increased supplies from Egypt. The subjoined statement shows the progress made by this branch of Brazilian trade:

IMPORT OF BRAZIL COTTON INTO EUROPE.

	Bales.		Bales
1831—1835, average....	175,000	1861—1865, average....	201,000
1841—1845, "	105,000	1866—1870, "	614,000
1851—1855, "	149,000	1871—1874, "	723,000

Egypt.—The C. plant has been known in Egypt from time immemorial; but the trade, properly so called, was first introduced by the celebrated Mehemet Ali, about fifty years ago. The first exportation took place in 1821, and amounted to 944 cantars. During the seven years ending 1827, 1,011,697 cantars were produced, or 144,528 cantars per annum. In the next septennial period, there was a falling off, owing to the withdrawal of a large number of laborers to carry on the wars of the pasha in Soudan, &c., and Syria; the exports therefore only reached 900,521 cantars, or 128,646 per year. The transactions of the subsequent seven years show a considerable improvement, the total shipments being 1,498,042 cantars, and the annual average 214,006 cantars. During the years 1842—1848, the total rose to 1,549,909 cantars, being an annual average of 221,415 cantars. Since then, the trade has continued to augment. The average shipments of the years 1849—1859 were 473,282 cantars. The cantar is equal to 94 lbs., and there are about 5½ cantars to the bale of the present (1873) average size; so that the exports in 1849—1859 represented 86,000 bales per annum. In 1865, the shipments reached 406,000 bales; in 1875 they amounted to 347,000 bales—or 2,020,000 and 1,908,000 cantars respectively. Great Britain is the principal consumer of Egyptian C., after which comes Austria, then France. The following figures show the destination of the C. exported from Alexandria during the six years ending September 30, 1875.

EXPORTS TO

	England.	France and Spain.	Austria and Italy.	Total.
1870	177,631	26,356	26,735	230,722
1871	246,513	14,974	25,391	313,878
1872	274,921	22,577	43,967	341,465
1873	299,062	35,251	50,580	384,913
1874	312,172	54,540	43,545	410,257
1875	273,019	34,644	39,651	347,314

Other Countries.—In addition to the districts just passed in review, C. is grown in numerous other countries. During the infancy of the trade our spinners received 75 per cent. of the C. consumed from the West Indies, and the remainder from the Levant; with the great expansion of the culture in America, the supplies from the West Indies gradually fell off, the planters finding it more profitable to occupy their labor and capital in the production of sugar and other growths. Early in the present century, the imports into Great Britain from the West Indies averaged 80,000 bales per annum; but by 1858 the arrivals had dwindled to 6500 bales, of which only about 2200 bales were from the West Indies, properly so called. Under the stimulus of the high prices which ruled during the C. famine, the supplies from miscellaneous sources—that is, from all countries except the United States, East Indies, Brazil, and Egypt—rose from 6500 bales in 1858, and 9800 in 1860, to 23,000 in 1863, and 131,000 in 1865. With the decline in prices, the import fell to 100,000 in 1868. There was an increase to 166,000 in 1872, owing to the high prices ruling in that year, but the increase was chiefly from Peru. Since that year, with a falling market, the import from 'other countries' has annually diminished, being only 89,000 bales in 1875, against 166,000 in 1872, the decrease, like the previous increase, being principally in Peruvian. Twenty years ago, Peruvian cotton was almost unknown in the Liverpool market; in 1864, the imports reached 27,000 bales; in 1872 they amounted to nearly 105,000 bales; but in 1875 they fell to 56,000 bales.

4. *Consumption.*—Our remarks under this head will be confined to Europe and the United States of America. An immense quantity of C. is consumed annually in India, China, and Africa, but there are no means of ascertaining even an approximation of the amounts so used. There are 11 spinning and weaving mills in Bombay, containing 404,000 spindles, and 4294 looms; and there are 8 mills in other towns of the presidency. 'These,' says an official Report (1873), 'are quite independent of the old native manufactories, and were started entirely in consequence of the inferiority of the piece-goods imported from Manchester.' This inferiority was occasioned by the excessive and deleterious method of sizing adopted during the C. famine, in order to meet the demand for low-priced goods, and is a matter which has lately occupied the serious attention of the Manchester Chamber of Commerce. Besides the mills in the Bombay presidency, factories have also been erected in the Bengal and Madras presidencies; and in the North-west and Central Provinces; a considerable native manufacture is also carried on in Burmah.

Great Britain.—The origin of the C. trade of the continent dates as far back as the 10th c., at about which period the staple was introduced into Spain by the Mohammedans. Since that time the manufacture has continued to expand, more or less, until it has arrived at its present gigantic proportions. Though we have early mention of C. goods in the annals of almost every country of Europe, still the progress of the trade was very slow until within the past one hundred years. Indeed, before the middle of the 18th c., C. goods, properly so called, were never produced—the fabrics manufactured being a mixture of either C. and linen, or C. and wool, C. yarn being used for weft only. It is from the dates of the patents of Wyatt (spinning by rollers, 1738), Arkwright (water-frame, 1769), Hargreaves (jenny, 1770), Cromptom (mule, 1779), and Cartwright (loom, 1785), that the rise of our modern manufacture must be dated. The stimulus given to the trade of our own country by these inventions was instantaneous, and when adopted on the continent, a few years after their utility had been sufficiently proved, similar effects followed there. The following figures will give the reader an idea of the rapid extension of the consumption of C. in Great Britain:

IMPORT OF COTTON WOOL INTO GREAT BRITAIN.

	American. lbs.	Total of all kinds. lbs.
1701	none	1 976,659
1751	none	2,976,610
1771, one year after Arkwright's loom and Hargreave's Jenny	none	4,764,589
1780, year after Crompton's mule,	none	6,766,613
1785	none	18,400,384
1791	189,316	31,447.605
1794, year after the invention of the saw-gin	487,600	19,040,929

	American. lbs.	Total of all kinds. lbs.
1808		43,379,278
1820	89,999,174	151,672,655
1840	487,856,504	592,488,010
1860	1,115,890,608	1,390,938,752
1871	1,038,677,920	1,778,139,776
1875	816,223,920	1,458,598,470

The imports of cotton in 1880 were 1,628,664,576 lbs., valued at £42,772,088. The following table furnishes particulars of the imports, exports, and home consumption of C. in periods from 1801 to 1875:

SUPPLY AND CONSUMPTION OF RAW COTTON IN GREAT BRITAIN, IN THOUSANDS OF BALES, FROM 1801 TO 1875.

Avrage Periods of Ten Years.	Import. *United States.*	*Brazil.*	*Egypt.*	*West Indies, &c.*	*East Indies.*	*Total.*	*Export.*	*Home Consumption.*	*Total Deliveries.*
1801—10,	127	72	..	81	19	299	8	291	299
1811—20,	159	130	..	54	70	413	31	346	377
1821—30,	436	144	36	26	54	696	65	630	695
1831—40,	818	128	31	22	131	1130	97	1014	1111
1841—50,	1190	113	52	13	209	1577	176	1403	1579
1851—60,	1778	125	106	9	432	2450	362	2070	2432
1861—70,	907	332	227	80	1405	2951	804	2151	2955
1871—75,	1873	525	397	129	1138	3962	727	3183	3910

The bales vary considerably in weight. In 1875 the averages were as follow: American, 439 lbs.; Brazilian, 160 lbs.; Egyptian, 602 lbs.; Smyrna, 370 lbs.; West Indian, &c., 205 lbs.; Surat, 390 lbs.; Madras, 300 lbs.; and Bengal, 300 lbs. During the C. famine, a considerable quantity of C. was received from China in bales averaging 266 lbs. The comparative statement in the following table shows the relative importance of the various sources of supply—actual and proportional—in 1802, and on the average in 1828—1830, 1858—1860, and 1874—1875. The quantities are given in millions of pounds—32·1 equal 32,100,000 lbs.

	Weight in lbs.				Proportion.			
	1802	1828—1830	1858—1860	1874—1875	1802	1828—1830	1858—1860	1874—1875
America	32·1	173·3	970·3	837·9	53·2	72·7	79·7	56·3
Brazil	10·5	30·4	19·4	73·2	17·4	12·8	1·6	4·9
Egypt, &c.		5·5	40·1	170·2		2·3	3·3	11·4
West Indies, &c.	15·0	5·8	10·8	21·2	25·0	2·4	0·9	1·4
East Indies and China	2·7	23·2	176·4	386·6	4·4	9·8	14·5	26·0
Total	60·3	238·2	1217·0	1489·1	100·0	100·0	100·0	100·0

The factory returns for 1875 state that there were in Great Britain, in that year, 41,300,000 spindles (including 3,800,000 doubling spindles), and 463,000 looms, and that 479,500 persons were employed in the manufacture. The various buildings and machines are said to have cost £66,000,000, and it has been calculated that a floating capital of £30,000,000 is employed in carrying on the trade. If we take into consideration the persons employed in the building of the mills and making of the machines, and in the buying and selling of raw and manufactured material, it will be found that something like 4,500,000 individuals are dependent upon the prosperity of the cotton trade for their livelihood. The total quantity of yarn exported in 1880 was 215 000,000 lbs., worth £12,000,000; and the total quantity of calicoes, cambrics, fustians, &c., was 4,495,000,000 yards, worth £57,677,000. Besides these, there were £6,000,000 worth of lace, small-wares, &c.; which raises the total value to £75,677,000.

France and Alsace.—The first import of C. into France took place in 1668—viz., 450,000 lbs. *viâ* Marseilles from the Levant. In 1750, the receipts reached 6,978,588 lbs.; but during the wars of the Revolution and the first Empire, little progress was made. In 1815, the import was 36,200,000 lbs.; in 1825, it rose to 55,150,000 lbs.; in 1836, to 118,000,000 lbs.; in 1846, to 159,000,000 lbs.; in 1856, to 211,000,000 lbs.; in 1860, to 270,000,000 lbs. In 1862, the arrivals fell to 127 millions, owing to the stoppage of supplies from America. In 1869, the consumption was estimated at 242 millions; but the war cut down the figures to 165 millions in 1870, and 185 millions in 1871. In 1874, there was a rise to 208 millions. These latter figures are exclusive of Alsace and Lorraine, which use about 65 million lbs.; making 273 millions for France, as she stood before the war, against 242 millions in 1869. The number of cotton spindles in France is about 5,200,000. In Alsace there are about 1,700,000.

Belgium.—The average import of C. into Belgium in 1836—1840, was about 39,500 bales; in 1846—1850, 56,600 bales; in 1856—1860, 61,000 bales; in 1870, 91,000 bales; and in 1874, 127,000 bales. In the last-named year, 91,000 bales were consumed; part of the remainder was forwarded to Germany, Switzerland, or Alsace, and part was added to stock. The number of spindles in Belgium is variously estimated at from 650,000 to 800,000.

Switzerland.—The trade of this confederation has flourished considerably. In 1833, its consumption was about 6,000,000 lbs.; in 1843, about 22,000.000 lbs.; in 1859, about 28,000,000 lbs.; in 1874, about 52,500,000 lbs. The first spinning-machine was set up at Zurich in 1807. In 1826, the number of spindles was 300,000; in 1830, 400,000; in 1835, 650,000; in 1840, 750,000; in 1845, 850,000; in 1850, 950,000; in 1860, 1,350,000; and at the present time, about 2,100,000. Prior to the Franco-Prussian war, the Swiss spinners received the bulk of their raw material *viâ* France, but now they are supplied mainly through Holland and Germany. The manufactured products of Switzerland are well liked, and compete successfully with those of England in the various continental markets.

Holland.—The C. trade of Holland is chiefly a transit one. The imports in 1872 reached 268,000 bales; in 1873, 180,000 bales; and in 1874, 168,000 bales. The deliveries were 224,000 in 1872, 180,000 in 1873, and 183,000 in 1874; but only about 28,000 bales per annum were retained for consumption, the remainder passing to Germany, &c. The number of spindles in Holland is about 230,000.

German Empire.—Under this head are included the various political divisions of Germany. The several states have made considerable progress in the production of C. fabrics. The C. is received chiefly through the ports of Hamburg and Bremen, but a considerable quantity is also received *viâ* Holland and Belgium, while a further portion is received in South Germany from Trieste. The average imports into Hamburg, Bremen, Amsterdam and Rotterdam, in the five years ended with 1840, reached 109,000 bales; in the five years ended with 1855, they averaged 233,000 bales; in the three years ended with 1874, they averaged 655,000 bales. The deliveries in the last-named period, however, did not exceed 644,000 bales—the balance being retained in stock. The number of spindles in Germany in 1846 was about 815,000; in 1858, 2,000,000; and in 1874, 3,500,000, besides 1,700,000 in Alsace; making a total of 5,200,000. The Germans consume nearly the whole of their own produce, and are besides large buyers of English yarns and goods. The leading seat of the manufacture after Alsace is Saxony; then follow Bavaria, Prussia, Baden, Würtemberg, &c.

Austria.—In the C. trade, Austria has made the least progress of any country on the continent. In 1854, there were in all Austria, including Lombardy and Venice, about 1,533,000 spindles; while in 1872 (including the Italian provinces for the purpose of comparison) there were only 1,900,000—an increase of only 24 per cent. in 18 years. The manufactures receive nearly the whole of their raw material *viâ* Trieste. The deliveries from that port averaged about 82,000 bales in the five years ended with 1840; 107,000 in 1851—1855; and 125,000 in the three years ended with 1874. The C. trade of Trieste has increased considerably since the opening of the Suez Canal, by which means the spinners of Austria and South Germany have been brought into direct communication with India. Formerly a large quantity of C. was annually exported from Liverpool to Trieste, but the success of M. Lesseps' enterprise has entirely destroyed this branch of trade.

Italy.—The statistical materials relating to this part of the continent are very scanty. The imports into Genoa and Naples in 1851 amounted to about 31,000 bales; in 1860, they reached 94,000, but a good portion of this was forwarded to Switzerland and other places. In 1870, the import was only 47,000 bales; in 1871, the

figures reached 92,000; in 1874, fell to 64,000. There are considerable imports also into Venice and Naples. The number of spindles in Italy is estimated to amount to about 700,000, capable of using 88,000 bales per annum.

Spain.—The C. trade of Spain is the oldest in Europe, but until recently has made the slowest progress of any. During the past twenty-five years, however, things have greatly improved. In 1850, the annual consumption was only about 80,000 bales; in 1860, it reached 106,000; and in 1870, 152,000; and in 1874, 189,000. There are in Spain about 1,500,000 spindles, capable of using about 189,000 bales of 370 lbs. each.

Russia.—The C. manufacture of this empire is of comparatively recent origin. The imports of raw C. in 1824—1826 (average of three years) were only 2,700,000 lbs.; in 1833—1835, they reached 6,200,000 lbs.; in 1845—1847, 28,000,000 lbs.; in 1853—1855, 55,000,000 lbs.; in 1858—1860, 94,000,000 lbs.; and in 1869—1870, 100,000,000 lbs., besides a considerable quantity from Bokhara, say from 15,000,000 to 20,000,000 lbs. This immense increase in the consumption of raw C. has considerably curtailed the demand for English yarn. In 1838, we exported 19,311,877 lbs. yarn to Russia, but in 1865, only 1,700,000 lbs.; and in 1872, about 3,000,000 lbs. The number of spindles in Russia is estimated at 2,100,000, capable of using 136,000,000 lbs. of cotton. Except in times of depressed trade, the mills work night and day, each mill having two sets of hands.

Sweden, &c.—There are in Sweden and Norway about 300,000 spindles. The coarser sorts of yarn are produced, and the annual consumption of C. is about 18,000,000 lbs., or 48,650 bales of 370 lbs. each. The C. is imported partly from Liverpool, and partly direct from the United States.

United States.—The first C.-mill built in the United States was in 1791; the second in 1795; the third in 1803; the fourth in 1804; followed by eleven more during the next three years. In 1810, there were 31,000 spindles; in 1831, 1,246,503 spindles; in 1850, 3,633,693; in 1860, 5,035,798; in 1868, 6,600,000; and in 1874, 9,415,000. In 1831, the consumption of C. amounted to 182,000 bales; in 1850, 613,000; in 1860, 843,000; in 1868, 968,000; in 1871, 1,173,000; and in 1874, 1,313,000. In 1851—1852 (average of two years), the consumption represented 21 per cent. of the C. grown, but in 1871—1875, 28¼ per cent.! Europe has therefore to look to other countries to supply her increased requirements, as we have already shown in a previous portion of this article.

Down to 1845, supply kept constantly ahead of demand, and, at the close of that year, the stock of C. in Europe reached 1,219,000 bales, or about 27 weeks' consumption, the average rate at that time being about 45,000 bales per week. The result was a very serious fall in prices—middling Orleans descending to 3⅞*d.* per pound. The produce of America had almost driven the growth of every other country out of the market, and in 1846, the imports from the United States represented 86 per cent. of the total arrivals! The great decline in values naturally led to a serious reduction in the rate of production, which reduction was further aggravated by unfavorable seasons in the South, and in 1846 the imports from the United States fell to 401 million pounds, and in 1847, to 364 millions, against 626 millions in 1845. Then followed a sharp reaction in prices, and ultimately an important recovery in the amount of supply. Between 1845 and 1856, however, consumption encroached upon production to such an extent, that the stock in Europe at the close of 1856 was only 439,000 bales, or about six weeks' consumption; against 1,219,000 bales, or 27 weeks' requirements, at the end of 1845. In the autumn of 1857, therefore, middling Orleans touched 9⅝*d.* per pound. Thence to 1860, there was a gradual recovery in stocks, and a corresponding decline in prices; but even at the end of 1860, the stock was only 782,000 bales, or about 9½ weeks' consumption, and though middling Orleans had, in the interval, declined to slightly below 6*d.*, the average price for the five years ended with 1861 was 7*d.* per pound. Then followed the American War, of the effects of which we have already written.

The following table furnishes particulars of the consumption of C. in Europe and the United States in average periods from 1826 down to 1874. (The total import of C. into the United Kingdom amounted, in 1880, to 14,541,648 cwts.)

In the healing art, C. and the cloth and wadding made from it are used for wrapping up and keeping warm, and of late much more than formerly for binding up burns and wounds. A prejudice formerly prevailed against the use of C., as irritating to wounds; but experience has shown this opinion to be unfounded and C. is now used in many hospitals quite as freely as linen.

Cotton Manufacture.—It has already been remarked that the modern system of C. manufacture dates no further back than about 1760. Prior to the mechanical inventions of Hargreaves, Arkwright, Crompton, and Cartwright, the arts of spinning and weaving were entirely domestic, and the instruments of manipula-

STATEMENT OF THE CONSUMPTION OF COTTON IN EUROPE AND THE UNITED STATES FROM 1826 TO 1874 (IN THOUSANDS OF BALES AND MILLIONS OF POUNDS.)

In Thousands of Bales.

	1826—1830.	1831—1835.	1836—1840.	1841—1845.	1846—1850.	1851—1855.	1856—1860.	1861—1865	1866—1870.	1871—1874.
Consumption—										
Great Britain	711	903	1156	1368	1458	1895	2265	1669	2639	3209
France	263	278	372	415	355	442	527	440	613	2265
Rest of Europe	148	182	257	314	421	698	963	756	1229	
United States	114	193	255	375	566	659	810	410	870	1197
Total	1236	1556	2040	2472	2800	3694	4565	3275	5351	6671
Sources of Supply—										
America	821	1122	1528	1990	2277	2949	3675	1203	2523	3813
Brazil	169	175	142	105	131	149	153	201	614	723
West Indies, &c	53	39	73	57	30	30	35	73	175	214
East Indies, &c	77	97	159	198	233	352	540	1380	1601	1444
Egypt, &c	116	123	138	122	129	214	162	418	438	477
Total	1236	1556	2040	2472	2800	3694	4565	3275	5351	6671

In Millions of Pounds.

	1826—1830.	1831—1835.	1836—1840.	1841—1845.	1846—1850.	1851—1855.	1856—1860.	1861—1865.	1866—1870.	1871—1874.
Consumption—										
Great Britain	212·3	295·2	405·7	521·3	569·8	750·1	947·3	628·6	973·8	1228·2
France	77·8	89·6	127·3	157·3	142·4	178·1	225·5	175·1	222·2	834·5
Rest of Europe	42·0	53·1	81·1	109·9	158·0	273·3	401·9	280·3	431·2	
United States	38·5	68·7	96·9	152·5	240·5	281·4	358·8	181·2	381·9	525·2
Total	370·6	506·6	711·0	941·0	1110·7	1482·9	1933·5	1265·2	2009·1	2587·9
Sources of Supply—										
America	266·7	405·9	585·7	816·3	964·2	1254·7	1633·7	531·7	1108·6	1669·9
Brazil	29·5	30·6	25·3	18·9	23·8	27·1	27·7	36·2	99·9	113·9
West Indies, &c	13·2	9·5	13·4	9·4	6·3	6·3	7·2	14·6	33·2	45·2
East Indies, &c	25·0	34·2	56·5	72·6	86·7	134·8	207·9	491·3	576·5	522·0
Egypt, &c	26·2	26·4	30·1	23·8	29·7	60·0	57·0	191·4	190·9	236·9
Total	370·6	506·6	711·0	941·0	1110·7	1482·9	1933·5	1265·2	2009·1	2587·9

tion much the same as those which had been in use in the East for centuries before. By means of the ancient distaff and spindle, or the more recent spinning-wheel, only *one* thread at a time was produced, and the process, as may be imagined, was tedious, and not very remunerative; besides which, only a very inferior yarn was the result; for whilst a tolerable thread could be spun from flax, the produce of C. was soft, weak, and uneven, and in weaving was used for *weft* (or *transverse* yarn) only, with linen, woollen, or worsted for the *warp* (or *longitudinal* yarn). Altogether, in the middle of the 18th c., the machinery for spinning was much more imperfect than that for weaving, and the weavers of the time were often at a stand for want of yarn to go on with.

This state of things had long occupied the attention of the thinking portion of the spinners, but without any practical result until the invention of the 'jenny,' by Hargreaves, about 1767. By this machine, eight threads at a time could be spun against the one of the spinning-wheel. Hargreaves was much abused by the populace of his native town and neighborhood, who feared that the invention would deprive them of all employment; the machine was destroyed, and the inventor compelled to leave his birthplace. Genius, however, ultimately triumphed, and the 'spinning-jenny' was patented at Nottingham in 1770. The year previously, Arkwright had patented his 'water-frame,' or 'throstle,' for spinning by rollers, by means of which a stronger and much firmer yarn was produced. It was about this period that fabrics composed entirely of C. were woven for the first time, the 'jenny' supplying the *weft*, and the 'throstle' the *warp*. A few years later, Mr. Crompton brought out a new piece of mechanism, which he styled the 'mule-jenny,' from its combining the principles of both Hargreaves' and Arkwright's patents; but it had an advantage over both, insomuch as it produced a much finer yarn than either. The 'mule' came into full play in or about 1780, which is the period assigned for the birth of the *muslin* trade. There was now no longer a scarcity of yarn; the fear was, that there would be too much, for it was clear that the hand-loom weavers of the time could not keep up with the improved spinning machinery. But the invention of the 'power loom,' by Dr. Cartwright, in 1785, set aside all doubts in this respect; the question now was, whether a sufficient quantity of raw C. could be obtained in order to keep pace with the requirements of the rising manufacture. West India C., which in 1784 averaged 1*s.* 6*d.* per lb., rose to 2*s.* in 1788; 2*s.* 1*d.* in 1792; and 2*s.* 8*d.* in 1798. Great exertions were made to obtain increased supplies from India; but the invention of the saw-gin in America brought the required succor from an unexpected quarter. It was only by means of this machine that the production of the short-stapled C. of the United States could be made at all remunerative. The export of hand-cleaned C. in 1791 was only 189,316 lbs., and in 1792 only 138,328 lbs.; but the year after the appearance of the gin—viz., 1794—the exports rose to 1,601,700 lbs.; in 1795, to 6,276,300 lbs.; and in 1800 to 17,789,803 lbs.

But to return. The first 'mule-jenny' contained about *thirty* spindles, which, instead of being stationary, as in the 'jenny' and 'throstle,' were placed on a carriage, which was moved outwards, in order, whilst twisting, to increase the fineness of the thread, and inwards again, to wind the yarn on the spindles. This required the constant attendance of a spinner to wheel the carriage backwards and forwards; but subsequent improvements have gone so far as to produce what is called the self-acting mule, two or three of which only require the assistance of one person, generally a boy or girl, whose place it is to piece any of the threads which may break during spinning. Mules of this construction are made with as many as 1000 or 2000 spindles, sometimes more; and with the self-actor, as now improved, a single thread has been produced measuring upwards of *one thousand miles in length*, and yet weighing but *one pound!*

A word or two on the processes preliminary to spinning. The raw material is received from the various producing countries, packed either in bags or square bales. On arrival at the mill, the C. first enters the *mixing-room*, where it is *sorted*, and the various qualities, which are often contained in a single purchase, laid out in layers of equal extent, one over the other, and trodden close together. In this manner, two descriptions of C. are sometimes placed in one mixing. When Surat, for instance, is scarce and dear, and short-stapled low American plentiful and cheap, spinners of what are called coarse numbers invariably use a mixture of both growths; the same of other kinds, provided there is an approach to equality in length of fibre. C. of different shades of color are also sometimes spun together, in order to produce a particular yarn. A quantity of this *bing*, as it is called, is then raked down from the top to the bottom of the side, a portion of each layer being thus secured. This is carried to the *scutching* or *willowing machine*, by means of which the C. is cleansed from all impurities, such as sand, seeds, leaf, &c. The cleaned C. is then taken to the *spreading-machine*, through which it passes, and is then wound, in a fleecy state, upon a large wooden roller, to be transferred to the *carding-machine*. The latter machine is brought into requisition for the purpose of drawing out the fibres of the C. into parallel layers, so as to facilitate the twisting of them together. Originally, this process was performed by hand. The first improvement was made by Lewis Paul in 1748, and the next by Hargreaves in 1760. Arkwright and subsequent spinners have perfected the machine. The C. was formerly cleaned by hand. The *sliver* is next passed through the *drawing-frame*, which removes all inequalities, and reduces the bands to one uniform thickness. Here also several of the slivers are joined together (called *doubling*), so as to form one continuous cord, which is still further lengthened and increased in fineness by the *roving-machine*, whence it passes on to bobbins ready for *spinning*. Under the heads SPINNING and WEAVING, will be found a full description of the various processes above briefly glanced at. Other branches of the subject are treated of under CALICO-PRINTING; CALENDERING; DYEING, &c.

The finer kinds of yarn are spun from Sea Island and long-staple Egyptian, and from them are fabricated our muslins, laces, &c. From Brazil and the better classes of short-stapled American, come our cambrics, calicoes, shirtings, sheetings, &c., and from the inferior qualities of American and Surat are spun the coarse yarns required for fustians and other heavy fabrics. Yorkshire broadcloths are sometimes half cotton. From warps of C., and wefts of wool or worsted, are formed varieties of Orleans cloths, Coburgs, mousselines de laine, damasks, &c. There are also fabrics composed of silk and C., linen and C., alpaca and C., &c.

Of the total amount of yarn produced, from one-fifth to one-fourth is exported in its raw state. The following figures will give the reader an idea of the progress of our export trade in C yarns and goods:

	Yarns.			Manufactured Goods Exported.			
	Total Spun.	Total Exported.		Entered by the Yard.		At Value only.	Total Value of Yarn and Goods.
	lbs.	lbs.	£	Yards	£	£	£
1816	78,987,200	15,740,675	2,628,448	189,263,731	12,309,079	746,643	15,684,170
1830	622,840,000	63,678,116	4,133,741	441,578,498	14,119,770	1,175,153	19,428,664
1845	494,766,000	135,766,487	6,963,235	1,091,686,069	18,029,818	1,126,288	26,119,341
1860	965,993,000	197,343,655	9,870,875	2,776,218,427	40,346,342	1,795,763	52,012,380
1874	1,120,525,000	220,599,004	14,516,093	3,587,132,479	54,355,800	5,380,477	74,232,370

In 1818, 14,743,675 lbs. of twist were exported, of which 14,727,882 lbs. went to Europe, and only 1861 lbs. to India and China. In 1843, 149,206,448 lbs. were exported; 128,664,218 lbs. to Europe; 899,746 lbs. to America and Africa; and 12,642,484 lbs. to India and China. In 1874, of the 220,599,000 lbs. exported, 77,438,000 lbs. went to Germany and Holland, 62,781,000 lbs. to India, China and Japan. In 1880, there were in all 215,544,800 lbs. of yarn exported.

In 1820, Germany was the best customer for both our plain and printed cottons. The next largest consumer for *plain* cottons was Italy; then followed the Brazils, United States, Russia, Portugal, East Indies, Holland and Belgium, West Indies, &c.; and for *printed* cottons—British West Indies, United States, Italy, Holland and Belgium, Portugal, East Indies, Brazil, &c. The Netherlands were the principal buyers of our laces and small wares; then Germany, British West Indies, Central America, Brazils, United States, East Indies, Portugal, Russia, Italy, &c. At the present time the East Indies take nearly one-third of our exported manufactured goods. For *plain calicoes*, our next best customer is China; then follow Turkey, Brazil, Egypt, United States, Portugal, Italy, Germany, &c.; of *printed and dyed calicoes*, Turkey is the largest purchaser; then follow India, Brazil, Germany, United States, France, West Indies, Central America, &c. The United

States take nearly one-half our exports of *lace and patent-net;* then follow Belgium, France, Holland, Germany, &c. The United States take over one-third of our exports of *stockings*, and one-half of our shipments of other sorts of *hosiery;* then follow Australia, the Argentine Republic, &c. One-fourth of the *sewing-thread* exported goes to the United States; then follow Germany, Brazil, Russia, &c.

Subjoined is an estimate of the weight and value, of the total production of cotton manufactures in Great Britain, with the cost of cotton consumed, and the balance remaining for wages, all other expenses, interest of capital, and profit for the years 1870, 1872, and 1874 (000's omitted; 1,071,770 = 1,071,770,000):

	1870.	1872.	1874.
WEIGHT.	lbs.	lbs.	lbs.
Cotton consumed	1,071,770	1,175,345	1,266,129
Waste in spinning	129,310	134,965	145,604
Yarn produced	942,460	1,040,380	1,120,525
Exported in yarn	186,078	211,940	220,599
Do piece-goods, &c.	616,232	698,840	726,000
Consumption and stock	140,150	129,600	173,926
Total as above	942,460	1,040,380	1,120,525
VALUE.			
Yarn exported	£14,671	£16,710	£14,516
Goods, &c., do	61,424	69,900	66,934
Consumption and stock	17,050	15,660	20,110
Total	£93,145	£102,270	£100,560
Cost of cotton consumed	42,145	48,054	40,225
Left for wages, expenses, profits, &c.	£51,000	£54,216	£60,335

The figures relating to the export of 'piece-goods, &c.,' include two-thirds of the goods shipped as apparel, haberdashery, &c. The average annual production of yarn and goods for the three years 1870–72, was 1,018,563,000 lbs., distributed as follows:

	lbs.	Per cent.
Exported to India, China, Japan, &c., including 47,000,000 lbs. yarn	333,000,000	32·70
Exported to all other countries, including 150,166,000 lbs. yarn	529,030,000	51·94
Left for Home Consumption and Stock	156,533,000	15·36
Total as above	1,018,563,000	100·00

In round numbers, therefore, it may be said that one-third of the total production of cotton goods is exported to the East, one-half to other countries, and one-sixth consumed at home.

With the great improvements which have taken place in the mechanics of the trade, and the reduced price of the raw material, a gradual but considerable decline has taken place in the cost and price of the fabrics produced. The price of 1 lb. of yarn containing 100 hanks, in 1786, was 38*s.*; in 1807, 6*s.* 9*d.*; in 1829, 3*s.* 2*d.*; at the present time, 2*s.* 6*d.* The *cost* of weaving during the last sixty years has been reduced upwards of sixty per cent. A species of calico, selling at 6*s.* per yard towards the close of the last century, can be purchased in our day at as many pence! The average price per yard of *goods* exported in 1815 was 1*s.* 5½*d.*; in 1825, 10⅛*d.*; in 1835, 6½*d.*; in 1845, 3 15/16*d.*; and in 1859, 3 7/8*d.* In 1864, the price rose to 6*d.* per yard, but in 1874 it fell to 3⅝*d.* per yard. The average price per lb. of *yarn* exported in 1815 was 3*s.* 7⅝*d.*; in 1825, 1*s.* 11½*d.*; in 1835, 1*s.* 4⅝*d.*; in 1845, 1*s.* 0½*d.*; and in 1859, 11¼*d.* In 1864, the average rose 2*s.* 4¼*d.* per lb.; but in 1874, fell to 1*s.* 3¾*d.* per lb. The most profitable years for spinners are said to have been 1845, 1848, 1859, 1860, and 1871.

The earnings of the work-people have upon the whole steadily increased from year to year. The following table furnishes the rates current in 1839, 1849, 1859, and 1875. It will be observed that the proportionate advance during the last sixteen years was much greater in the lowest than in the highest paid hands:

AVERAGE WEEKLY WAGES.

	1839. Week of 69 Hours.	1849. Week of 69 Hours.	1859. Week of 60 hours.	1875. Week of 60 Hours.
	s. d.	*s. d.*	*s. d.*	*s. d.*
Steam-engine tenters	24 0	28 0	30 0	32 0
Warehousemen	18 0	20 0	22 0	26 0
Carding Department—				
Scutchers (women and girls)	7 0	7 6	8 0	12 0
Strippers (young men)	11 0	12 0	14 0	19 0
Overlookers	25 0	28 0	28 0	32 0
Spinning on Self-acting Mules—				
Minders	16 0	18 0	20 0	25 0
Piecers (women and young men)	8 0	9 0	10 0	16 0
Overlookers	20 0	22 0	26 0	30 0
Throstle Spinning—				
Spinners (girls 14 to 18 years)	4 0	4 6	5 0	9 0
" (women)	7 0	7 6	9 0	13 6
Overlookers	18 0	20 0	24 0	26 0
Ruling—				
Throstle reelers (women)	9 0	9 6	9 6	12 6
Warpers	22 0	22 0	23 0	26 0
Sizers	23 0	23 0	25 0	30 0
Doubling—				
Doublers (women)	7 0	7 6	9 0	12 0
Overlookers	24 0	25 0	28 0	32 0

Other branches show the same ratio of advance.

The following table exhibits the extent of the manufacture at the close of 1874:

Estimated weight of *cotton* consumed	1,226,129,000 lbs.
" value of same, at 7⅞*d.* per lb	£40,226,000
" weight of *yarn* produced	1,120,525,000 lbs.
Declared weight of yarn exported	220,599,000 lbs.
" value of yarn exported (1*s.* 3¾*d.* per lb.)	£14,516,000
Number of yards of goods exported	3,587,132,000 yards.
Declared value of same (3⅝*d.* per yard)	£54,356,000
" " other cotton goods exported	£5,380,000
Total declared value of all cotton manufactures exported	£74,232,000
Total declared value of all British exports	£297,650,000
Proportion of *cotton* exports to *entire* exports per cent	25 per cent.
Estimated number of persons employed	479,000
" average rate of wages per week	13*s.*
" total amount of wages paid in twelve months	£15,190,000

ESTIMATED FIXED CAPITAL.

Cost of 41,300,000 spindles, at 25*s.* to 27*s.* per spindle, inclusive of buildings, &c.	£53,690,000	
Cost of 463,000 power-looms, at £26 each	12,038,000	
		£65,728,000

ESTIMATED FLOATING CAPITAL.

Employed in carrying on the routine of business	£18,000,000	
Cash at bankers	12,000,000	
		£30,000,000

The average price of cotton consumed in 1860 was 6⅝*d.* per lb.; in 1861, 7½*d.*; in 1864, 1*s.* 10½*d.*; in 1867, 10⅝*d.*; in 1871, 8½*d.*; and in 1881, 6 9/16*d.* The average prices of the principal descriptions in 1871 to 1875 were as follows:

	Uplands. Mid.	Pernam. Fair.	Egypt. Fair.	Dhollera. Fair.	Bengal. Fair.
1871	8 9/16*d.*	8½*d.*	8⅞*d.*	6⅝*d.*	5⅞*d.*
1872	10 9/16*d.*	10⅝*d.*	10½*d.*	7½*d.*	5½*d.*
1873	9*d.*	9⅜*d.*	9 1/16*d.*	6 5/16*d.*	4½*d.*
1874	8*d.*	8¼*d.*	8¼*d.*	5 5/16*d.*	4¼*d.*
1875	7⅜*d.*	7 15/16*d.*	8 7/16*d.*	5*d.*	4 5/16*d.*
1875, Dec. 31.	6⅜*d.*	7½*d.*	7⅝*d.*	4 1/16*d.*	4⅛*d.*

Except Bengal, prices at the end of September and December 1875 were lower than since 1860.

The Cotton Famine.—The American civil war broke out in 1861, and in 1862 our import of cotton fell to 524 million pounds, against 1257 millions in 1861, and 1391 millions in 1860. Increased supplies from India and other sources brought the arrivals up to 669 millions in 1863, 893 millions in 1864, 978 millions in 1865. The war closed in 1865, trade with America was resumed, and the imports in 1866 rose to 1377 million pounds, and the cotton industry shortly afterwards resumed its former dimensions. At the crisis of the famine the mills were not working more than half-time, and in December 1862, 247,000 cotton operatives and others connected with the trade, were out of employment, and 165,000 others only partially employed. In the same month, 234,000 persons, or 24 per cent. of the total population of the districts affected, were in receipt of charitable relief. In 1863, the average number of persons out of work was 189,000, and that of those only partially employed, 129,000; in 1864, the figures were 134,000 and 97,000 respectively; and those for the first five months of 1865, 107,000 and 68,000. During the course of the famine, the losses of the trade amounted to between £65,000,000 and £70,000,000, including from £28,000,000 to £30,000,000 loss of wages to operatives. Of the latter amount about one-fourth was recovered in the form of relief, or in wages for employment in public works, &c. The total sum distributed

in charity alone was about £3,000,000. In some districts in 1863, the poor-rate rose to nearly 6*s.* in the £. In the same year, the average rate for the whole of the cotton districts was 2*s.* 2¾*d.*, against only 7¾*d.* in 1861. See also COTTON FAMINE.

COTTON, GUN. See GUN COTTON.

COTTON, SIR ROBERT BRUCE, a distinguished English antiquary, founder of the Cottonian Library, now in the British Museum, was born at Denton, Huntingdonshire, 22d January 1570. He was educated at Cambridge, and soon after taking his degree of B.A. in his 16th year, he commenced those archæological pursuits which have made his name famous, and proved of such immense value to British historians. The dissolution of the monasteries about half a century before, dispersed many valuable collections of manuscripts into private hands, and C. hunted up and purchased these wherever practicable. On account of his eminent abilities and great knowledge, he was frequently consulted by ministers of state on difficult constitutional points and international questions. In 1600 at the request of Queen Elizabeth, who desired to have the views of the Society of Antiquaries on the matter, he wrote *A Brief Abstract of the Question of Precedency between England and Spain.* King James, by whom he was made a knight, employed him to vindicate the conduct of his mother, Mary Queen of Scots, and also to examine whether the Roman Catholics, on account of whom some alarm was then felt in the nation, should be imprisoned or put to death. C. took the most humane view of the matter. His intimacy with the earl of Somerset led him to be suspected of complicity in the death of Sir Thomas Overbury, and in consequence he was imprisoned for about five months. In 1629, a tract entitled *A Project how a Prince may make himself an Absolute Tyrant*, was obtained from his library, the tendency of which was considered dangerous to the liberty of the state. His library was accordingly declared unfit for public inspection, and he himself was denied all use of it. His heart being bound up in his library, he pined and died in less than two years after, on 6th of May 1631.

The COTTONIAN LIBRARY, which now forms so important a part of the British Museum, was, after the death of Sir Robert C.'s son and grandson, who augmented it considerably, invested in trustees for the use of the public. In 1730, the library was removed to Ashburnham House, Westminster, where the royal collection was; and in the following year a fire occurred in the house, in which about 114 out of the 958 MS. volumes of which the library consisted were reported as 'lost, burned, or entirely spoiled; and 98 damaged so as to be defective.' Fortunately, however, under the care and intelligence of skilful keepers, a great number of these injured volumes have been restored, so that the library now consists of nearly 900 volumes, of which, says Mr. Edwards in his *Memoirs of Libraries*, 'nearly 200 are state papers of the highest value. They include a vast series relating to the diplomatic intercourse between England and almost every state of Europe, extending from the reign of Edward III. to that of James I.; and of these documents, no small proportion consists of the original letters of sovereigns and of statesmen. Even those papers which are not original have a high degree of authority, as being, for the most part, coeval transcripts.' The Cottonian Library was transferred to the British Museum (q. v.) in 1757. In addition to the MSS., the Cottonian collection consists of many valuable coins and antiquities.

COTTON FAMINE. The history of manufacturing industry does not present a more striking episode that that which was connected with the effects of the Civil War in America on the cotton manufactures of Great Britain in 1861 and following years.

The years 1859 and 1860, unparalleled for the magnitude of the cotton manufacture, had much to do with the collapse that followed. So rapidly has this branch of industry increased in Lancashire, that the immigrants into that county from other districts have varied from 10,000 to 20,000 a year for a long series of years, irrespective of the natural increase of population by the excess of births over deaths. The imports of raw cotton, the exports of manufactured cotton, the number of mills, the number of hands, all were at their maximum in 1860. The imports were 1390 million lbs., of which 1054 millions were worked up in Great Britain. There were 1920 mills in Lancashire, 275 in the adjacent portions of Cheshire and Derbyshire, and enough elsewhere to make up a total of 2650. There were 440,000 hands employed in these mills; by age, 90 per cent. adults and young persons, and 10 per cent. children; by sex, 44 per cent. males, and 56 females. The machinery was worked by steam-engines having an aggregate of 300,000 horse-power. There were more than 30,000,000 spindles making from 4000 to 6000 revolutions per minute; and 350,000 power-looms. The fixed capital in mills and machinery was valued at £54,000,000; while the money paid for wages in that year was £11,500,000. The cotton goods of various kinds manufactured for home consumption used up 180 million lbs. for cotton, and were valued at £24,000,000; while the exported goods—consisting of 2776 million yards of calico, muslins, &c., and 197 million lbs. of yarn—were valued at the enormous sum of £50,000,000; besides £2,000,000 more for cotton hosiery and small wares. The total value for home consumption and export, £76,000.000, exceeded the total imperial revenue for that year. Considering that, of 1390 million lbs. imported, no less a weight than 1120 millions came from the United States, there is at once evidence afforded of the tremendous effect that would be produced by any stoppage in the American cotton-trade. Irrespective of this, however, there would have been a stagnation in our manufacturing districts in 1861, even if raw cotton had been plentiful and cheap. The manufacturers had glutted all the markets by the wholly unprecedented extent of their operations in 1860. The English warehouses, as well as those elsewhere, were full; and time was needed to carry off the immense stock. There were cotton goods on hand in Great Britain at the end of the year valued at £20,000,000; while in India our merchants continued to pour in goods even when the consignments of 1860 exceeded £17,000,000.

Fort Sumter was bombarded in April 1861. This was virtually the beginning of the American Civil War, and the beginning also of the rise in the price of cotton. A blockade was early established by the Federal government of Washington; and it was only by 'running' this blockade that cotton-laden ships could clear from the Southern or Confederate ports. The price of Middling Orleans (the kind of cotton mostly used, and that which governs the price of all other kinds) rose from 7¾*d.* to 9*d.*, 10*d.*, and 12*d.*, as the year advanced. There was thus a twofold motive for lessening the operations of the Lancashire mills—the markets were so fully supplied with manufactured goods, that no immediate augmentation was necessary; while the increase in the price of the raw material rendered manufacturing less profitable than before. The Liverpool dealers made colossal fortunes by the enormous rise in price of every bale of cotton which could reach the country from any quarter; while the manufacturers were also prosperous, because they could sell their accumulated stocks of calicos and yarns at much higher prices than had been obtainable in 1860. It was the operatives who suffered. One by one, the mills were put upon half-time, because the mill-owners had not much inducement to spin and weave, under the extraordinary double influence above adverted to. It was not until autumn, however, that these effects were heavily felt, when there was the enormous quantity of 1000 million lbs. of cotton, raw and manufactured, on hand in Great Britain. When half-time began at the mills in October, there were, in Lancashire and the two neighboring counties, 890 spinning-mills, 593 weaving-mills, 635 spinning and weaving mills, and 152 other cotton-mills of miscellaneous kinds, employing 369,453 factory-hands; and all these four classes of establishments became equally embarrassed. India or Surat cotton could still be had in considerable quantity, at 10*d.* per lb. instead of its former price of 5*d.*; but it was greatly out of favor, on account of its dirty condition, and the shortness and hardness of its staple. In November, there were 49 mills stopped, throwing out 8063 hands, while 119 were working half-time—placing something like 20,000 persons on half their usual wages. In December, Middling Orleans rose to 12*d.* So singular was the state of things, and so unlike what would be called a 'famine,' under other circumstances, that the actual quantity of raw cotton in Great Britain at the end of the year (280 million lbs) was greater than ever before known in the history of the trade; but as the market-price of yarns and piece-goods at that time scarcely equalled that of raw cotton *plus* wages, the manufacturer could scarcely operate without a loss; and therefore, he either closed his mill, or placed his hands on half-time. It was not so much a famine of cotton as a famine of employment.

The year 1862 opened very gloomily. Relief committees began to be formed in Manchester, Wigan, Blackburn, Preston, and other towns, to distribute subscribed funds to such of the hands as were totally out of work. The streets were thronged with the unemployed; but there was no disturbance, and scarcely any begging. Sewing-schools were established by ladies in the several districts, to teach the factory girls useful domestic needle-work—of which they are generally very ignorant—to get them to make clothes for themselves and others; and to shield them from the vicious temptations which would beset them during a period of idleness. The ladies also won upon the affection of the girls by reading to them, and sympathizing in many ways with their sorrows. Many of the manufacturers set apart large rooms as school-rooms and soup-kitchens for the boys and men, and abundant stores of soup were provided at 1*d.* per basin. The Poor-law Board sent down instructions to the local guardians how to give as much elasticity as possible to the system of parochial relief. In April, Blackburn had only 18 mills on full-time out of 84, the rest being either on half-time or closed; and there were 9000 of the inhabitants receiving parochial relief. Most of the other towns were in nearly as bad a plight. In May, matters were worse; Preston had 10,000 operatives out of work, and Blackburn had just about half-employment for 27,000. Middling Orleans rose in price to 15*d.*, and manufacturers had more inducement to specu-

late in cotton than to spin it. Meanwhile, great efforts were made to assist the distressed operatives. The letters of a 'Lancashire Lad' in the *Times*, with the text, 'Con yo help us a bit?' made a great impression. The *Daily Telegraph* raised a fund of £5000 by its own exertions. The Lancashire landowners established a 'Cotton District Relief Fund' in London, to which they subscribed £11,000 in one day; the Lord Mayor established a 'Mansion-house Committee,' which received subscriptions from all parts of the world; Manchester established a 'Central Relief Committee,' as a nucleus for various local funds; while a great county meeting brought in £130,000, of which £70,000 was subscribed in one day in one room. Mr. Farnall was sent down by the Poor-law Board, as special commissioner, to superintend the plans for parochial relief. A Rate-in-aid Bill was passed through parliament, to enable the government to issue Orders in Council, authorizing parishes to raise money on the guarantee of future rates; it was only to be done where the current poor-rate had already reached a high figure, and the money raised was to be applied strictly to mitigate the distress of the operatives. Notwithstanding all these sources of assistance, the work-people became reduced to great distress. 'The pawnbrokers' stores,' said an eye-witness, 'were glutted with the heir-looms of many an honest family. Little hoards were drained to meet the exigencies of the time. Many found it the sorest trial of their lives to ask for food; and it is a happy circumstance for all to remember, as it is honorable to those of whom it is recorded, that none suffered more severely than those who had a struggle to overcome their unwillingness to subsist upon food which they had not earned.

Rents were falling in arrears, and many a house which had held only one family, was now occupied by three or four, in order to economize rent, fuel, and furniture.' Nevertheless, none died of privation, and the average sickness was even less than usual. It was a fact well ascertained that spirit-drinking was less indulged in than in times of full wages. Meanwhile, the manufacturers began to make great profits; the prices of yarn and calicos rose rapidly, and the stocks were sold off which had been so long on hand. Middling Orleans rose to 2*s*. 3*d*. in October, and thus there was less inducement than ever to purchase for the sake of manufacturing. Strange as it may appear, 50,000 bales of cotton were resold by the manufacturers themselves during the year, at the very time when the phrase 'cotton famine' was on the lips of every one; but the simple fact was, that more profit could be made by reselling than by manufacturing.

It was a gloomy winter, that of 1862—1863, for the mill-hands. In October, the loss of wages was estimated at £136,000 per week. In November, there were 208,000 persons in a Lancashire district receiving out-door parochial relief, and 144,000 others aided by subscribed funds; there were at the same time 20,000 mill-girls at the sewing schools. At Christmas, there were 250,000 hands totally out of work; those, and about as many more dependent on them, received £40,000 a week from the parishes and the committees. Vast sums were sent from various parts of the world to be spent in winter-clothing only, and prodigious stores of second-hand clothing were contributed by private families. As the money relief seldom exceeded 2*s*. or 2*s*. 6*d*. per week per applicant, to purchase clothing out of this was of course impracticable. The small shopkeepers also suffered greatly; for there was only one-third the amount of wages received by their customers per week that had been received two years before. Emigration schemes were much discussed, but were not carried on very largely, because Lancashire men felt convinced that trade would revive after a time. Meanwhile, the *rate* of wages was not lowered; few mill-owners proposed it, and the operatives were rootedly against it; however small the quantity of work, it was paid for at the old rate.

No date can be named for the actual cessation of the distress; it died out by degrees. When the manufacturers had sold off their old stocks, they recommenced buying more to spin and weave; because, although the price of raw cotton was enormously high (2*s*. 5*d*. for Middling Orleans in May 1863), the selling price for calicos and muslins was now proportionately high, and therefore they could manufacture at a profit.

In June 1863, a 'Public Works Act' was passed, to enable the government to advance £1,200,000 for public works in the cotton districts—partly to make good drainage, roads, water-supply, &c., and partly to yield £600,000 or £700,000 as wages to the unemployed cotton-hands in doing so much of the work as they could manage. The money (to be repaid by parish rates at subsequent dates) was to be advanced by the Exchequer Loan Commissioners on the recommendation of the Poor-law Board, and a government engineer was to examine and sanction the several works to be executed. All these operations were to be confined strictly to the cotton districts, where the distress existed. Mr. R. A. Arnold, the resident government inspector of these public works, states in his *History of the Cotton Famine*, that by the month of June 1865, there had been works planned, and in great part executed, under the clauses of this and a supplementary bill, to the amount of £1,846,000. They comprised the making or improving of 276 miles of street and highway, 304 miles of main sewer, reservoirs for 1500 million gallons of water, several parks and cemeteries, and a large area of land-drainage. Nearly 30,000 persons had been fed by the wages of the cotton operatives on these works. The subscriptions to meet the distress reached the vast sum of £2,000,000; while the out-door poor relief was about £1,000,000 more than in an equal period of average times.

The fluctuations in the value and quantity of cotton available during this extraordinary period are strikingly shown in the following parallel columns, relating to the raw cotton imported, and the money paid for it:

	Quantities (Cwts.).	Value.
1860	12.410.000	£35,757,000
1861	11,223,000	38,653,000
1862	4,678,000	31,093,000
1863	5,978.000	56,278,000
1864	7,976,000	78.204.000
1865	8.732.000	66,032,000
1866	12,296,000	77,521,000

COTTON GRASS (*Eriophorum*), a genus of plants of the natural order *Cyperaceæ*, having the fruit accompanied with long silky hairs which spring from the base of the ovary. The species are not very numerous; they are natives of the colder regions of the northern hemisphere. Several are found in Britain, and their white cottony fruit-bearing spikes are well-known in our moors and bogs. The cottony substance has been used for stuffing pillows, making candle-wicks, &c. Mr. Helliwell has shown that a firm and beautiful cloth can be made of it; and according to him, it might be gathered in some places, without cultivation, at a cost of twopence or threepence per pound. The stems of a Himalayan species, *E. cannabinum*, called *Bhabhur*, yield a very strong fibre, and are much employed for making cordage, being simply twisted into cables, of which rope-bridges are usually made; but they are not durable, and require much repairing every year.—C. G. is said to be valuable for sheep-pasture. Its leaves were formerly employed as a remedy for diarrhœa, and the spongy pith of the stem to expel tape-worms.

Cotton Grass (*Eriophorum*).

CO'TTONWOOD. See POPLAR.

CO'TTUS, a genus of acanthopterygious fishes, of the *Mailed Cheek* family or *Sclerogenidæ*, having a large depressed head, more or less armed with spines or tubercles, a tapering body destitute of scales, and two dorsal fins. Some of the species are marine, others inhabit fresh water. Of the latter, the Bull-head (q. v.) is an example. The marine species are mostly found in northern seas. A few occur on the shores of Britain, of which the most common are the Sea Scorpion (*C. scorpius*) and the Father Lasher (*C. bubalis*), both of which are very often left by the receding tide in rock-pools, and amongst sea-weeds. The greatest size to which they attain on the British coasts is only about 10 inches, but in more northerly seas, they become much larger. They form a principal part of the food of the Greenlanders. Notwithstanding their large gill-openings, they live long out of water.

COTU'RNIX. See QUAIL.

COTYLE'DON (Gr., a cup or cup-shaped hollow) or SEED-LOBE, in Botany, a principal part of the embryo in phanerogamous or flowering plants. Cryptogamous plants are *Acotyledonous* (q. v.); their seeds or *spores* have no cotyledons. Phanerogamous plants are divided according to their seeds into *Monocotyledonous* (q. v.), having only one C., and *Dicotyledonous* (q. v.), having two cotyledons. With the latter are ranked some *Coniferæ* remarkable for having more than two cotyledons, which form a sort of whorl. The cotyledons enclose the *plumule* or *gemmule;* and in germination they usually come above ground as the first leaves (seed-leaves) of the young plant—the plumule in dicotyledonous plants, appearing between them—and they become at the same time more leaf-like; but in some plants, which have thick fleshy cotyledons, they remain underground. In either case, they contain a store of nourishment, by which the young plant is sustained on its first germination. Instances of cotyledons remaining under ground may be seen in the common pea and bean; and instances of cotyledons coming above ground, in the kidney-bean and scarlet-runner, plants of the same natural order. Cotyledons are sometimes very thick, sometimes very thin and delicate; those of the same seed are generally equal, but not always so; they are fre-

quently undivided, but sometimes cut and lobed. The cotyledons of dicotyledonous plants are often simply applied face to face; when if the radicle is folded along their edges, they are said to be *accumbent;* if it is folded on their back, they are *incumbent*. Sometimes the two cotyledons of a seed are *conduplicate*, or laterally folded; sometimes they are *reclinate*, or folded from apex to base; sometimes *convolute*, or laterally rolled up; sometimes *circinate*, or spirally rolled up with the apex innermost. These terms are of importance in descriptive botany, as characters of high value are often furnished by the seed.

Couchant.

COU'CHANT. In Heraldry, a beast lying down, with his head up, is couchant. If the head is down, he is DORMANT.

COUCH GRASS (*Triticum repens*), also called *Wheat Grass, Dog Grass, Quickens*, and *Squitch*, or *Quitch*, a grass which, although of the same genus with wheat, is chiefly known to British farmers as a troublesome weed. It is common in most parts of Europe and North America. It grows to a height of 1½—3 feet, and has two-rowed spikes and flat spiklets, the side of which is applied to the rachis. It is perennial, and its creeping roots render it extremely difficult of extirpation; they are carefully gathered out of land under cultivation, but they make the plant very useful in fixing loose sandy soils, so as to form pasture. It is not, however, esteemed a very nutritious grass. The roots are sweet and mucilaginous, and are collected at Naples for feeding horses; they have also been dried and ground into meal, to make bread in times of scarcity. A kind of beer is made from them, and in some countries they are much used in domestic medicine. They are diaphoretic and aperient.—The popular name *Squitch*, or *Quitch*, is also given to some other perennial grasses.

Couch Grass.

COUCHING. See CATARACT.

COUCY, RENAUD, CASTELLAN OF, a court-poet belonging to the north of France, who flourished probably in the latter part of the 12th century. The love-songs ascribed to him are distinguished above all similar productions of the same epoch by the great warmth of passion displayed. They are addressed, of course, to a mistress, whose name, in accordance with the fashion of the time, is not mentioned. From their contents, we can gather little or nothing of the circumstances of C.'s life, except that he had become a crusader, and had separated himself very reluctantly from the object of his adoration. It is supposed that he accompanied Philippe Auguste and Richard Cœur de Lion to the Holy Land, probably in the service of Raoul Sieur de Coucy, with whom, indeed, he is often confounded. Like Tristan and Isolde, C. and his mistress soon became patterns of true but unfortunate lovers. As early as the first half of the 13th c. the *Roman d'Aventure* gives a very prolix and incredible account of both. The best edition of the *Chansons du Châtelain de C.* was edited by Franç. Michel (Paris, 1830).

COU'GAR. See PUMA.

COUGHING, considered physiologically, consists, 1st, in a long inspiration which fills the lungs to a greater extent than usual; 2d, in the closure of the glottis, or narrow opening in the organ of voice (see LARYNX), at the commencement of the act of expiration; and, 3d, in the sudden forcing open of the glottis by the violence of the expiratory movement. In this way, a blast of air is driven upwards from the lungs through the mouth, which carries with it any sources of irritation that may have been present in the air-passages. C. may occur from irritation in the back of the throat, in the larynx, trachea, or bronchial tubes, and may be excited by acrid vapors, by irritant gases, or by articles of food or drink—such as even a drop of water or a crumb of bread—making their way into the air-passages instead of into the pharynx, or by excessive or morbid secretion from the walls of the air-tubes, or even by the entrance of cold air, when the lining membrane of the air-passages is abnormally irritable.

It is not very easy to explain to the non-professional reader *how* cough is produced. From the medulla oblongata, or uppermost part of the spinal cord (lying within the cavity of the cranium), there is given off a very important nerve called, from its distribution to the lungs and stomach, the pneumo-gastric nerve (q. v.), which contains both sensory and motor filaments. The sensory filaments are distributed to the mucous lining of the larynx, trachea, &c. Any of the irritating substances already mentioned may produce an impression upon these sensory filaments which, being conveyed to the medulla oblongata, gives rise, through the motor filaments, to the transmission of motor impulses to the various muscles which are concerned in the act of coughing. Other motor nerves, especially those supplying the intercostal muscles and the diaphragm, co-operate powerfully with the motor filaments of the pneumo-gastric.

The object of C. in the animal economy is unquestionably to guard against the danger of the entrance of mechanical and chemical irritants into the air-passages; and accordingly the mucous membrane, especially of their upper part, is endowed with a most exquisite sensibility which, when aroused by irritation or by a state of disease, provokes incessant coughing until the irritation be allayed or removed. Cough is an exceedingly common symptom of all diseases of the respiration. See PNEUMONIA, CONSUMPTION, BRONCHITIS, CATARRH, &c.

Cough occurs amongst the lower animals under similar conditions. From continued breathing of a close foul atmosphere, the bronchial mucous membrane becomes unduly irritable, hence the prevalence of chronic cough amongst the cows in our overcrowded town-dairies. Chronic cough also occurs in horses, usually as a sequel to repeated attacks of bronchits. It constitutes unsoundness, is best treated by repeated doses of belladonna and camphor, but often requires for its entire removal a run at grass.

COULOMB, CHARLES AUGUSTIN DE, known by his experiments on friction, and his invention of an instrument—the *Torsion Balance* (q.v.)—to measure the force of magnetic and electrical attraction, was born at Angoulême in 1736, and in early life entered the engineers. In 1777, he gained a prize by an essay on the construction of magnetic needles (*Sur les Aiguilles Aimantées*). In 1779, his *Théorie des Machines simples* gained the prize offered by the Academy; and in 1781, he was a third time successful in an essay on the friction and resistance of cordage, &c., used in machines. In the same year he was elected as member of the Academy, and his services were employed on all the most difficult problems in mechanics. Having offended certain influential persons by reporting unfavorably on their project of a navigable canal in Bretagne, C. was for some time imprisoned, but received from the States of Bretagne a present of a seconds' watch, as a reward of his firm opposition to an expensive and unprofitable scheme. C. lived in retirement during the Revolution; became a member of the Institute, 1804; and died August 23, 1806.

COU'LTER. See PLOUGH.

COU'MARIN, or TO'NKA STEARO'PTEN (see STEAROPTEN), is a camphor-like substance of a very agreeable smell, which gives their fragrance to the well-known Tonka Bean (q. v.), (*Dipterix odorata*), so much used for flavoring snuff; the Woodruff (*Asperula odorata*); the Melilot (*Melilotus officinalis*); a number of grasses, as the sweet-scented Vernal Grass (*Anthoxanthum odoratum*); and the Faam or Faham leaves (*Angræcum fragrans*), much prized among the Asiatics for their vanilla-like scent; and is probably the cause of similar fragrance in many other plants. C. may be procured from Tonka beans by digestion in ether. It crystallizes in small prisms, is colorless, has the smell of the bean, and is scarcely soluble in cold water, but dissolves pretty easily in boiling water. A beverage well known in Germany as *May Drink*, and made of wine and woodruff, derives its flavor from coumarin.

COU'NCIL, or SY'NOD, is an assembly of ecclesiastical dignitaries held for the purpose of regulating the doctrine or discipline of the church. As early as the 2d c., church councils were convened in which only one or two provinces took part, the bishops and presbyters binding themselves to carry out the decisions arrived at in their own communities. These assemblies were commonly held in the chief town or metropolis of the province, and the bishops of such capitals—who, after the 3d c., bore the title of *metropolitan*—were wont to preside over the meetings, and to consider questions of doctrine and discipline which had arisen within the territory.

Over these metropolitan councils were established, at a later period, the provincial synods, exercising authority over several united provinces, and finally, the national councils. After the 4th c., when the Christian religion was established in the Roman empire, we read of *œcumenical*, i. e., universal councils, so called because all the bishops of Christendom were invited or summoned by the emperor. In some early synods, we find bishops, presbyters, and others, taking part in the deliberations; but after the opening of the 4th c., only the bishops were convened. According to the doctrine of the Roman Catholic Church, the pope alone, or, by way of exception, in some cases the college of cardinals had the power of convening œcumenical councils, which, in the Catholic view, represent the universal church under the guidance of the Holy Ghost. Questions were determined by the majority of votes, and the pope or his proxy presided and confirmed the resolutions carried in the synod. In matters of faith, the Holy Scriptures and the traditions of the church are the guide; while in lighter matters, human reason and expediency were consulted. In the former, œcumenical councils are held to be infallible, but in other matters of discipline, &c., the latest synod decides questions. The question of the pope's subordination to the decrees of

the œcumenical councils was long and warmly debated, but the recent Vatican council may be said to have set the question at rest. Twenty œcumenical councils are recognized in the Roman Catholic Church—9 eastern and 11 western.

1. The synod of apostles in Jerusalem, wherein the relation of the Christian doctrine to the Mosaic law was determined. (See Acts, c. xv.). 2. The first C. of Nice, held 325 A.D., to assert the Catholic doctrine respecting the Son of God in opposition to the opinions of Arius. 3. The first C. of Constantinople, convoked under the Emperor Theodosius the Great (381 A.D.), to determine the Catholic doctrine regarding the Holy Ghost. 4. The first C. of Ephesus, convened under Theodosius the Younger (431 A.D.), to condemn the Nestorian heresy. 5. The C. of Chalcedon, under the Emperor Marcian (451 A D.), which asserted the doctrine of the union of the divine with the human nature in Christ, and condemned the heresies of Eutyches and the Monophysites. 6. The second C. of Constantinople, under Justinian (553 A.D.), which condemned the doctrines of Origen, Arius, Macedonius, and others. 7. The third C. of Constantinople, convoked under the Emperor Constantine V., Pogonatus (681 A.D.), for the condemnation of the Monothelite heresy. 8. The second C. of Nice, held in the reign of the Empress Irene and her son Constantine (787 A.D.), to establish the worship of images. 9. The fourth C. of Constantinople, under Basilius and Adrian (869 A.D.), the principal business of which was the peace of the eastern and western churches, and the deposition of Photius, who had intruded himself into the see of Constantinople, and the restoration of Ignatius, who had been unjustly expelled. 10. The first Lateran C., held in Rome under the Emperor Henry V., and convoked by the pope, Calixtus II. (1123 A.D), to settle the dispute on investiture (q. v.) 11. The second Lateran C., under the Emperor Conrad III. and Pope Innocent II. (1139 A.D.) condemned the errors of Arnold of Brescia and others. 12. The third Lateran C., convened by Pope Alexander III. (1179 A. D.), in the reign of Frederick I. of Germany, condemned the 'errors and impieties' of the Waldenses and Albigenses. 13. The fourth Lateran C., held under Innocent III. (1215 A.D.), among other matters asserted and confirmed the dogma of transubstantiation and necessity for the reformation of abuses and the extirpation of heresy. 14. The first œcumenical synod of Lyon, held during the pontificate of Innocent IV. (1245 A.D.), had for its object the promotion of the Crusades, the restoration of ecclesiastical discipline, &c. 15. The second œcumenical synod of Lyon, was held during the pontificate of Gregory X. (1274 A.D.). Its principal object was the re-union of the Greek and Latin churches. 16. The Synod of Vienne in Gaul, under Clemens V. (1311 A.D.), was convoked to suppress the Knights Templars, &c. 17. The C. of Constance was convoked at the request of the Emperor Sigismand, 1414 A.D., and sat for 4 years. It asserted the authority of an œcumenical C. over the pope, and condemned the doctrines of John Huss and Jerome of Prague. 18. The C. of Basel was convoked by Pope Martin V., 1430 A.D. It sat for nearly 10 years, and purposed to introduce a reformation in the discipline, and even the constitution of the Roman Catholic Church. All acts passed in this C., after it had been formally dissolved by the pope, are regarded by the Roman Catholic Church as null and void. 19. The celebrated C. of Trent, held 1545—1563 A.D. It was opened by Paul III., and brought to a close under the pontificate of Paul IV. The Vatican C. above mentioned, held in 1870, decreed the infallibility of the pope. For details of the more important councils, see NICE, BASEL, CONSTANCE, TRENT, &c.

Among the provincial or local synods convened after the division of the church into east and west, we may mention that of Clermont (1096 A.D.), when the first crusade was proposed, and that of Pisa (1409 A.D.), when three popes were contending for the see of Rome. Among Protestants no general C. has ever been convened; but several particular synods have decided various questions. Of these synods one of the more remarkable was that of Dort in 1618, when Calvin's creed was asserted against the Arminians.

The decrees of the Roman Catholic councils were edited by Mansi (31 vols., 1759—1798). See Hefele's *Conciliengeschichte* (7 vols., 1855—1874).

COUNCIL, PRIVY. See PRIVY COUNCIL.

COUNCIL, TOWN. See TOWN COUNCIL.

COUNCIL OF WAR is a conference of officers, in military or naval warfare, on some matter in which the commander wishes to fortify his judgment by an appeal to that of others. The French make a special provision for a Council of Defence in a garrison. The governor or commandant may summon the heads of departments to meet him in consultation whenever he may think such a step desirable; and the opinions expressed at such meetings are placed upon record. The commandant of a garrison generally solicits the opinion of a C. of W. before surrendering to besiegers. The English military code leaves these matters to the discretion of the commander. In the navy, a C. of W. consists usually of flag-officers only; but officers of lower rank occasionally assist.

COU'NSEL. See ADVOCATE and BARRISTER.

COUNT (Fr. *comte;* Lat. *comes*). In classical writers, down to the end of the 4th c., the meanings attached to the word *comes* were comparatively few and simple. At first it signified merely an attendant, and differed from *socius* chiefly in expressing a less intimate and equal relation to the person accompanied. Suetonius uses it for an attendant on a magistrate. A little later, in Horace's time, it was applied to those young men of family whom it had become customary to send out as pupils under the eye of a governor of a province, or the commander of an army. Very soon the fashion of having similar attendants at home was introduced, and Horace speaks of this necessity as one of the miseries of a high position. The emperor, of course, had many *comites* in this sense; and to these, as he gradually became the center of power, he transferred the various offices of his household, and even of the state.

. Around his person these comites formed a sort of council of state, very much resembling that instituted by the first Napoleon. The example of the emperors of the west was followed by the emperors of the east, though at Byzantium the title attached less to the office than to the individual. Most of the titles of our own court officials are translations of those belonging to similar officers in the lower empire. The *comes sacrarum largitionum* was the grand almoner; the *comes curiæ*, the grand-master of ceremonies; the *comes vestiarius*, the grand-master of the wardrobe; *comes equorum regiorum*, the grand equerry, &c. The *comes marcarum*, or count of the marches, there can be little doubt, was the original of the *marquis* of later times. In France, the C. of the palace (*comes palatii nostri*) was the highest dignitary in the state after the *maire* of the palace; and in the 11th c. he had already acquired a rank apart from that of the other counts. He presided in the court of the sovereign in his absence, and possessed sovereign jurisdiction. The habit of instituting counts-palatine was adopted by Spain and England. Those counts, again, who, at a later period, as rulers of provinces, assumed something approaching to sovereign power, arrogated to themselves the right of appointing counts-palatine under them—e. g., the Counts of Chartres, of Champagne, of Blois, Toulouse, &c.; and the ancient houses of Chartres and of Blois continued to claim in perpetuity the title of C.-palatine as that of their eldest sons. Counts of this sovereign class owed their origin to the feebleness of the later Carlovingian kings, under whom they contrived gradually to convert the provinces and towns which they had governed as royal officers into principalities hereditary in their families. It was then that the counts came to be known by the names of their counties. Since the great revolution, the title of C. in France has been purely honorary, and has been used with a license which has almost deprived it even of that character. The title was never used in England, though its Latin equivalent has always been the common translation for Earl (q. v.), and the wife of an earl, from a very early period, has been styled *countess*. For the history of the office in Germany, where it was of great importance, see GRAF.

COUNT AND RE'CKONING, the technical name given in the law of Scotland to a form of process, by which one party compels another to account judicially, and to pay the balance which may be found to be due. In these actions a remit is usually made to an accountant.

COU'NTER APPROA'CH, in Military Engineering, is a trench or passage, cut by the defenders of a fortified post from some of the outworks towards the besiegers, and leading to a battery in a small work. Its object is to enable the defenders to foil the approaches of the besiegers, by carrying the fight further away from the body of the place, and enabling the besieged to enfilade the besiegers' batteries and approaches.

COU'NTER-CHANGED, or CO'NTER-CHANGED, in Heraldry. When several metals and colors are intermixed, one being set against the other, they are said to be counter-changed.

COUNTERFEIT. See COINING.

COUNTERFORT, in Fortification, is a mass of stone or brickwork added to the revetment of a rampart, in such a way as to form a buttress for resisting the pressure of the mass of earth. Counterforts occur at intervals of about 20 feet, and assist in preventing the earth from pushing down the revetment-wall into the ditch.

COUNTER-GUARD, is an outwork designed to defend the two faces of a bastion or ravelin from a direct fire, so as to retard a breach being made. The C. consists of two lines of rampart parallel to the faces of the bastion or ravelin, and separated from them by a narrow ditch. The crest of the C. must be some three feet lower than that of the works it covers, in order not to obstruct the defence. Lest the enemy should establish a battery on the

C., the terre-plein, or flat space behind its parapet is made very narrow.

COUNTER-IRRITANTS, agents applied to the skin so as to redden (rubefacients), to vesicate (blisters or vesicatories), or to produce postules, purulent issues, or even sloughs of skin and of the subcutaneous textures. The milder C. are mustard (see CATAPLASM), turpentine applied on warm cloths, and spirit or acetic acid in lotion. The stronger are blisters of cantharides (q. v.) or of ammonia; croton-oil (q. v.) or tartar emetic (q. v.), in ointment; setons, caustic or pea-issues, and the moxa; and above all, the actual cautery (q. v.) or hot iron. None of the stronger C. should be used without careful consideration and medical advice; great mischief is often done by their careless or improper use. C. relieve internal pain, and tend to promote the absorption of morbid effusions.

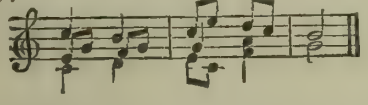
Amongst horses, C. are much used for strains and diseases of the joints, but should never be applied, as they too often are, in recent cases, or whilst the part is hot or inflamed. Cantharidine preparations, of ointment of biniodide of mercury, are the most convenient. For cows, use hot fomentations, followed by the smart infriction of mustard-paste; for dogs, soap-liniment, strengthened, if required, by ammonia or turpentine.

COUNTERMARCHING. See MARCHING.

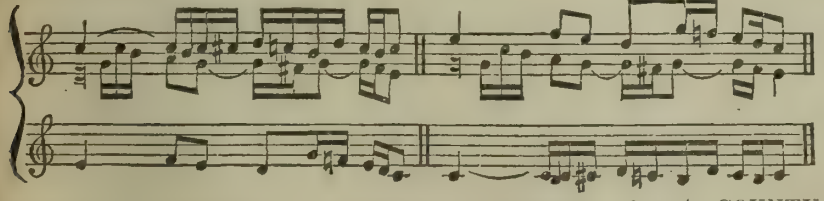
COU'NTERMINE, in Military Engineering, is a gallery or chamber, excavated under the glacis or some other part of a defence-work of a fortress. Its purpose is to foil a besieger. In a fortress on a large scale, there are envelope galleries, counterscarp galleries, listening galleries, galleries of communication, and other subterranean passages, under various parts of the outworks, all for the purpose of assisting the defenders in discovering and frustrating plans laid by the besiegers. Listening galleries are sometimes pushed forward even to the foot of the glacis. In such places, selected men put their ear to the ground, and listen for the approach of the enemy, as denoted by the sound of tools used in driving a mine or gallery of attack. The sound of a pickaxe so employed can be heard through the ground at a distance of 60 feet. As there are no openings above, these galleries cannot be driven beyond a certain distance, as the sappers would be stifled for want of air. If a mine be driven to blow up the defence-works, a C. is driven to blow up the besiegers; and sometimes the two parties carry their works so far as to meet in the subterranean passages, and there fight. If there be only a thin wall of earth left between them, they will fire pistols through bored holes, or drive in cartridges or smoke-balls. This terrible work is mostly carried on by sappers and miners.

COUNTER-PASSANT, in Heraldry, when two beasts are passing each other the contrary way.

COU'NTERPOINT, in Music, means the setting of a harmony of one or more parts to a melody. In the early age of the science, notation was represented by mere points on the lines. The setting of parts to a melody already represented by a row of dots or points was therefore called *punctum contrapunctum*. In this respect C. is nothing else but the uniting of various harmonious parts. In a more circumscribed sense, it is the art or manner of accompanying a given melody with other parts. Simple C. is a musical combination where the melody of the parts is not mixed or changed, and may be either all in notes of the same length or of different lengths, as for example:



If the parts be constructed in regard to one another so that they can be changed, or transposed over or under each other, without alteration in the movement, or injury to the harmony, it is then called double C., for example:



As double C. consists of the changing or transposing of one part over or under another, it follows that there must be as many different kinds of it as there are different intervals in the scale. We have, therefore, double C. of the octave as above, of the twelfth, tenth, ninth, &c. That of the octave is, however, the most useful, as it is more free in movement, and easier to recognize.

The first indication of contrapuntal writing is to be found in the 12th c. by Adam de la Hale, who received a genuine artistic education in the Netherlands, but was far in advance of his time, for his style of music was forbidden to be performed in the church by a bull of the pope, who gave Palestrina an order to replace it with a more simple music. The best masters for C. have been Kirnberger and Albrechtsberger in former times, and in modern times, Schneider, Hauptmann, and Dehn.

COUNTER-PROOF. An impression which is obtained from a freshly-printed proof of an engraving, by laying it, before the ink is dry, upon plain paper, and passing it through the press. By this means the ink is transferred from the wet proof to the plain paper, and a reversed impression is obtained, which is often of use in enabling the engraver to judge of the success of his work.

COUNTERSCARP, in Fortification, is the vertical or nearly vertical side of the ditch nearest to the besiegers, and opposite to the scarp or escarp.

COUNTERSIGN, in military discipline or manœuvres, is a word extended between sentinels, inspectors of posts going their rounds, or persons having business with the soldiers in camp or garrison. The C. in use at any particular time, is supposed to be known only to those immediately concerned, and is generally a simple word.

COUNTERSIGN, the signature of a secretary, minister, or other subordinate, to any writing signed by the principal or superior, as a guarantee for its authenticity.

COUNTER-TENOR, the highest adult male voice, and the lowest female voice.

COUNTER-VAIR, a heraldic fur. It differs from *Vair* by having its cups or bells of the same tinctures placed base against base, and point against point. The tinctures are OR and AZURE.

COU'NTERVALLA'TION, in Military Engineering, is a chain of posts constructed by the besiegers of a fortified place; it completely surrounds the place at a certain distance, and is intended to prevent sorties of the besieged. The posts are generally small redoubts, either isolated or connected by a line of earthworks. It is only during very protracted sieges that countervallations are constructed. They bear a certain relation to Circumvallation (q. v.).

COUNTIES CORPORATE. In England there are certain cities and towns, some having territory annexed to them, some scarcely any, which possess the privilege of being governed by their own sheriffs and other magistrates altogether independently of the counties in which they are situated. The Act 3 Geo. I. c. 5, for regulating the office of sheriff, enumerates twelve cities and five towns in this position. The cities are London, Chester, Bristol, Coventry, Canterbury, Exeter, Gloucester, Lichfield, Lincoln, Norwich, Worcester, and York. The towns are Kingston-upon-Hull, Nottingham, Newcastle-upon-Tyne, Poole, Southampton. From forming no part of the counties with which they were locally connected, they had no share in the county elections. To this extent twelve of the number are now included in their respective counties (2 Will. IV. c. 45, s. 17, schedule G).

COU'NTRY DANCE (Fr. *contre-danse*, of which the English term is a corruption), a dance in which as many couples can take part as there is space to accommodate them; at the commencement, the gentlemen being ranged on one side, and the ladies on the other. In its figure, the dancers are constantly changing places, leading one another back and forward, up and down, parting and uniting again. The numerous different figures, which give an interest to this dance, are generally designated with a particular name. The music is sometimes in $\frac{2}{4}$ time, and sometimes in $\frac{6}{8}$ time, and the step is more smooth than springing. The C. D. keeps its ground in England notwithstanding the introduction of many fashionable new dances. See DANCING.

COU'NTY, a term equivalent with shire. Although of the same signification, the terms are appliedon no uniform principle. In England and Scotland, the shires are also called counties; but in Ireland the term C. seems to be exclusively employed. Such, likewise, appears to be the case in the British colonies and United States. See SHIRE.

COUNTY COURTS. According to Blackstone, the *Sciremote* or ancient county court was established by Alfred the Great about 870; the suitors themselves being the judges. Henry II. appointed justices of assize courts, 1176, and thus the C. C. became superseded for judicial purposes. There is still a remnant of jurisdiction left in these ancient courts, unconnected, however, with the recovery of debts; outlawries of absconding offenders are here proclaimed, and certain proceedings connected with the election of coroners, knights of the shire, &c., take place in the old county court.

The modern C. C. were established in all the cities and large towns of England and Wales by C. C. Act, 1846, chiefly by the efforts of Lord Brougham; and the courts commenced business in March 1847. By the original Act the jurisdiction was not to exceed £20. In 1850 this was extended to £50 in all personal actions, and by a succession of Acts since that time the jurisdiction has been extended in many collateral points. In 1865 an equity jurisdiction was conferred on the C. C. to £500, and the judges have all the power and authority of the Court of Chancery in equitable suits. By the C. C. Act of 1867, actions of ejectment and actions of disputed title may be tried in C. C. where the value of the lands, &c. does not exceed £20. The jurisdiction of the C. C. is protected by the disallowance of costs in High Court, if less than £20 is recovered on contract, or £10 in tort. Causes commenced in the High Court may be remitted to the C. C. for trial. Any action of tort of whatever nature and amount may be remitted to the C. C. if plaintiff has no visible means of paying costs.

The C. C. are courts of record. In England and Wales there are 499 courts, divided into 55 circuits, presided over by 56 judges. The judges are appointed by the Lord Chancellor, or, where the whole district is in the duchy of Lancaster, by the chancellor of that duchy. Their salaries, owing to extended jurisdiction, are now nearly all £1500, and have, with slight variations, been made uniform throughout the country. Judges resigning from permanent disability are allowed a retiring pension not exceeding two-thirds of their annual salary. Each court has a registrar. The registrars are appointed by the judge, but the Lord Chancellor, or chancellor of the duchy of Lancaster, may remove them for misconduct. Their salaries depend on the number of *plaints* entered in their districts. In courts under 6000 plaints, they vary from £120 to £500, out of which the registrar provides a staff of clerks. Where the plaints exceed 6000, the salary is £650 and clerks; where they exceed 8000, £700 and clerks. Each court has also a high-bailiff, whose duties are outside, serving process and levying executions. In the smallest courts, their salaries may fall to about £140; in the largest, they may rise to £800 net. In 1866 an Act was passed for the abolition of the offices of treasurer and high-bailiff, as vacancies occur.

The registrar has power under C. C. Act, 1867, to take all undefended and admitted cases by leave of the judge. In every action or suit of whatever nature where more than £5 is claimed, and in all other actions, by leave of judge, a jury may be demanded at three clear days' notice. The number of jurymen to try a cause in C. C. is five. There were only 993 causes tried by a jury in 1878, out of 616,490 causes tried. The plaintiff obtained a verdict in 599,883 cases, and the defendants obtained verdicts or non-suits in 16,607 cases. There is a right of appeal in all cases where more than £20 is claimed, and by leave of judge in all other cases. There were only 87 appeals in 1878. By the Debtors Act, 1869, the judge only may commit to prison in cases where he is satisfied the debtor has the *means* to pay the debt or instalment thereof. There is no other ground of imprisonment for debt in C. C. In 1878 there were 5664 persons imprisoned out of 28,574 orders issued, the majority paying before imprisonment. A debtor may be committed for any period not exceeding forty-two days, and can be imprisoned only once for the same default.

Counsel and solicitors are frequently employed in the C. C., but as a rule suitors conduct their own cases. By the Bankruptcy Act, 1869, the C. C. in large towns (exclusive of London C. C.) have an unlimited jurisdiction in bankruptcy. They have also a limited jurisdiction in Admiralty, but this is exercised only by certain designated C. C. in maritime towns. The metropolitan C. C. have a jurisdiction *inter se*. Judgment once obtained can be followed out in any part of England and Wales.

The C. C. exercise jurisdiction under thirty-four Acts of Parliament. The gross charge of the C. C. in 1881–82 was £462,930.

COUNTY RATE, a local tax levied in England and Wales, for the purpose of defraying the expenses to which counties are liable; such as the maintenance of bridges, jails, lunatic asylums, prosecutions and costs incident thereto, coroners, &c. It is levied on all property liable to be assessed for the relief of the poor. Rogue-money in Scotland, and the grand jury cess in Ireland, are the taxes most nearly resembling the English county rate. See the Poor-law Commissioners' *Report on the Local Taxes of the United Kingdom*, 1846.

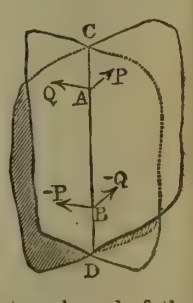
COUP is a French word signifying 'stroke.' It is used in certain phrases that have become current in Europe. *Coup d'état*, 'stroke of state,' means an arbitrary encroachment suddenly effected by the governing authorities upon the constitution of the state, altering or setting aside the prerogatives of other parts of the body politic.—*Coup de main*, 'a stroke of the hand,' is applied, in the language of war, to a sudden and successful attack.—*Coup d'œil*, 'a stroke or glance of the eye,' is applied in speaking of persons who have the faculty of comprehending all the relations of a complicated matter at one survey; or, in art, it expresses the general effect of a picture or group at first sight.—*Coup de théâtre*, means properly a trick of the stage to produce an effect by surprise, and is hence applied to any analogous proceeding.

COUPED (Fr. *coupé*), in Heraldry, is used to describe the head, or any limb of an animal cut off from the trunk, and smooth. It is distinguished from *erased*, i. e., forcibly torn off, and therefore ragged and uneven. A distinction is also made between *couped* and *couped close*, the latter signifying that the head or limb is cut off close, leaving no part of the neck or trunk attached to it. When crosses, bars, bends, and the like, are cut so as not to touch the sides of the escutcheon, they are also said to be couped.

COU'PLES, the name given in statics to pairs of equal parallel forces acting in opposite directions, and at different points of a body. It is shown in the art. Parallel Forces (q. v.), that when two parallel forces act in opposite directions on a body, they may be replaced by one equal to their difference acting parallel to them in the direction of the greatest, at a point *not* between but *beyond* the points where they are applied; and which point recedes the further from their points of application the nearer they approach equality, getting to an infinite distance when they become equal and when their resultant accordingly is zero. In this limiting case, the forces constitute a couple; they have no tendency to *translate* the body; their action goes wholly to make it rotate about an axis passing through its center of gravity, and perpendicular to the plane in which the couple acts. Such being the case, a couple cannot be replaced or counteracted by any single force, for such a force would produce translation; it can only be replaced or balanced by other couples. The length of the straight line which meets the lines of action of the forces at right angles is called the 'arm' of a couple, and the product of the force into its arm is called its 'moment.'

Most of the leading propositions in the theory of C. are readily seen to be true, as soon as they are stated. For instance, as the axis round which a couple tends to make a body rotate passes through the body's center of gravity perpendicularly to the plane of the couple, it does not matter what position the couple occupies in its own plane. Also, supposing the body to be rigid, the couple may be moved into any plane parallel to its own, provided its new position be rigidly connected with the original position. It is also obvious, on the principle of the lever, that the efficiency of the couple depends on its moment simply, so that its arm may be shortened or lengthened at pleasure, provided the force be increased or diminished as the case may require, so as always to make the product of the force and arm the same. Suppose ropes fastened at the bow and stern of a ship pulling with equal force in opposite directions; they will make the ship turn round an axis through its center of gravity, at a rate depending on the force applied to the ropes.

If the ropes be fastened to opposite points of the vessel nearer midships, it will only turn round at the *same* rate, provided the force applied to the ropes be *increased;* and, on experiment, it would be found that the force must be increased so as that its product into the distance between the ropes shall equal the product of the force in the first case into the length of the ship. Through this we can compound C. acting in the same plane, for we can turn them round till their arms coincide, and then give them a common arm; their forces will then act in the same lines, when their resultant into the arm will be the new couple. So two C. which are situated in planes inclined at any angle to each other may be replaced by a single couple (see fig.). Suppose the C. both to be moved in their respective planes till their arms coincide with the line of intersection of the planes, CD. Bring them then to a common arm in this line, AB. At each end of this arm we shall have a pair of forces, say P and Q, inclined to one another at the angle of inclination of the planes. Their resultant, by the composition of forces, will be a force R, acting in a line between the planes. We shall have then forces R acting at each end of the arm, and evidently in directions parallel and opposite. R × arm, AB, then, is moment of the resultant couple. Having seen how to compound C. whose planes are inclined to one another, the theory of the composition of C. may be said to be complete, for if they are in parallel planes, we know we can bring them into the same plane and to a common arm, and so into a common couple. In statical theory, any number of forces acting on a body, and not in equilibrium, may be reduced to a single force, a single couple, or a single force and a single couple. We have shown that the C. may all be reduced to one, as well as those forces which do not produce couples. If the single force do not act perpendicularly to the plane of the couple, it can always be compounded with the forces of the couple, so as to reduce the whole to a single force; if it act perpendicularly, then it cannot be com-



pounded with the couple, and the body will have at once a motion of translation and motion of rotation.

COU'PLET. Any two lines which rhyme together may be called a C.; but the term is more frequently used by critics to denote two lines which contain the complete expression of an idea, and are, therefore, to a certain extent independent of what goes before or what follows. The poetic wits of the age of Queen Anne excelled in this kind of aphoristic versification. Pope, it has been said, reasons in couplets. For example:

> 'Tis with our judgments as our watches, none
> Go just alike, yet each believes his own.'

COUPLING, an organ register, by which two or more rows of keys can be connected by a mechanism, so that they can be played together.

COUPON (Fr. *couper*, to cut), a term signifying any billet, cheque, or other slip of paper cut off from its counterpart. It is, however, applied chiefly to a dividend or interest warrant, which is presented for payment by holders of debentures. Coupons in Great Britain must now be stamped.

COURA'NT, in Heraldry, always used for *running*, which is its meaning in French.

COURBEVOIE, a town of France in the department of Seine, situated on the left bank of the river of that name, about 5 miles north-west of Paris. C. has well-built houses, mostly supplied with gardens, and large barracks erected by Louis XV. Its principal manufactures are white-lead and brandy, and it has some commerce by the Seine. Pop. (1876) 11,811.

COU'RGNÉ, a market-town of Piedmont, situated at the foot of a hill on the west side of the Orca, 12 miles west-south-west of Ivrea. It has several convents, and a population of 5600.

COURIER, Paul Louis, a French scholar and political writer, was born in Paris, January 4, 1772. He was educated for the army, but, without neglecting his military studies, he showed a special predilection for ancient literature. In 1793 he became lieutenant of artillery, served in the Italian campaign 1798—1799, and in 1803 was appointed *chef-d'escadron*. After the battle of Wagram, he tendered his resignation, which was accepted. He now proceeded to Switzerland and Italy, returning to his native country in 1812. Up to this period, he was known publicly only by his translations from the classics. In 1816 he appeared for the first time as a political pamphleteer, and rapidly obtained a brilliant reputation. The piece in which he made his *début* was the *Petition aux Deux Chambres*. In 1819—1820, he published in a journal, called *Le Censeur*, a series of letters containing an exposition of his political ideas, which were those of an ardent constitutional reformer. These letters, for keenness, wit, and eloquence, have been compared to those of Pascal. His *Simple Discours* (1821) was directed against the project then entertained of purchasing Chambord for the Duc de Bordeaux in the name of the nation. It is exceedingly vigorous, clever, and sensible, and had a great success. For his audacity, he was tried and condemned to one month's imprisonment. In 1823 he published his *Livret*, a kind of memorandum-book; and in 1824 his *Pamphlet des Pamphlets*, which is finely called by Armand Carrel *Le Chant du Cygne* (the Swan's Death-song). On the 10th April 1825 he was assassinated near his own house at Veretz, in the department of Indre-et-Loire, a little before sunset. The murderer was never detected. C. was the pamphleteer of the middle class. Manly earnestness, pleasant wit, cutting irony, and admirable sense are his characteristics. Time, which generally dims the lustre of a pamphleteer's reputation, has not touched that of C., which is still as bright as ever.

COU'RIERS. There are two distinct classes of couriers. The first to be noticed are employed by government to carry, securely and expeditiously, important dispatches to and from ambassadors at foreign courts. Active, and accustomed to travel, speaking several languages, and with a sufficient idea of their own consequence, they will set out at a moment's notice, pursue their way by steamer, by rail, by hired voiture, or on horseback, with little intermission by night and by day, until they reach their destination. Acquainted with routes, officials, and methods of clearing the way, and provided with all proper credentials, including a requisite supply of cash, nothing interrupts them in their eager course. Such are *Government C.*, a useful class of public servants. The other class of C. are not dissimilar in accomplishments, but their services are limited to private parties, and coming more generally into notice, we may enter more minutely into a description of their character.

Private Couriers.—These are usually persons of middle age, natives of Switzerland, France, or Germany, who have either been at some time gentlemen's servants, or been long employed as attendants on families while traveling on the continent. In some instances, they are of English origin, and have travelled again and again through Europe with employers who relish the dignity of having a man-servant, and dislike personal responsibility and trouble. Of whatever country the courier has settled down into a perfectly cosmopolitan character. With equal fluency, he speaks English, French, Italian, and German, with perhaps Spanish, Portuguese, and Russian; he is acquainted with processes of getting passports and visés; knows the best routes, the best hotels, and where anything curious is to be seen. Acting for the time as a servant, he is not intrusive. Whether by railway or steamboat he knows his place, and makes his appearance only when he is wanted. No doubt, the courier is an expensive luxury; his usual wages being from £8 to £10 a month, independently of traveling-fares. His keep at inns is nominally paid by himself, but, of course, it weighs with the hotel keeper in making out the bill. 'A courier, however, though an expensive luxury, is one which conduces much to the ease and pleasure of traveling, and few who can afford one will forego the advantage of his services. He relieves his master from much fatigue of body and perplexity of mind, in unraveling the difficulties of long bills and foreign moneys, sparing his temper the trials it is likely to endure from disputes with innkeepers, postmasters, and the like.

'If clever and experienced, and disposed to consult the comfort of his employer, he is a most useful person. His duties consist in preceding the carriage at each stage, to secure relays of post-horses; he must make arrangements for his employer's reception at inns where he intends to pass the night; must secure comfortable rooms, clean and well-aired beds, and order meals to be prepared, fires to be lighted, taking care that his master is called and the post-horses ordered at the right hour. He ought to have a thorough knowledge of everything that relates to a carriage; he should examine it at the end of each day's journey, to ascertain whether it requires any repairs, which should be executed before setting out. He should superintend the packing and unpacking of the luggage, &c. It falls to the courier to pay innkeepers and post-boys; and he ought to take care that his master is not overcharged. Besides this, he performs all the services of waiting and attendance, cleaning and brushing clothes; and he is not perfectly accomplished unless he has a smattering of the art of cookery' (Murray's *Hand-book for Travelers on the Continent*). As among ordinary domestics, there are honest and dishonest C., and it is of importance that travelers should not hire them without proper recommendations as to character. For places at which C. are to be heard of, we refer to the work just quoted, also to Bradshaw's *Continental Railway Guide*. In Paris, information respecting them will be obtained at Meurice's Hotel.

COU'RLAND, or KURLAND, a Russian government, and one of what are called the Baltic provinces, in lat. 56°—58° N., long. 21°—27° E. It was formerly an independent duchy—properly, indeed, consisting of two duchies, Courland and Semgall—and belonged, along with Livonia, to the Teutonic Knights. The difficulty of resisting the Russians led to the acknowledgment, in 1651, of the feudal sovereignty of Poland; and the last grand-master, Gotthard Kettler, secured the duchies of Courland and Semgall for his family. The country was long distracted by the contentions of two parties, one Russian and the other Polish; and after being for some time very completely under Russian influence, and the scene of many Russian intrigues, it was finally united to Russia in 1795. It contains about 10,500 square miles, with a population in 1880, of 682,000, mostly Protestants. It is generally a level country, with ranges of low hills, and contains many lakes, bogs, forests, and downs, but some parts have a very fertile soil. The proprietors of land are mostly German; the peasantry, of Lettish or Esthonian extraction, are chiefly engaged in husbandry; there is little manufacturing industry or commerce. The capital is Mitau; but the most flourishing town is Libau.

COURSE, in Building, is a continuous range of stones or bricks of uniform thickness.

COURSES, on shipboard, is a name given collectively to all the lower sails; above them is the group of top-sails, and highest of all, the group of top-gallant sails. The C. comprise the mainsail, foresail, main-staysail, fore-staysail, and mizen-staysail.

COURSING, a method of hunting hares by greyhounds, in which the dogs follow the game by *sight*, instead of by *scent*. C. is of very ancient date, having been practised by the Greeks. Within the last twenty years, however, its popularity as a sport has greatly increased, and the breed of the greyhound is now studied with nearly the same care and zest as that of the race-horse. The method pursued in C. is briefly as follows:

Meetings are held in open districts, well frequented by hares, where the greyhounds—technically called 'dogs,' as foxhounds are technically called 'hounds'—are entered by their owners for a variety of stakes, which are to be competed for—C., in this respect, partaking of the nature of a race between horses. The first thing done is to select a judge to decide upon the merits of the best dogs; second, a 'slipper' is appointed to hold the dogs in leash, and start them at the hare; and, third, a flag-steward is chosen, who remains near the judge and announces the color of the victorious dog by means of a red or white flag, according as

the competitors are arranged. The next thing done is to 'beat' the field for a hare. When one is found, the judge usually allows it 80 or 100 yards 'law' before he cries to the 'slipper' to let the dogs 'go.' Upon the word 'go,' the 'slipper' liberates the animals by a spring attached to the 'slips'—i. e., the long strong cord held by the 'slipper' and communicating with the leathern collars fixed round the necks of the dogs. The judge's duties now begin in earnest. He follows the dogs wherever they go, calculating carefully the number of 'points' made by each—a 'point' being any meritorious achievement on the part of the dogs (as when the one outstrips the other at any time, or turns the hare, i. e., causes it to 'double'); and at last he adjudges the victory, not *necessarily* to the dog which has killed the hare, but to the one which has made the most points during the course, i. e., which has exhibited the finest qualities of speed, sagacity, endurance, &c.

COURT (Fr. *cour*, Ital. *corte*, from Lat. *cohors*, or *chors*, *chortis*, an enclosure or cattle-yard; allied to Polish *grod*, a city; Sw. *gard;* Eng. *yard* and *garden*) was originally applied to the square or space enclosed by the buildings of a feudal castle; and hence it came to denote the persons immediately surrounding a feudal chief or superior. Its application is now confined to the residence and surroundings of sovereign princes. In England, and in other free countries, when we speak of 'the court,' we mean little more than the family and attendants of the sovereign, viewed not in a private, but a public capacity.

The bishops and nobles, the ministers of the Queen for the time being, and other persons entitled to precedence, either on hereditary, official, or personal grounds, are those who habitually encircle the sovereign; and 'the court circle' consequently means those persons of distinction, and their families, who are in the habit of approaching the Queen, and of associating with the other members of the royal family. But this circle is one the circumference of which is marked by no absolute line, like that which in France, under the old monarchy, divided the C. from the city.

COURT, PRESENTATION AT. The honor of being presented at C., or introduced to the sovereign, is only to be obtained by persons of respectable position, and is a thing sought after not only for the *éclat* of the ceremonial, but as giving a certain stamp of character; for, having been received by the sovereign, a person may with justice expect to be received anywhere. Valuable so far as a credential, a reception at C. is carefully guarded from abuse. At the C. of her Majesty, Queen Victoria, there is a scrupulous and very proper exclusion of all parties, male or female, of damaged reputation. Those who aim at the distinction of being presented at C. belong chiefly to what are called the higher circles—nobility and landed gentry; officers in the army, navy, and higher departments of the civil service; judges, magistrates, church-dignitaries, members of the learned professions; and the wives and daughters of these respective classes. Men of scientific, literary or artistic attainments do not generally attempt to appear at C., and neither, of course, do the classes engaged in trade. It is usual to be presented on taking office, or on attaining some personal dignity, or on arriving from an important and distant expediton. Young ladies of good family are said 'to come out,' on being presented at court. What perhaps contributes more than anything else to secure selectness, is the obligation of appearing in 'court-dress,' an expensive and somewhat fantastic costume of old date; from which only those who assume professional uniforms are exempted. As is well known, the court-dresses of ladies are superb. It will thus be seen that the notions prevailing among foreigners arriving in England—those from the United States in particular—as to the practicability of indiscriminate presentation at C., are erroneous. It is the duty of the Lord Chamberlain at St. James's to furnish information regarding the steps to be adopted by those who desire to be presented at C., either at levées, which are restricted to gentlemen, or at draw ing-rooms, which are chiefly, though not exclusively, intended for ladies.

The days on which these receptions take place are advertised in the newspapers some days before with the necessary directions for preventing confusion. Her Majesty's birthday is the occasion on which the greatest reception of the year takes place, but there are no new presentations on that day. Any British subject who has been presented at C. in England, can claim to be presented by the British ambassador at any foreign court. Those who wish to be mere spectators, can obtain tickets to the corridor, where they see the company passing in and out, by applying to the Lord Chamberlain. For this purpose, however, an introduction is required. It is indispensable that the names of gentlemen desiring to be presented, and of the nobleman or gentleman who is to present them, be sent to the Lord Chamberlain's office several days previously, in order that they may be submitted for the Queen's approbation. Gentlemen are also requested to bring with them two large cards, with their names clearly written upon them, one of which is left with the Queen's page in the presence-chamber, and the other is delivered to the Lord Chamberlain, who announces the name to her Majesty. The same rules apply to ladies. Lists of presentations appear next day in the principal London newspapers.

COURT BARON. See COMMON LAW, COURTS OF.

COURT OF COMMON PLEAS. See COMMON LAW, COURTS OF.

COURT OF SE'SSION, the highest civil tribunal in Scotland, was instituted in the reign of King James V., by statute dating 17th May 1532. The object of its institution was to discharge the judicial functions which originally belonged to the king and council, and which, since 1425, had in a great measure devolved on a committee of parliament, as the great council of the nation. The C. of S. consisted at first of 14 ordinary judges and a president. One half of these judges and the president were churchmen, and the practice of appointing ecclesiastics to the bench did not cease for some time even after the Reformation. The king had the privilege of appointing, in addition to the ordinary judges, three or four peers or members of his great council, to sit and vote with the Lords of Session. When the Lord Chancellor (see CHANCELLOR OF SCOTLAND) was present, he was president of the Session.

His office was abolished at the Union, and the habit of appointing peers gradually fell into disuse, though, when a peer chances to be present, he is still, as a mark of courtesy, accommodated with a seat on the bench. From its foundation, till 1808, the C. of S. consisted of one court; in that year it was divided into what are known as the First and Second Divisions, two separate courts possessing co-ordinate jurisdiction. The Lord President is still president of the whole court when called together for consultation, and enjoys other privileges in that capacity; but on ordinary occasions, he officiates simply as president of the First Division. In 1810, another very important change was made. The First Division up to this time had consisted of 7, and the Second Division of 6 ordinary judges, the latter being presided over by the Lord Justice-clerk (q. v.), as the former was by the Lord President. The three junior judges were now taken from the First Division, and the two junior judges from the Second, and appointed to sit as permanent Lords Ordinary in the Outer House. The quorum, which had formerly been four, was now reduced to three in both Divisions. In 1830, the number of judges in the C. of S. was reduced to 13; and that is still the full number, though since 1877 there have actually been but 12 judges. Of the five Lords Ordinary, four only sit daily. The judgments of the Outer House, with a few statutory exceptions, are appealable to the Inner House. The youngest judge, or junior Lord Ordinary, officiates in a separate department of the Outer House, called the Bill Chamber (q. v.), where summary petitions, and other branches of business peculiarly requiring dispatch, are disposed of. This department alone is open during the vacations of the court, the judges, with the exception of the Lord President and Lord Justice-clerk, officiating in it in rotation. Either Division of the C. of S. may call in the aid of three judges of the other, when equally divided in opinion (31 and 32 Vict. cap. 100). In cases of still greater difficulty, the Lords Ordinary are also called in, and a hearing before the whole court, or *in presence*, as it is called, takes place. Since the 31 and 32 Vict. cap. 100, no hearings before the whole court have taken place; the cases being decided in written arguments submitted to the judges. The judges of the C. of S. are appointed by the crown, and hold their offices for life. No one is eligible to the office unless he has served as an advocate or principal clerk of session for five, or as a writer to the signet for ten, years. Practically, none but advocates are appointed. No action for debt can originate in the C. of S. in which the interest of the pursuer is less than £25. With few exceptions, the judgments of the inferior courts of Scotland are reviewable by the C. of S., but this rule does not apply to the small-debt courts. The judgment of the C. of S. may be appealed to the House of Lords within two years.

COURTALLUM, a town of the district of Tinnevelly, in the presidency of Madras, stands in lat. 8° 56' N., and long. 77° 20' E., near the junction of the Eastern and Western Ghauts. Open towards the east, at a height of 700 feet above the sea, it is elsewhere embosomed in hills, having, in its immediate neighborhood, a deep glen which affords easy communication between the opposite shores of Hindustan. The place is a favorite retreat for invalids, deservedly enjoying a reputation for salubrity of air, richness of vegetation, and beauty of scenery. The indigenous flora comprises 2000 species, and many exotics, such as the nutmeg, clove, and cinnamon, have been introduced with success.

COU'RTESY, or CURTESY, in Law, is the life interest which the surviving husband has in the real or heritable estate of the wife. It is remarkable that, both in England and in Scotland, this customary right should be regarded as a national peculiarity—that in England it should be called the C. of England, and in Scotland

the C. of Scotland—whereas it is well known to be peculiar to neither of them. Traces of it are to be found in a constitution of the Emperor Constantine (Code 6, 60, 1); and there can be no doubt that it had found a place, with all the peculiarities which now belong to it, in the *coutume* of Normandy, from whence there is every reason to think that it was transferred to England (Barnage, vol. ii. p. 60; Stephen's *Com.* vol. i. p. 264; Fraser's *Domestic Relations*, i. p. 635). The four circumstances which are requisite to make a tenancy by C. in England are—marriage, seizin of the wife, living issue, and the wife's death. The rule that the child must have been heard to cry, which at one time was followed in England, is still adhered to in Scotland. It is not necessary, however, in either country, that the child survive; it is enough that it was once in existence, although it should have died immediately after its birth. In both countries, the child must be the mother's heir, and it is consequently said that C. is due to the surviving husband rather as the father of an heir than as the widower of an heiress. By 19 and 20 Vict. c. 120, which enables tenants for life of *settled* estates (see SETTLED ESTATE) to make effectual leases for twenty-one years, subject to the exceptions and provisions in the act contained, a similar power is also conferred upon tenants by the C. of *unsettled* estates (Stephen, i. p. 267). As to the law of Scotland on the point, see Hunter on Landlord and Tenant, i. p. 119.

COURTESY TITLES. Titles of honor (q. v.) are imparted by the sovereign or other competent authority. Independently of these, there are C. T. assumed by or given to individuals, and which have no validity in law. The term C. T. is best known in connection with the titles given by popular consent to the sons and daughters of certain peers. English dukes, marquises, earls, and viscounts have several titles, accumulated by distinct patents in their progressive steps in the peerage. Thus, a duke may at the same time be a marquis, an earl, a baron, and a baronet; a marquis may be also an earl, &c.; and an earl is almost always a baron.

In ordinary parlance, they respectively take only their highest title. One of the inferior titles so set aside is permitted, as a matter of social dignity, to be assumed by the eldest son. For example, the Duke of Bedford being also Marquis of Tavistock, his eldest son takes the title of Marquis of Tavistock; and the Duke of Buccleuch and Queensberry being also Earl of Dalkeith, his eldest son takes the title of Earl of Dalkeith. When it happens that the inferior title is of the same name as the first, there is a somewhat different usage. For example, the Earl of Gosford being also Viscount Gosford, his eldest son, to prevent confusion, takes only the family surname, Acheson, with the prefix Lord—Lord Acheson. The younger sons of dukes and marquises have the courtesy title of Lord prefixed to their Christian and surname: as, for example, Lord Frederick Charles Cavendish, a younger son of the Duke of Devonshire; or Lord Archibald Campbell, a younger son of the Duke of Argyll. The eldest son of an earl, when not a viscount, takes his father's second title of Lord: as, for example, the eldest son of the Earl of Wemyss is styled Lord Elcho. A proper understanding of those conventional customs will serve to clear up some of the perplexities into which foreigners are apt to become involved in thinking of our highly artificial social system. It is to be kept in mind, that titles by courtesy do not raise their bearers above the rank of commoners; and that, consequently, they are eligible for election as representatives to the House of Commons. Very many of the peers, indeed, begin their political career as county or borough representatives under their C. T.; serving in this way a kind of apprenticeship as statesmen before they are advanced, by the decease of their fathers, to the House of Lords.

The daughters of dukes, marquises, and earls have the title Lady prefixed to their Christian and surname; and in the event of their marrying a person of inferior rank, they retain the title Lady with their Christian name, adding the surname of their husband. Yet, these are but courtesy titles. The only valid title they can claim in virtue of their birth is the prefix Honorable, which is applicable alike to the sons and daughters of peers. The wives of baronets receive the courtesy title of Lady; their lawful designation being Dame. Ladies who have had a title by a first marriage, retain it as a matter of courtesy when they are married a second time, though the alliance be with a person without a title—a circumstance sometimes leading to a certain awkwardness in designation. In Scotland, the eldest son of a baron has the courtesy title of Master. For example, the eldest son of Lord Elibank is styled Master of Elibank.

The title Right Honorable is given in some few instances by courtesy to officials, as in the case of the Lord Advocate of Scotland. The judges of the Court of Session in Scotland, on first taking their seat on the bench, assume the courtesy title of Lord along with their own surname or a territorial title.

But such titles are used only senatorially. In writing the real name is subscribed. The titles of Mr. or Master and Esquire (q. v.), are now given by courtesy to nearly all classes of persons. For an exact definition of titles by courtesy of members of the peerage, see the *Hand-book to the Desk*, or any good *Letter-writer*.

COU'RT-FOOL. From very ancient times there existed a class of persons whose business it was to while away the time of the noble and wealthy, particularly at table, by all manner of jests and witty sayings. Alexander the Great, Dionysius of Syracuse, Augustus and his successors, maintained such jesters. It was, however, during the middle ages that this singular and repulsive vocation became fully developed, and that the office of jester or fool became a regular and indispensable court-office. The symbols or such a personage were—the shaven head; the fool's cap of gay colors, with asses' ears and cock's comb; the fool's sceptre, which was variously formed; the bells, which were mostly attached to the cap, but likewise to other parts of the dress; and a large collar. The rest of the costume was regulated by the taste of the master. Of these professional fools, some obtained a historical reputation,

Court-fool and Buffoon.
From Harleian MS., fourteenth century.

as Triboulet, jester to King Francis I. of France, and his successor, Brusquet; Klaus Narr, at the court of the Elector Frederic the Wise of Prussia, whose jests have been repeatedly printed; and Scogan, court-fool to Edward IV. of England. The kings and regents in Scotland had their jesters, as was usual in their time; and the sarcastic sayings of some of these privileged personages—such as those of Patrick Bonny, jester to Regent Morton—are still remembered among the national *facetiæ*. English court-jesters died out with the Stuarts; one of the last of the race being the famous Archie Armstrong, whose death took place characteriscally, on April 1, 1646.

Besides the regular fools recognized and dressed as such, there was a higher class, called merry counsellors, generally men of talent, who availed themselves of the privilege of free speech to ridicule in the most merciless fashion the follies and vices of their contemporaries. Of these, Kunz von der Rosen, jester to the Emperor Maximilian I.; John Heywood, a prolific dramatic poet and epigrammatist at the court of Henry VIII.; and Angely, a French courtier, were particularly distinguished for talent and wit. In all times, there existed at courts persons who, without becoming jesters by profession, were allowed the privilege of castigating the company by their witty and satirical attacks, or who served as the general butts. Among these were, on the one hand, the Saxon general Kyau, celebrated for his blunt jests; and on the other, the learned Jacob Paul, Baron Grundling, whom Frederic William I. of Prussia, to show his contempt for science and the artificial court system, loaded with titles. Flögel's and Nick's German treatises on this subject, and Dr. Doran's *History of Court Fools*, are interesting works. Such a history forms a kind of barometer of the manners and morals of courts at different times. At a later period, imbecile or weak-minded persons were kept for the entertainment of the company. Even ordinary noblemen considered such an attendant indispensable; and thus the system reached its last stage, and towards the end of the 17th and beginning of the 18th century, was finally abolished. It survived longest in Russia, where Peter the Great had so many fools that he divided them into distinct classes.

COU'RT-HAND, a name given in England to the old, Gothic, or Saxon handwriting, as distinguished from the modern or Italian handwriting. The old way of writing continued to be used in the law-courts after it had been superseded elsewhere, and hence its name of Court-hand.

COURT-MA'RTIAL, a court for the trial of any one belonging to the army or navy, for some breach of military or naval law. The members of the court fill the functions both of judge and jury. In the British army, courts-martial are *general*, *district*, or *regimental*. The first is the only one of the three empowered to award death or transportation for life, as a punishment to the offending person. It consists of thirteen commissioned officers, if so many can be obtained at the time and place; and a deputy judge-advocate is specially appointed to conduct the prosecution. A non-commissioned officer, or a private, may be tried by any one of the three kinds of court; but a commissioned officer only by a general court-martial. A *district* or *garrison* C. may be convened by a field-officer commanding a district or corps, without requiring the sovereign's sign-manual.

It consists of a number of members, varying from three to seven, with a captain or higher officer to act as deputy judge-advocate. Such a court tries warrant officers, non-commissioned officers, and rank and file; and can only treat such offences, or alleged offences, as meet with secondary punishment. A *regimental* C. may be convened by the commanding officer of a regiment or detachment; it consists of three or more members; it treats of minor offences, and can award only minor punishments.

In all these kinds of C. the members are sworn in; the court is an open or public one; the vote or sentence is decided by majority, the junior members voting first; but two-thirds of the whole number, in a general C., are necessary to give validity to a sentence of death. Before execution, the sentence of every military court-martial has to be approved and confirmed by the convening authority.

Sometimes *Courts of Inquiry* are held instead of a C., not to try or to punish, but to make an investigation; the members not being on oath. Such a court occasionally precedes a court-martial.

Naval courts-martial consist of admirals, captains, and commanders, who try for offences against the naval articles of war. The chief admiral of the fleet or squadron appoints the members; but all captains have a *right* to sit, if not implicated. The C. is open to all the crew and others as spectators. The sentence is final, and needs no confirmation.

COURTRAI (Flemish *Kortryk*), a town of Belgium, in the province of West Flanders, about 30 miles south of Bruges, lat. 50° 49′ N., long. 3° 18′ E. C., which is built on both sides of the Lys, is surrounded with walls, and has a castle, a citadel, a fine old bridge flanked with Flemish towers, a noble town hall, and a beautiful Gothic church, founded in 1238 by Baldwin, Count of Flanders. Though a busy manufacturing place, C. is nevertheless very clean. Table damask and other linen are the principal articles of manufacture. There are extensive bleaching-grounds in the vicinity, and the neighboring plains supply fine flax in large quantities to many European markets. Pop. (1880) 26,943. In 1302 the Flemings, citizens of Ghent and Bruges chiefly, won a splendid victory over the chivalry of France beneath the walls of C., more than 700 gilt spurs (worn only by French nobles) being afterwards gathered from the dead by the victors. The battle was hence named 'the Battle of the Spurs.'

COU'RT-YARD. See FARM BUILDINGS.

COUSIN, VICTOR, the founder of systematic eclecticism in modern philosophy, was born in Paris, November 28, 1792. He studied with brilliant success at the *Lycée Charlemagne*. In 1812, he was appointed Greek tutor in the *Ecole Normale*, and in 1814, Examiner in Philosophy. In the following year he became assistant-professor to Royer-Collard at the Sorbonne, and threw himself heartily into that reaction against the sensualistic philosophy and literature of the 18th c., which was then the order of the day. Following the path of his senior, he became an exponent of the doctrines of the Scotch metaphysicians, but exhibited far more brilliancy, energy, and warmth of expression than the original authors of these doctrines. In 1817, C. visited Germany, where he was introduced to bolder and more speculative systems of philosophy than any he had yet known. He studied successively, or at the same time, Plato, Kant, Jacobi, Fichte, and Schelling. A second visit to Germany, in 1824—1825, had also important consequences. Suspected of carbonarism, he was arrested at Dresden by the police, and sent to Berlin, where he was detained for six months. He took advantage of his compulsory residence in the capital of Prussia to study the philosophy of Hegel, which exercised considerable influence on his susceptible intellect. On his return to France, he took a decided stand against the reactionary policy of Charles X.; and in 1827, when the comparatively liberal ministry of Martignac came into office, C., who had for some years been suspended from his professorial functions, was reinstated in his chair. Meanwhile, C. had appeared as an author. During 1820—1827, he published his editions of Proclus and Descartes, and part of his celebrated translation of Plato, which was finished in 1840, in 13 vols. The year 1828 witnessed the most splendid triumph in the career of C. as a philosophic teacher. It is said that to find an audience as numerous, and as passionately interested in the topics discussed, as gathered round C., it would be necessary to go back to the days of Abelard and other medieval teachers of philosophy. C. was still young, simple, and pure in his habits; his doctrines were for the most part new to his hearers, bold, and in harmony with the spirit of the time. The finest qualities of the national genius appeared in his lectures, a wonderful lucidity of exposition, an exquisite beauty of style such as no modern or ancient philosopher, excepting Plato, has equaled; a brilliancy of generalization and criticism that enchanted every one; and a power of co-ordinating the facts of history and philosophy in such a manner as to make each illustrate the other, and reveal their most intricate relations. At this period, C. was one of the most influential leaders of opinion among the educated classes in Paris; and consequently, after the revolution of 1830, when his friend Guizot became prime-minister, C. was made a member of the Council of Public Instruction; in 1832, a peer of France; and later, Director of the *Ecole Normale*. His efforts for the organization of primary instruction are to be seen in those valuable reports which he drew up, from personal observation, on the state of public education in Germany and Holland.

In 1840, he was elected a member of the *Académie des Sciences Morales et Politiques*, and in the same year became minister of Public Instruction in the cabinet of Thiers. The revolution of 1848 found in C. a friend rather than an enemy. He aided the government of Cavignac, and published an anti-socialistic brochure, called *Justice et Charité*. After 1849, he disappeared from public life, and died in 1867.

It is more easy to state what philosophical doctrines have received exposition at the hands of C., than to determine precisely what are his own. At first a disciple of Royer-Collard and the Scotch school, he was attached to the psychological method of investigation; afterwards a keen student of the German school, he expounded the views of Shelling with such copious enthusiasm, that he might legitimately enough have been considered a thorough Pantheist. Judging from such a book as *Du Vrai, du Beau, et du Bien* (1853), he seemed more disposed, latterly, to regard philosophy in its religious and æsthetic relations. See ECLECTICISM.

C.'s chief works (besides those already mentioned) are *Fragments Philosophiques* (1826), *Cours de l'Histoire de la Philosophie* (1827), *Ouvrages inédites d' Abelard* (1836), *Cours d'Histoire de la Philosophie Morale au XVIII^e Siècle* (1840—1841), *Leçons de Philosophie sur Kant* (1842), *Des Pensées de Paschal* (1842), *Etudes sur les Femmes et la Société du XVIII^e Siècle, &c.* (1853). C. also contributed a great variety of papers to the literary and philosophic Reviews of France.

COU'SINS, FIRST. See MARRIAGE.

COUTANCES, a town of France, in the department of La Manche, at the confluence of the Soulle and Bulsard. It is built on a conical hill, a few miles from the English Channel, and is a somewhat lugubrious place. Its cathedral, however, is one of the finest specimens of ecclesiastical architecture in the early pointed style in Normandy. One of the towers of the edifice is lighted up with a lantern, that serves as a beacon for ships navigating the channel. C. has manufactures of druggets, muslins, &c., and a trade in corn. Pop. (1876) 8008.

COUTHON, GEORGES, a fanatic of the French Revolution, was born in 1756 at Orsay, near Clermont, in Auvergne. At the outbreak of the Revolution, he was engaged as an advocate, and in 1790 was elected president of the Tribunal for the district of Clermont. In 1791, he was sent by his fellow-citizens to the National Convention, where he made himself conspicuous by his furious hatred of the court, the priesthood, and the monarchy. In spite of an infirmity which prevented him using his limbs, C. soon became very influential from the rabid violence of his sentiments. He voted for the death of the king without delay or appeal to the country, and (after a brief relapse into moderatism) became a devoted and bloothirsty partisan of Robespierre. In July 1793, he was appointed a member of the *Comité de Salut Public*, and along with Châteauneuf-Randon and Maignet, was sent against the Lyonnese insurgents. After some opposition, the city was taken, when a multitude of the citizens were put to death.

On his return to the Convention, he became quite maniacal, demanding the 'impeachment' of all the kings of the earth, and voting for Pitt being declared 'the enemy of the human race,' and the English nation a 'traitor to humanity.' The fall of Robespierre brought down C. also. Accused by Fréron, he was thrown into prison, delivered by the mob with whom he was popular, recaptured by the soldiers of the Convention, and executed 28th July 1794, along with St. Just and Robespierre.

COUTRAS, a town of France in the department of Gironde, situated on the left bank of the Dronne, about 26 miles north-east of Bordeaux. C. has a considerable trade in flour, and the district produces red wine; but the place is known principally on account of the bloody victory gained here (1587) by Henry of Navarre over the forces of the League. In this battle the Duc de Joyeuse,

commander of the Leaguers, was slain, as well as many other great noblemen on the same side. Pop. (1876) 2202.

CO'VENANT, in English Law, an agreement by *deed* (q. v.). In the common law-courts, a special form of action is appropriated to the enforcement of a C. called an Action of Covenant. But in many cases it may also be enforced by the form called an Action of Debt. A C. may also be *implied*. 'Covenant running with the land,' is a C. affecting the land into whosesoever hands it comes.

COVENANT (Lat. *convenire*, to come together), a contract or agreement; a term much used by theologians, and in its ordinary signification, as well as in its theological use, nearly if not always exactly equivalent to the Hebrew *berith* of the Old Testament and the Greek *diatheke* of the New. Applied to relations established between God and men, the term C. must be understood with a certain modification of the meaning which it bears when employed concerning the relations of men to one another, when two independent parties enter into a C., which they have equal right to make or to refuse to make; and is sometimes employed as equivalent to *dispensation*, and the Jewish dispensation is called the *Old* C. (or *testament*, by another translation of *diatheke*), in contradistinction to the Christian, which is called the *New*. God, in his supremacy, is regarded as appointing certain conditions for his creatures, which they cannot but accept, yet their willing consent to these conditions gives to the relation established the nature of a C.; and thus God is commonly said to have made two covenants with man: the *first C.*, or *C. of Works*, with Adam, as the representative of the whole human race, promising life (with perfect happiness), upon condition of perfect obedience, whilst death was threatened as the penalty of transgression; the *second C.*, or *C. of Grace*, being that on which depend the whole hope and salvation of man, since the first C. was broken, and in which life is freely offered to sinners, and they are simply required to believe in Jesus Christ that they might be saved.

This C. God is regarded as having made with Christ, as the representative of his people, and with them in him. The older theologians often speak of the *C. of Redemption* between God and Christ, employing the term of *C. of Grace* rather to designate the whole dealings of God with men in giving effect to the C. of Redemption; but the term *C. of Grace* has long been almost universally employed to include all that was comprehended under both terms. The *Abrahamic C.* is the C. of Grace as declared to Abraham, in its particular relation to him and his seed. God is represented in Scripture as sustaining a *C. relation* to his *own people*, to the Jews under the Old C., to believers in Christ under the New; and doctrinal theology consists not a little in tracing out the nature of this relation, and the consequences which flow from it. As the people of God collectively sustain a C. relation to him, so do believers individually; and it has not been an uncommon thing for pious persons to endeavor to reduce to writing their sense of this '*C. obligation*,' under the notion of a *personal covenanting* with God; and of binding themselves by a stronger obligation to what they believed to be good and their duty. It has also been common for men, from the earliest ages, to enter into covenants with one another with more or less of religious solemnity; and this has in particular been done among those who have suffered persecution, or have been engaged in contests concerning matters of religion, for which the authority of certain passages of the Old Testament is strongly pleaded. Instances occur in the history of the Waldenses, and of some of the Reformed churches, particularly in the history of the Reformation in Scotland. But the most memorable covenants in Scottish ecclesiastical history belong to a period subsequent to the Reformation.

COVENANTS, THE, known in Scottish history and tradition, are chiefly two in number—the NATIONAL COVENANT, and the SOLEMN LEAGUE AND COVENANT. As it is necessary to discriminate between these, we shall speak of them separately.

NATIONAL COVENANT.—This was a bond of union or agreement, drawn up at Edinburgh in 1638, by the leading Presbyterian ministers, and subscribed by vast numbers of persons of all ranks of life. It embodied the confession of Faith of 1580 and 1581, subscribed by James VI. in his youth, and again recognized in 1590 and 1596; and was binding on all who signed it to spare nothing which might save their religion. The proximate cause of this extraordinary manifestation of feeling was an attempt of Charles I. to enforce Episcopacy and the use of the Service-book in Scotland.

The subscribing of the National Covenant began on the 28th of February 1638, in the Greyfriars' church and churchyard, at Edinburgh. Numerous copies were also circulated through the country for signature—a circumstance which accounts for many copies being still extant. 'In the Library of the Faculty of Advocates at Edinburgh are preserved five parchment copies, with the original signatures of Rothes, Montrose, Loudon, and many others of the nobility, gentry, commissioners of counties and burghs, and ministers, though only one of these five copies is apparently connected with the first signing, and the other four, which are dated 1639, were subscribed after the ratification by the General Assembly.'—*Historical Sketch Illustrative of the National Confession of Faith* (Davidson, Edinburgh, 1849), to which we refer for a variety of details. The General Assembly which met at Glasgow, November 21, 1638, ratified the National Covenant and the Confession of Faith which it embraced, and deposed the whole of the hierarchy which had been established by Charles I. The National Covenant was subsequently ratified by the 5th act of the second parliament of Charles I., held at Edinburgh June 11, 1640, and subscribed by Charles II. at Spey, June 23, 1650, and Scoon, January 1, 1651. The document will be found in the volume which comprehends the *Westminster Confession of Faith*, in use by the Church of Scotland. Those who subscribe the National Covenant, promise to 'continue in obedience of the doctrine and discipline of this kirk.' They also give assent to various acts of parliament in the reign of James VI., which, besides repudiating the jurisdiction of the pope, and all the ceremonial observances and errors of the Romish Church, ordain 'all sayers, wilful hearers, and concealers of the mass, the maintainers and resettors of the priests, Jesuits, trafficking Papists, to be punished without any exception or restriction.'

SOLEMN LEAGUE AND COVENANT.—This was a document of date four to five years later than the National Covenant, since the signing of which, Charles I. had broken with the English parliament, set up his standard at Nottingham (August 1642), and from his various successes, it was thought he might finally be able to reinstate Episcopacy in Scotland. With some alarm on this ground, the Scotch willingly received overtures from commissioners deputed from the English parliament. Hopes were held out to the Scottish nation, that in the event of success against the king, the Presbyterian model should supersede the Episcopalian both in England and Ireland. Approving of a measure of this kind, the Scottish Estates entered into what was called a Solemn League and Covenant with the English parliament. One of the provisions of the bond of agreement was, that the Scotch should send an army into England against the king, which they did in January 1644.

The Solemn League and Covenant was subscribed by many of all ranks in Scotland and England, including the Assembly of Divines at Westminster, was ratified by the General Assembly at Edinburgh, August 17, 1643, and the Scottish parliament, July 15, 1644; and subscribed by Charles II. at Spey, 1650, and Scoon 1651. Like the National Covenant, it has, till the present day, a place in the volume which comprehends the *Westminster Confession of Faith* of the Church of Scotland. While the National Covenant refers to the observance of the Presbyterian polity within Scotland alone, the Solemn League and Covenant is much more comprehensive. Those who subscribe it, setting out with a profession of attachment to the Church of Scotland, are to endeavor to bring about a uniformity in religion and church-discipline in the three kingdoms; and further—'That we shall in like manner, without respect of persons, endeavor the extirpation of popery, prelacy (that is, church-government by archbishops, bishops, their chancellors, and commissaries, deans, deans and chapters, archdeacons, and all other ecclesiastical officers depending on that hierarchy), superstition, heresy, schism, profaneness, and whatsoever shall be found to be contrary to sound doctrine and the power of godliness, lest we partake in other men's sins, and thereby be in danger to receive of their plagues; and that the Lord may be one, and his name one, in the three kingdoms.'

Such were the famous covenants at one time enforced by civil penalties, and for which their adherents, under the name of Covenanters, fought and suffered in Scotland, between the Restoration and Revolution, maintaining to the last that both Covenants, notwithstanding certain rescissory acts of Parliament, were still binding on the whole nation. At the Revolution, the two Covenants were set aside, and cannot be said to have now any practical effect in any part of the United Kingdom. As above stated, they have a place in the volume which comprehends the *Westminster Confession of Faith*, but for what reason, it is difficult to say; for the Church of Scotland does not make adherence to them obligatory on either clerical or lay members. Certain Scottish and Irish dissenters, however, still profess attachment to the Covenants, and on particular occasions renew their subscription of them. See CAMERONIANS. The obligations undertaken by the sovereign, and the modern acts of parliament abolishing religious tests on taking civil office, and admitting Roman Catholics, Nonconformists, and Jews to parliament, not to speak of public opinion are totally at variance with the Covenants. It is customary in popular lectures on the Covenanters to overlook the fact, in compassion for their sufferings, that they contended for what is now quite adverse to the principles of religious toleration. Yet, in so far as the manful struggle in which they were concerned helped to accelerate the revolution, the history of the Covenanters must be associated with that of civil and religious liberty.

CO'VENT GA'RDEN (properly *Convent Garden*, from having been originally the garden of Westminster Abbey) is a square in London celebrated for its great market of fruit, vegetables, and flowers. In the 17th c., C. G. was a very fashionable quarter of the town—the residence of many eminent persons. The scene of one of Dryden's plays is laid here, and frequent allusions are made to the place in plays of Charles II.'s time. The market, now so famous, appears to have originated about 1656 in a few wooden sheds and stalls. C. G. is for a stranger one of the sights of London, and is seen to greatest advantage about three o'clock on a summer morning; Tuesday, Thursday, and Saturday being the principal days.

CO'VENTRY (Convent Town), a city, parliamentary and municipal borough, and manufacturing town in the north of Warwickshire, on the Sherbourne, an affluent of the Avon, 18½ miles east-south-east of Birmingham. It stands on a gentle eminence in a valley, with a ridge of hill on the south, and contains many old houses, with timbered fronts, projecting into narrow streets, and belonging to the 15th and 16th centuries. The modern part of C., however, is well, though not regularly built. The chief buildings are the churches, with imposing spires. St. Michael's Church, built 1313—1395, is said to be the largest church in England, and is one of the noblest of the lighter Gothic structures. St. Mary's Hall, built 1450, for the Guild, is one of the finest specimens of ornamental work in England, with grotesque carved oak roof, ancient tapestry, and great painted window. In the market-place formerly stood a rich hexagonal Gothic cross, 57 feet high, erected in the 16th c. in three stories, with exquisitely finished pillars, pinnacles, and niches, with statues of English kings and saints. Before the year 1760, the cross had fallen to decay, and in 1771, the remains of it were taken down and removed. The ancient walls, three miles in circuit round C., were demolished by Charles II. Pop. (1871) of mun. bor. 37,670; (1881) 42,111. C. returns two members to parliament. The chief manufactures are ribbons and watches. There are large silk-dyeing works. C. is nearly in the center, between the four great English ports, London, Bristol, Liverpool, and Hull, and has extensive canal communication with other parts of the country. It is a very ancient place. In 1044, Earl Leofric and his wife, Lady Godiva, founded here a magnificent Benedictine monastery. In memory of Godiva (q. v.), who is said to have ridden round the town naked, to free it from certain imposts laid on by her husband, curious and splendid processions were formerly held in C. In the 15th c., religious mysteries or plays were often acted here by the Grey Friars before kings. Henry VIII. demolished the beautiful cathedral of C. Here occurred the famous meeting for the intended trial by battle between the Dukes of Norfolk and Hereford, immortalized in Shakspeare's *Richard II.* Two memorable parliaments were also held in the monastery of C. in the 15th century.

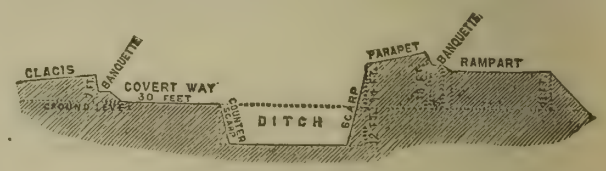
The one contained no lawyers, while the other passed many attainders against the Duke of York, &c. In the 15th, 16th, and 17th centuries, C. was famous for woollens, broadcloths, caps, and blue thread bonnets. The Lammas Land lying around C., and comprising about 1100 acres, was not long ago divided between the proprietors and the freemen, numbering about 4000, in the proportion of about two-thirds to the former, and one-third to the latter. C. was visited by the plague six times between 1350 and 1625. The phrase, 'to send to Coventry,' took its rise most probably from the derivation of the name C., and meant 'to send to a convent;' i. e., to shut out from society.

COVENTRY, SIR JOHN, has obtained a niche in English history from accidental circumstances. In the month of October 1670, he rose in parliament and asked a question relative to a measure before the House, which was taken as an unwarrantable reflection on the king's amours. Charles was furious, and sent some of his guards to watch in the streets where C. lived, and leave a mark upon him. C. was attacked one night, and had his nose cut to the bone. Parliament took notice of this atrocious outrage, and passed a bill known by the name of the COVENTRY ACT, making cutting and maiming a capital offence; but they had not courage sufficient to bring the king's bravoes to trial.

CO'VERDALE, MILES, an eminent English divine, was born in Yorkshire in 1487. He was educated at Cambridge by the Augustin friars, and becoming an Augustin monk, was ordained at Norwich. He appears, however, to have soon changed his religious opinions, and to have devoted himself earnestly to the work of the Reformation. Being abroad in 1532, he assisted Tyndale with his translation of the Scriptures, and three years afterwards appeared his own translation of the Bible, with a dedication by himself to Henry VIII. This was the first English Bible sanctioned by royal authority, as, indeed, it was the first complete translation of the Bible printed in the English language. The Psalms of this translation are those still used in the Book of Common Prayer. In 1538, C., with the consent of King Henry VIII., and with the permission of Francis I., went to Paris to superintend another English edition of the Scriptures, his reason for going to Paris being that paper and workmanship were there cheaper and better than in England.

The inquisition, however, notwithstanding the royal license of Francis, interfered, seized the whole impression, consisting of 2500 copies, and condemned them to the flames. But through the cupidity of one of their executive officers, who sold a considerable number of the heretical books to a haberdasher as waste paper, some copies were saved and brought to London along with the presses, types, &c., which had been employed in printing them. Several of the workmen also came over to London; and Grafton and Whitchurch, the noted printers of that day, were thus enabled to bring out in 1539, under C.'s superintendence, the *Great Bible*, commonly called *Cranmer's Bible*, on account of that prelate having written a preface to it. In 1551, C. was appointed to the see of Exeter, the duties of which high ecclesiastical office he discharged with great zeal, until the accession of Mary in 1553, when he was ejected, and thrown into prison, from which he was only released after two years' confinement, on the earnest intercession of the king of Denmark, whose interest was evoked by his chaplain, C.'s brother-in-law, and on the condition that he should leave the country. C. went to Denmark, and subsequently to Geneva, where he assisted in producing the *Geneva Translation* of the Scriptures (1557—1560). On the accession of Elizabeth, he returned to England, but certain notions concerning ecclesiastical ceremonies imbibed at Geneva operated against his preferment in the church; and it was not until 1564 that he was collated to the rectory of St. Magnus, London. Owing to age and infirmities he resigned this living in 1566, and died in about two years afterwards. C. was the author of several tracts designed to promote the Reformation, and made various translations from the works of the continental reformers. The tri-centenary of the issue of his Bible was celebrated throughout the English Church, October 4, 1835, and medals were struck in honor of the occasion.

CO'VERT WAY, or COVERED WAY, in Fortification, is a road or broad path outside the ditch of a fortified place, between the counterscarp and the glacis. It is about 30 feet wide, and is sunk so far below the crest of the glacis, that soldiers standing



Vertical Section of Defence-works.

upon it cannot be seen by the besiegers; hence the name of covert or hidden way. Sentinels, placed in the C. W., prevent all access of the enemy's spies to examine the ditch; and when musketeers mount on the banquette or raised platform on the side next the glacis, they can pour out a grazing fire on the enemy over the crest. The C. W. is broad enough to allow bodies of troops to form on it, either to act defensively or to make sorties; and to increase this accommodation, enlarged portions, called *places of arms*, are made at certain spots.

In the annexed cut, representing a vertical section of the whole range of defence-works, from the *rampart* next the city to the *glacis*, the relation between the *C. W.* and the other works is clearly shown. The *banquette* of the C. W. is here shown to be about 3 feet high by 4 wide, and reached by a sloping ascent of 4 feet. A ground or horizontal plan of the C. W. is shown in the woodcut annexed to CURTAIN.

COVILHA', a town of Beira in Portugal. Pop. (1878) 10,986, who manufacture a brown cloth.

CO'VINGTON, a city of Kentucky, U.S., on the south bank of the Ohio River, and west of the mouth of Licking River, opposite Cincinnati, with which it is connected by a lofty suspension-bridge and steam-ferries. It has a city hall, 25 churches, the Western Theological College, a Roman Catholic cathedral, and manufactories of cotton, hemp, silk, tobacco, and iron. There are also several establishments for packing pork and beef. Pop. (1860) 16,471; (1870) 24,505; (1880) 29,720.

COW. See Ox, DAIRY.

COW PA'RSNIP (*Heracleum*), a genus of plants of the natural order *Umbelliferæ*, having petals bent in at the middle, and flat compressed fruit. One species only is a native of Britain, the Common C. P. or HOG-WEED, called *Kiesh* in Scotland; a common and rank weed, with coarsely hairy leaves, and stem about 3—5 feet high. It is gathered in some parts of England for fattening hogs, and is said to afford wholesome food for cattle. Some Siberian species are much larger, and have been recommended for cultivation on account of the great quantity of herbage which they yield very early in the season, particularly *H. panaces*, which

sometimes attains a height of 10 feet, and the root leaves are 3—5 feet long.

Cow Parsnip Flower.

Cow Parsnip Fruit.

COW PLANT (*Gymnema lactiferum*), a perennial plant of the natural order *Asclepiadaceæ*, a native of Ceylon; with erect stem, ovate leaves, and very short umbels; which has acquired a factitious celebrity from the statement made and often repeated that its milky juice is used as a substitute for milk, and that its leaves are boiled to supply the want of cream! But this, according to Sir J. E. Tennant, is altogether a mistake, and the name is derived merely from the appearance of the juice.

COW TREE, a name given to a number of species of tree of different natural orders, the bland milky juice of which is used instead of milk. They are all natives of tropical countries, and mostly belong to natural orders in which acridity is the general characteristic of the milky juice. Some of them belong to the natural order *Moraceæ*, and are closely allied to the Fig; others to the natural order *Artocarpaceæ*, one of which is the famous PALO DE VACA or C. T. of the Cordilleras and Caraccas (*Galactodendron utile*, now rather referred to the genus *Brosimum*, see BREAD-NUT). Another is the HYA-HYA (*Tabernæmontana utilis*), a native of equatorial America, belonging to the natural order *Apocynaceæ*.

Cow Tree (*Galactodendron utile.*)

Fruit of Cow Tree.

The PALO DE VACA grows in rocky situations, at an elevation in equatorial regions of about 3000 feet. It is a lofty tree, with laurel-like leaves, 10—16 inches long, and very small flowers. For several months in the year, not a shower moistens its foliage, and its branches appear dead; but as soon as the trunk is pierced there flows from it a copious stream of sweet and nourishing milk. The milk flows most freely at sunrise. The natives are then to be seen hastening from all quarters with bowls to receive it. The milk has an agreeable odor and a viscidity which does not belong to the milk of animals; it becomes yellow in a short time, and thickens or forms a sort of cream at the surface, which gradually thickens into a cheesy consistency before it begins to putrefy. This milk is nutritious, and is much used by the negroes and Indians; but differs very materially in its composition from the milk of animals; more than half being wax and fibrin; a little sugar, a salt of magnesia, and water, chiefly making up the rest.

The HYA-HYA also yields a copious milky juice, which is used in Demerara and elsewhere as a substitute for milk, and is very agreeable and nutritious.

COW'AGE, COW'HAGE, or COW'ITCH, consists of short, slender, brittle hairs, which grow on the outside of the pods of plants of the genus *Mucuna*, natives of the tropical parts of America and Asia. This genus belongs to the natural order *Leguminosæ*, suborder *Papilionaceæ*, and has a knotted, two-valved pod, divided by transverse partitions. The species are twining plants, shrubby or herbaceous, with leaves of three leaflets. That which yields most of the C. brought to Europe is *M. pruriens*, a native of the West Indies, with racemes of fine purple flowers, which have a disagreeable alliaceous smell, and pods about four inches long. *M. prurita* of the East Indies, and *M. urens*, the Ox-eye Bean of the West Indies, yield C. of similar quality. The hairs readily stick in the skin, and cause intolerable itching. C. is used in medicine, acting mechanically in killing and expelling worms, particularly the species of *Ascaris* (q. v.). That it does not act on the inner surface of the intestinal canal, is supposed to be owing to the mucous secretion. It is generally administered in syrup, treacle, or honey.—Before the pods of C. plants are ripe, they are used as a vegetable like kidney-beans, and are very palatable.

COW'BANE. See HEMLOCK.

COW'BERRY. See WORTLEBERRY.

COW'BRIDGE, a municipal and parliamentary borough in the south of Glamorganshire, on the Ddaw, 12 miles west of Cardiff. It chiefly consists of one long and wide street. It once had walls with three gates, built in the end of the 11th century. One of the gates, a Gothic structure, still remains. Pop. (1871) 1134. With Cardiff and Llantrissant, it returns one member to parliament.

COWES, WEST, a seaport and watering-place in the north corner of the Isle of Wight, on the west side of the mouth of the estuary of the Medina (here a third of a mile broad). It stands on a hill slope, and has a striking aspect from the sea. There are many elegant villas in the vicinity. C. has much trade, being the port of the Isle of Wight. It has daily steam communication with Southampton, from which it lies 10½ miles to the south-south-east, and with Portsmouth, from which it lies 11 miles to the west-south-west. At the angle formed by the Medina and the sea, is a small battery built by Henry VIII. C. is the head-quarters of the Royal Yacht Squadron and Club, who hold their annual regatta here. Pop. (1871) 5730; (1881) 6487. In 1880, 15,211 vessels, of 1,093,673 tonnage, entered the port.—EAST COWES is situated on the east side of the mouth of the Medina, and 2 miles north-west of Osborne House, the marine residence of Queen Victoria. Pop. (1871) 2058; (1881) 2615.

COW'LEY, ABRAHAM, was born in London in 1618. He was the son of a grocer, and was educated at Westminster School and Trinity College, Cambridge. According to his own statement, he was made a poet by the perusal of Spenser, whose works were wont to lie in his mother's parlor. A volume of poems, entitled *Poetic Blossoms*, was published by him at the age of 15, and one of the pieces contained therein was written when he was 10 years old.

At Cambridge he obtained distinction through the elegance of his translations; and while there, he composed the greater part of the *Davideis*, an epic in four books—a work which he never completed. He was attached to the court party, and, in consequence, was ejected from his college in 1643, after he had taken his degree of M.A. In 1646, he followed the queen to Paris, in which city he remained ten years; and on his return to England, being under suspicion, he was seized and bound in heavy securities for his future behavior. In the same year, he published an edition of his poems, with a preface, in which certain passages appeared, supposed to have a political bearing, which were suppressed in subsequent editions. After the Restoration, he expected to obtain the mastership of the Savoy, but was disappointed. He subsequently obtained a lease of the queen's lands at Chertsey, in Surrey, whither he retired in 1665, He died in July 1667, in his 49th year, and was buried in Westminster Abbey, near Chaucer and Spenser. In 1675, a monument was erected to his memory by the Duke of Buckingham.

Although almost forgotten now, the time was when C.'s poetry was considered equal to Shakspeare's or Spenser's. It certainly possesses merits of ingenuity and verbal brilliancy. He is often splendid, but it is the splendor of the rocket rather than of the glowworm or the star. His prose is more natural than his verse, and some of its passages reach a stately eloquence, reminding the reader of the magnificent prose of Milton.

COWLEY, HENRY RICHARD WELLESLEY, first Earl (his father being first Baron Cowley, better known as Sir Henry Wellesley), an English diplomatist of liberal opinions, was born in 1804. He early devoted himself to diplomatic pursuits. An attaché at Vienna in 1824, he was afterwards successively promoted to be secretary of the legation at Stuttgart, and to the embassy at Constantinople. Having acted as minister-plenipotentiary to Switzerland, and afterwards to Frankfurt, he was (1851) appointed minister to the Germanic Confederation, and in the following year he succeeded the Marquis of Normanby as ambassador at Paris. For this position he displayed eminent qualifications, and held the appointment whether his party was in or out of office till 1867, when he resigned. Along with the Earl of Clarendon he represented Great Britain at the Paris Congress of 1856; and it was

greatly owing to his tact and temper that ill-feeling between the two countries did not result in more serious disagreement. He was created Viscount Dangan and Earl Cowley in 1857, and made a K.G. in 1865.

COW-PEN BIRD (*Molothrus pecoris*), also called Cow Bird, Cow Troopial, Cow Blackbird, Cow Bunting, &c., a bird nearly allied to the Baltimore Birds and Troopials, having a short conical beak, and remarkable for its habit of depositing its eggs, like the cuckoo, in the nests of other birds. It is a native of North America, common in some of the southern States in winter, and migrating northward in spring. Great flocks are sometimes seen together.

The C. B. is about seven inches in entire length, of glossy brownish black plumage. It derives its name from its frequenting cowpens, to feed on the insects contained in, or attracted by the dung. It selects for the reception of its eggs the nests of birds smaller than itself, and by an interesting provision of nature, its egg, which is not much larger than theirs, is hatched sooner, and theirs appear to be generally removed as addled eggs.

COW'PER, WILLIAM, an English poet, was born on the 26th November 1731, in the parsonage house of Great Berkhamstead. His father, who was chaplain to George II., married Ann, daughter of Roger Donne, Esq. of Ludham Hall, in Norfolk. This lady expired in childbirth in 1737, leaving two sons, William, the poet, and John. This event made a deep impression on C.'s mind; and the lines addressed to his mother's portrait have drawn more tears than any other poem in the English language.

C. was a delicate and sensitive child, and boyhood brought with it only deeper melancholy and depression. At the age of six he was placed at a considerable school, kept by a Dr. Pitman, in Market Street, Hertfordshire. The period he spent here was very miserable, and laid the foundation of that settled gloom which oppressed him till death. It is to the remembrance of these wretched days that we are indebted for the fierce invective that burns in the somewhat one-sided *Tirocinium, or a Review of Schools*. C. completed his studies at Westminster School, and shortly after was articled to a Mr. Chapman, an attorney in London.

After completing his three years' articles with Mr. Chapman, C. went, in 1752, to reside in the Middle Temple. In 1754 he was called to the bar, but never practised. His father died in 1756, and left him a small patrimony. In 1759 he removed to the Inner Temple; and although at this period he expected to secure some legal appointment through the influence of his family, he hated law with a perfect hatred, and seldom opened a book that bore on his profession. Yet he was industrious enough: he scribbled poetry, read Homer, and, in conjunction with his brother, translated some of the books of the *Henriade*. Soon after his settlement in the Inner Temple, he was appointed a Commissioner of Bankrupts; but there is no reason to believe that he ever entered on the duties of his office. An influential relative now offered him the office of Clerk of the Journals of the House of Lords, which was accepted; but he, having to undergo an examination at the bar of the House, was seized with nervousness, and could not appear. At this period his misery was so great, that he meditated suicide, but fortunately failed to carry out his intentions for want of courage. In December 1763 he was removed to the house of Dr. Cotton at St. Albans—a prey to the deepest remorse.

C.'s pecuniary means had suffered considerably by the loss of his appointments, but his friends contrived to make up an income sufficient for his wants. After his removal from St. Albans, he went to reside in the town of Huntingdon. Here he formed acquaintance with Mrs. Unwin, the Mary of his poems—an acquaintance which ripened into the deepest friendship, and which subsisted till death. He went to reside with the Unwins, and enjoyed much tranquil happiness under that religious roof. When on a visit in January 1773, to the Rev. Mr. Newton, a friend of the Unwins, and a man of sincere piety, but, from the peculiar cast of his religious views, perhaps not the best physician 'to minister to a mind diseased,' his malady returned. Mrs. Unwin carefully tended him through the crisis of his delirium, and through his long and slow recovery. When convalescent, he betook himself to writing hymns along with Mr. Newton, and to domesticating hares, with the particulars and little incidents of which amusement the world is pleasantly familiar. Mrs. Unwin also suggested, as a subject suited to his genius, *The Progress of Error*. C. set to work in December 1780, and by the following March had completed *Truth*, *Table-Talk*, *The Progress of Error*, and *Expostulation*. Although the volume was completed in 1781, its publication was delayed till the following year.

In 1781, C. made the acquaintance of Lady Austen, who suggested to him *The Task*, urged him to translate *Homer*, and—what the world is perhaps still more grateful for—she related to him the history of John Gilpin. The story so seized C.'s fancy, that in the course of a single night he produced the poem which has tickled the midriffs of three generations. *The Task* was begun in the winter of 1783, and published in 1785. Its success was great, and C. began to be considered the greatest poet of his day. In 1784 he began the translation of Homer, which appeared in 1791. It was received with great applause. He had labored hard, and had now to pay the penalty. The pen was the only weapon with which he could keep his constitutional malady at bay; but now, when seated at his desk, his genius would not answer the call. He began to hear again the voices and the whisperings which had afflicted him in earlier days. Mrs. Unwin's faculties also became affected, and the two friends were groping in the same twilight, deepening for both in the darkness of death. They left Olney, and were received into the house of Mr. Johnson, in Tuddenham, in Norfolk. Here Mrs. Unwin died on the 17th December 1796. C. now fell into a state of utter dejection; in 1799, he was attacked by dropsy. He died on the 27th April 1800.

C. was a great innovator in English literature; he destroyed the sentimentalists led by Hayley, and the image-hunters headed by Darwin. His poetry is eminently healthy, natural, and unaffected. C. and Robert Burns we have to thank for bringing back nature to English poetry. Besides being a poet, C. was perhaps the most delightful letter-writer in the English language. Nothing can surpass the charm of his epistles—full of fun, gentle sarcasm, anecdote, acute remark, and a tender shadow of melancholy thrown over and toning down the whole. The best edition of C.'s works (accompanied by an admirable biography) is that of Southey, 15 vols. 12mo, Lond. 1837—1838.

COW'SLIP (*Primula veris;* see PRIMROSE), a common native of pastures in England and many other parts of Europe, although rare in Scotland, a delicate and modest little flower, a universal favorite, both for its beauty and its fragrance. The flowers are small, in an umbel at the top of the scape, the limb of the corolla short and concave. The flowers have sedative properties, and are sometimes used as an anodyne and anti-spasmodic. They are fermented with sugar to make *cowslip wine* an agreeable and favorite soporific domestic medicine.—The name VIRGINIAN COWSLIP is given to the *Dodecatheon Meadia*, a perennial plant, also of the natural order *Primulaceæ*, a native of North America, with a stalk about eight inches high, bearing an umbel of gracefully pendent lilac flowers, the petals reflexed over the calyx, the stamens and pistil long, and the anthers of a golden color. It is very ornamental in the flower-border, flowering in the end of April or beginning of May.

Cowslip.

COW-WHEAT (*Melampyrum*), a genus of plants of the natural order *Scrophulariaceæ*, having an oblong two-celled capsule, with a few seeds somewhat resembling grains of wheat. The species are natives of the temperate parts of the northern hemisphere, annual plants with opposite narrow leaves and yellow flowers, growing in woods, corn-fields, pastures, &c. Several are natives of England. They are said to be very fattening to cattle, and to give a yellow tinge and peculiar excellence to butter made from pastures in which they abound.

COW'RY (*Cypræa*), a genus of gasteropodous molluscs of the order *Pectinibranchiata*—the type of a family, *Cypræidæ*, to all of which the name C. is often extended—having the margin of the mantle prolonged into a siphon, by which water is conveyed into the gill chamber, and a spiral convoluted shell, the spire visible in the young, but entirely concealed in the adult, and the outer lip then thickened and bent in. The aperture extends the whole length of the shell. The shells, called *Porcelain Shells* by the French and Germans, are almost entirely calcareous in their composition, are richly enamelled, and often very beautiful. They are most abundant, and attain their largest size in the seas of warm climates. Only a few very small species are found on the British coasts. Some of the species are much prized by collectors of shells. The Money C. (*C. Moneta*) is of commercial interest, from its general use as a substitute for coin in many parts of Asia and Africa. It is not of great beauty, is yellow or white, often with a yellow ring, about an inch long, and nearly as broad as long. It is found on the Indian coasts, and in particular abundance on those of the Maldive Islands, and is one of their principal exports.

Money Cowry.

In Bengal, 3200 cowries are reckoned equal to a rupee, so that a C. is about equal in value to one thirty-sixth of a farthing. Yet cowries to the value of 200,000 rupees are said to have been at one time imported annually into Bengal. Many tons of cowries are annually imported into Britain, to be used in trade with the west of Africa, and this importation began when it was in the slave-trade that they were employed.—To the family *Cyprœidæ* belong the shells called *Poached Eggs* (*Ovulum*), the *Weaver's Shuttle Shell* (*Ovulum volva*), remarkable for its prolongation at both ends, &c. Fossils of this family are numerous in some strata, as in the *Bagshot Beds* (q. v.).

COX, DAVID, a landscape painter of the English school, was the son of a Birmingham smith, born 29th April 1783. He worked for a time as a smith, then at the toy-trade; next as an assistant to a scene-painter, from which he advanced to teaching and painting. He died at Harborne, 7th June 1859. An exhibition of his pictures, sketches, and water-color drawings was held in London in the same year. Before his fame was established, C. destroyed not a few of his drawings, or sold them for a few shillings; while before and after his death £1575 to £3430 have been paid for single pictures. He was thoroughly insular, and distinctly English in his habits and tastes. His paintings are usually small, and chiefly Welsh subjects; they show thorough familiarity with nature, and though sometimes rough in execution, are very effective; while he was remarkable for his success in sketching rain and wind, bursts of sunshine, or the herbage of marshes. In 1814, he issued a *Treatise on Landscape Painting in Water-Colors*, which is still an authority.

COXE, WILLIAM, a very industrious historical writer, was born in London, March 1747, and was educated at Cambridge. As tutor to the sons of several noblemen, he, at various times, spent many years on the continent, where he neglected no opportunity of collecting information about the countries which he visited. The result appeared in many volumes of travels and history, all of which are characterized by close observation, care, and research; but the writing in general is far from sprightly. Among the best known of C.'s works is his *History of the House of Austria*, which is still a standard work. C. also wrote *History of the Kings of Spain of the House of Bourbon*, *Memoirs of the Duke of Marlborough*, *Memoirs of Sir Robert Walpole*, and *Memoirs of the Pelham Administration*, besides many contributions to our knowledge of the topography and social condition of several continental countries. C., who commenced his clerical life in 1771 as a curate at Denham, near Uxbridge, ended it as Archdeacon of Wilts, which appointment he obtained in 1805. He died June 1828. Several of his works have been published in Bohn's *Standard Library*.

COXI'M, one of the head-waters of La Plata, rises in Matto Grosso, a frontier province of Brazil, towards Bolivia and Peru. After flowing first to the north-east, and then to the north-west, it enters the Taquari, itself a tributary of the Paraguay, in lat. 18° 24′ S. The C. receives many affluents.

COY'PU (*Myopotamus Coypu*), a rodent quadruped nearly allied to the beaver, with which it agrees in the number and character of its teeth, in its short limbs, in its feet having five toes each, the

Coypu (*Myopotamus Coypu*).

hinder feet webbed and the fore feet not webbed, and to a considerable extent in its habits; but from which it differs in the form of its skull, having a more elongated muzzle, and a contracted palate, and in its slender tail resembling that of a mouse. It is the only known species of its genus, and inhabits great part of South America, on both sides of the Andes, burrowing in the banks of the rivers, and sometimes in forests near the sea-beach. It is very nearly equal in size to the beaver, has small ears, very long and stiff whiskers, and long hair mixed with dense and soft short hair, the upper parts beautifully pencilled with different shades of yellow, the sides and under parts lighter and more uniform in color. The fur has become an important article of commerce, under the names of RACOONDA (q. v.) and NUTRIA, the latter name signifying in Spanish an otter, having apparently been given to it by mistake, but being that chiefly used in Britain.

CRAB, ROGER, a singular secretary of the English Revolution, served for seven years in the Parliamentary army. C. set up in business as a 'haberdasher of hats' at Chesham, in Buckinghamshire, and imbibed the idea that it was sinful to eat any kind of animal food, or to drink anything stronger than water. Determined to follow, literally, the injunctions given to the young man in the gospel, he sold off his stock-in-trade, distributing the proceeds among the poor, and took up his residence in a hut. His food consisted of bran, dock-leaves, mallows, and grass. The persecutions the poor man inflicted on himself caused him to be persecuted by others, cudgelled, and put in the stocks. He was four times arrested on suspicion of being a wizard, and was sent from prison to prison; yet still he would persist in his course of life. He published two pamphlets, one entitled *The English Hermit*; the other *Dagon's Downfall*. He died on the 11th of September 1680.

CRAB, the popular name of all the crustaceans of the order *Decapoda* (the highest order of crustaceans, characterized by great concentration of the nervous system and corresponding general concentration, by five pair of thoracic limbs, and by having the gills enclosed in a special cavity on each side of the thorax, covered by the carapace) and sub-order *Brachyoura* (characterized by the small size of the abdomen, which resembles a short tail curved under the thorax and appressed to it, all the most important viscera being included in the thorax), and extended also to some of the sub-order *Anomoura* (purse-crabs, hermit-crabs, &c., characterized by a condition of abdomen intermediate between that of the *Brachyoura* and that of the *Macroura*, or Long-tailed Decapod Crustaceans, such as the Lobster, Cray-fish, &c.). All the crabs, besides many other crustaceans, were comprehended in the Linnæan genus *Cancer*; but the number of species is very great, and the *Brachyoura* alone are now arranged into many genera and even families. The different kinds of crabs differ very much in the form of the carapace (the back), which in some is orbicular or nearly so; in some, much broader than it is long; in others, longer than broad; in some, prolonged in front into a kind of beak, &c.; also in its smoothness, or roughness with hairs, tubercles, or spines; in the length of the legs, &c. The eyes are compound, with hexagonal facets, and are elevated on stalks, which are generally short, but sometimes considerably lengthened, and which have the power of motion, so as to turn the eye in different directions.

Large edible Crab (*Cancer Pagurus*).

The first pair of limbs are not used for locomotion, but exhibit in great perfection the characteristic claws or pincers (*chelæ*) of the decapod crustaceans. Crabs are inhabitants of almost all seas; most of them, however, having their limbs formed for walking rather than for swimming, are found chiefly near the coast; some inhabiting comparatively deep water, and others abounding in those parts which are left by the receding tide, where they occur equally in the rock pools and among the moist sea-weeds. Some small kinds of crabs (*Pea Crabs*) are often found in the inside of mussels and other bivalve molluscs. Some crabs inhabit fresh water, particularly in the warmer parts of the world; and others, known as Land-crabs (q. v.), live among moist herbage, or burrow in sand or earth. Some have the last pair of limbs expanded at the extremity into a broad blade for swimming, and some have even all the four pair of limbs intended for locomotion thus expanded, and sometimes occur far out at sea. Some of the crabs, with very long legs, are known as Spider-crabs. Crabs moult or change their shell, not at fixed intervals or seasons, but according to the exigencies of their growth; the change being made with great frequency when they are very young, but rarely in advanced age: indeed, from the molluscs, and other animals sometimes found adhering to the carapace, it is inferred that the same covering is sometimes worn for a number of years.—The metamorphosis of crabs is noticed in the article CRUSTACEANS.—Crabs are interesting inmates of the aquarium, from their readiness in seizing food, their activity in tearing and eating it, their general habits, and, in particular, their pugnacity. The number of specimens is apt, however, to be soon diminished by the stronger killing and eating the weaker.—Many kinds of crabs are used as articles of food in different parts of the world, as the Large Edible C. (*Cancer Pagarus*) and Small Edible C. (*Carcinus Mœnas*) of the British shores. The latter is extremely common on all parts of the coast, but is not nearly so much esteemed as the former, which is much sought after, and is caught either in the holes of the rocks at low tide, or by means of a kind of trap,

basket which readily permits its entrance but not its escape, and which is baited with meat or animal garbage of some kind. In winter it seems to retire to deeper water. Its black claws and very broad carapace, arched at the sides, readily distinguish it from all other British species. It is sometimes nearly a foot in breadth. The claws of the Edible C. were formerly ground to powder and used as a medicine, having, however, no properties but those of carbonate of lime.

CRABBE, GEORGE, a late English popular poet, was born at Aldborough, in Suffolk, on the 24th of December 1754. His father was a warehouse keeper, and collector of the salt duties at Aldborough, and exerted himself to secure for his son a superior education. C. early exhibited a passion for all kinds of book-learning, with a decided bias towards poetry. After being tolerably grounded at school in mathematics and classics, he was, in his 14th year, apprenticed to a surgeon at Wickham Brook, near Bury St. Edmunds; but he had no liking for the profession, and ultimately proceeded to London, where he arrived in 1780, with £3 in his pocket, to make a trial of literature. For a while he was very unfortunate. At last, when threatened with arrest for debt, he resolved to make his case known to Burke. He told Mr. Lockhart years after, 'the night after I delivered the letter at the door, I was in such a state of agitation that I walked Westminster Bridge backwards and forwards until daylight.' The great orator at once appointed an interview, looked over C.'s poetical compositions, suggested several alterations which were adopted, and finally took *The Library* and *The Village* to Mr. Dodsley, by whom the first-named poem was published in 1781. C. went to reside at Beaconsfield with his generous and brilliant acquaintance, and while there met Fox, Sir Joshua Reynolds, and Lord Thurlow; the last of these invited the new celebrity to breakfast and presented him with a bank-note for £100 at parting.

By the advice of Burke, C. entered into holy orders, and was ordained curate of his native place in 1782. Shortly after, he was appointed domestic chaplain to the Duke of Rutland, and took up his residence at Belvoir Castle. *The Village* appeared in 1783, and established the reputation for its author. Shortly after Lord Thurlow presented him with two small livings in Dorsetshire; and now, finding himself above all fear of want, he married Miss Sarah Elmy, and entered into the enjoyment of the purest domestic happiness. In 1785, he left the castle, and took up his residence in the parsonage of Strathern; thereafter for many years he botanized, studied geology, wrote poems, saw—in hurried visits to London—the distinguished men of his time, and was courted by them, enjoying an uninterrupted course of happiness and honor.

The Newspaper appeared in 1785; in 1807, C. published *The Parish Register;* in 1810, *The Borough;* two years after, he produced his *Tales in Verse;* and in 1819, he gave to the world his *Tales of the Hall.* In 1813 his wife died, and shortly after he procured the living of Trowbridge, where for the remainder of his life he resided. In the autumn of 1822, he visited Edinburgh, and was the guest of Sir Walter Scott. His health began to fail in 1828; he died on the 3d of February 1832, aged 78.

C. disdained all the luxuries of his art. He has no heroes with a Hyperion front, and no heroines radiant as Aurora. He worked with the delf, not with the porcelain of human clay. He concerns himself with wild smugglers, denizens of villages by the sea, full of ancient and fish-like smells; gypsies on the heath cooking the fowl purloined from the neighboring barnyard, with tramps, vagabonds, and vagrants, and the inmates of the workhouse. On his page these unsavory individuals live, carouse, curse, brawl, and die. He has pages stern as anything in *The Inferno;* many, droll as Hogarth's pictures; and one or two so sweet, and tender, and pathetic, that no man possessed of any sensibility can read them unmoved.

CRABETH, DIRK and WOUTER, the last surnamed the Elder, were two brothers, glass-painters, born (it is supposed) at Gouda in South Holland, and who flourished in the latter half of the 16th century. It seems Dirk visited France in his youth, whilst Wouter journeyed to Italy, where he studied the works of Raphael, as is evident from his productions. Wouter, it is said, surpassed his brother in drawing, grace, and clearness, while Dirk surpassed him again in coloring. They, however, were jealous of each other, and each concealed from the other the secrets of his processes. Their conjoint work in the church of St. John at Gouda, is the masterpiece of the two brothers. Of the eleven painted windows in that church, seven are by Dirk and four by Wouter. They were done between 1555 and 1571. Dirk died, it is believed, in 1601. It is unknown when Wouter died. The brothers were buried in the sanctuary they had so surpassingly illustrated.

CRACKED HEELS. From careless grooming, washing horses' legs and imperfectly drying them, permitting them to stand in accumulations of filth or exposed to draughts, the skin becomes inflamed, tender, itchy, thickened, and by and by cracked. An ichorous noisome discharge exudes, and lameness often results. In animals with round *gummy* legs, it is sometimes constitutional; underbred horses with rough hairy fetlocks present the majority of cases; white heels, being more delicate, are especially affected; whilst the hind limbs, exposed as they are to filth and cold, suffer most frequently. Cleanse carefully with tepid water; wash with a diluted solution of Goulard's Extract, or any other mild astringent; or dress occasionally with oxide of zinc ointment. Give, besides, a half-dose of physic, and a few mashes, carrots, swedes, or such laxative food, and where persistent, use diuretics (q. v.). When dry and irritable, poultice and apply glycerine before proceeding with astringents. In cold weather, and especially when the horse is heated, interdict washing the legs, except with tepid water, and enjoin careful drying.

CRA'CKLIN, a kind of chinaware, the glazing of which is purposely cracked in the kiln, as an ornament.

CRACOVIENNE (*krakowiak*), the national dance of the Polish peasantry around Cracow. It has a rather melancholy than lively melody in $\frac{2}{4}$ time, and is accompanied by singing. The pair who lead off the dance often begin only with the music of their own voices, and are soon followed by others, and the charm of the dance consists much in the diverting movements by which they seem to chase and avoid each other. The Poles have a multitude of little ditties of two lines each, adapted to this music and dance, which generally contain some allusion to natural phenomena, accompanied with some slight pleasantry.

CRA'COW (Pol. *Krakov*), formerly the capital of a small Polish republic, and anciently the capital of the kingdom of Poland, is now an Austrian city, situated on the left bank of the Vistula, where it becomes a navigable river, in a beautiful plain, surrounded by an amphitheater of gentle hills. Lat. 50° 4′ N., long. 19° 52′ E. Pop. (1880) 66,095, of whom 14,000 are Jews. It contains 46 churches, 15 monasteries, 10 nunneries, and 7 Jewish synagogues. The ancient city of C. is a labyrinth of narrow, dark, and deserted streets, but contains many fine specimens of Gothic architecture in its churches and other edifices; and some handsome buildings are also to be seen in the more modern suburbs. The old walls have been converted into a promenade. In the midst of the houses rises the castle, a huge building of an imposing appearance. The cathedral contains the tombs of many of the Polish kings, and of some of the greatest men of the Polish nation. The university was founded in 1364, by Casimir the Great, whose design was carried into effect by Jagello and Hedwig in 1401. It was long the center of light for Poland, but decayed under the influences of the Jesuits, till it ceased to exist. It was reorganized and opened in 1817, and underwent important changes in 1833. It possesses a museum of natural history, a botanic garden, a library of more than 140,000 volumes, and many MSS. of great value in connection with Polish history. Its manufactures are trifling, and its trade, at one time extensive, became, for a period, very limited, but has of late years greatly revived, owing to the extension of its railway communications, which connect it with Vienna, Berlin, Warsaw, and Lemberg. Three miles west of the city is a vast tumulus to the memory of Kosciusko. It is composed of earth taken from all the patriotic battle-fields of Poland.

C. was founded by Krak, Prince of Poland, from whom it derives its name, about the year 700, became the capital of Poland in 1320, and continued to be so till 1609, when that honor was transferred to Warsaw by Sigismund III. It was taken by the Bohemians in 1039, by the Mongols in 1241, by the Swedes in 1655 and 1702, and by the Russians in 1768. On the third partition of Poland, in 1795, it was assigned to Austria. From 1809 to 1815 it formed part of the Duchy of Warsaw. The congress of Vienna established it as a republic, with a small territory containing about 140,000 inhabitants, under the protectorate of Russia, Prussia, and Austria. The territory bordered with that of each of these great powers. Internal dissensions between the nobles and the common people afforded a pretence for interference, and the sympathy shown by the inhabitants of C. for the cause of Polish independence in 1830 and following years was made the ground of proceedings, which terminated in 1846 in the annexation of C. to the Austrian dominions, a measure alleged to be necessary for the security of the neighboring states, but against which Britain and France protested. C. now forms part of the Austrian crown-land of Galicia. An extensive line of fortifications has been constructed around it by the Austrians, with numerous detached forts, and one immense fortress on a height commanding the city, whose outworks extend over a space of about five miles. These works are intended as a barrier against the advance of Russia.

CRAFT is a general designation for lighters, hoys, barges, &c., employed in loading or unloading large ships. In the royal navy, the name *small C.* is sometimes given to vessels commanded by lieutenants, such as cutters, schooners, gun-boats, &c. Also a term applied by seamen to any vessel whatever.

CRAG, a local term given specially to those masses of shelly sand which have been used from very ancient times in agriculture

to fertilize soils deficient in calcareous matter. Geologists have used it to characterize several groups of strata. See NORWICH or MAMMALIFEROUS CRAG, and RED CRAG.

CRAIG AND TAIL, a term used to designate a peculiar hill conformation, in which a bold and precipitous front exists on one aspect of a hill, while the opposite is formed of a sloping declivity. Those who first observed this form of the surface, believed it was the effect of currents of water moving in the direction indicated by the C. and T.; but latterly there have been speculations calling in the aid of ice, though not excluding the presence of water also. Fine examples of this structure occur in and around

Castle Rock, Edinburgh.

Edinburgh, where the western current has left the bold 'Craig' facing the west and the 'Tail' sloping towards the east; as, for example, the Castle rock, precipitous and unapproachable on every side except to the east, where it has protected the shale and sandstone beds from erosion. The direction and progress of the current can easily be traced; rushing against the hard basalt of the Castle rock, it was turned aside, and continued its course eastward, hollowing out the Nor' Loch on the one side and the Cowgate valley on the other, until the influence of the rock being lost, and aided by the resistance of the Calton Hill and Salisbury Craigs, the currents again met in the valley at Holyrood, when the 'tail' entirely disappears.

CRAIG, JOHN, an eminent preacher of the Reformation, was born in Scotland about 1512. Having spent some time as a tutor in England, he returned to Scotland, and entered the Dominican order, of which he had not long been a member when he fell under the suspicion of heresy, and was cast into prison. On his release, he traveled on the continent; and after some time was, through Cardinal Pole's influence, intrusted with the education of the novices in connection with the Dominican order at Bologna. While here, Calvin's *Institutes* fell in his way, and converted him to Protestant doctrines. Having openly avowed the change in his opinions, he was brought before the Inquisition, and sentenced to be burnt—a fate from which he was saved by the mob, on the death of Pope Paul IV., breaking open the prisons in Rome, and setting the prisoners at liberty. C. escaped to Vienna, and obtained some favor at the court of Maximilian II.; but the news of his being there reached Rome, and the Pope demanded his surrender as one condemned for heresy. The emperor, however, instead of complying with the request of his holiness, gave C. a safe-conduct out of Germany. He now returned to Scotland, and was appointed the colleague of John Knox in the parish church of Edinburgh. Thinking the marriage of Queen Mary and Bothwell contrary to the word of God, he, while holding this position, boldly refused to proclaim the banns. In 1572, C. was sent 'to illuminate the dark places' in Forfarshire and Aberdeenshire, and remained in the north until 1579, when he was appointed minister to King James VI. in Edinburgh. He now took a leading part in the affairs of the church, was the compiler of part of the Second Book of Discipline, and the writer of the National Covenant signed in 1580 by the king and his household. He was not slow to oppose the proceedings of the court when he deemed them opposed to Scripture. He died 12th December 1600. See the facsimile edition of C.'s *Short Summe of the whole Catechisme* of 1581, with Memoir by T. G. Law (1883).

CRAIG, THOMAS, author of the well-known *Treatise on the Feudal Law*, was born probably about 1538. What part of Scotland he was born in is not known. Educated first at St. Andrews, he afterwards prosecuted his studies at Paris, and passed as an advocate at the Scottish bar in February 1563, and in that or the following year was appointed justice-depute to Archibald Earl of Argyle, hereditary justice-general of Scotland.

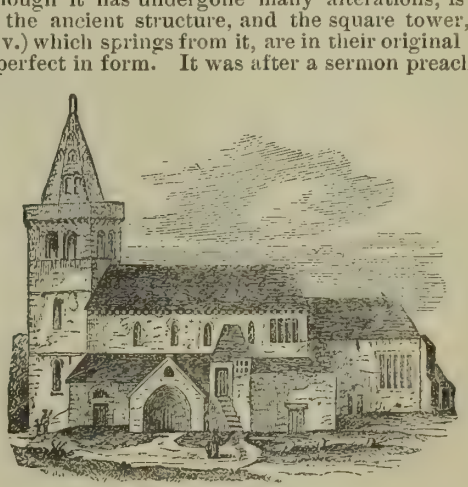
In literary pursuits, C. has distinguished himself above all his contemporaries, and while at the head of the criminal judicature of Scotland he did not neglect the *belles-lettres*, as was evidenced by an epithalamium on the queen's marriage with Darnley, and by a poem on the birth of James I. Besides his work on *Feudal Law*, C. wrote on the *Succession to the Throne of England*, in which he took a warm interest; a treatise on the union of Scotland and England, and one on *Homage*, vindicating Scotland from the charge of feudal dependence on England, which had been asserted by Hollinshed in his *Chronicles*, together with many poetical pieces. In the latter part of his life, C. acted as advocate for the Church of Scotland. He seems to have been high in favor with James VI., who wished to confer the honor of knighthood upon him; and when C. steadily refused, ordered that all persons should address him as if he really had accepted the honor. He died February 1608.

CRAIGLEI'TH STONE, a siliceous sandstone belonging to the carboniferous series, quarried at Craigleith, near Edinburgh, and largely used for building in that city, for which it is admirably adapted by its purity, durability, and the ease with which it can be wrought.

CRAIK, GEORGE LILLIE, was by birth a Scotchman. Born in Fifeshire in 1799, he was educated for the church at St. Andrews University, but, preferring a literary career, he went to London in 1824. His first work of importance was the *Pursuit of Knowledge under Difficulties* (1831), forming part of the series of publications issued by the Society for the Diffusion of Useful Knowledge. He also contributed largely to the *Penny Cyclopædia*. In 1839, C. became editor of the *Pictorial History of England*, some of the most valuable chapters of which were written by himself, and have since been enlarged and republished separately as independent works. Such are his *Sketches of the History of Literature and Learning in England from the Norman Conquest to the Present Time* (6 vols., 1844), and his *History of British Commerce from the Earliest Times* (3 vols., 1844); and in the same year, *Bacon, his Writings and Philosophy*. In 1849, C. was appointed to the chair of History and English Literature in Queen's College, Belfast, a situation which he occupied till he died in 1866. C. possessed an energetic mind, his thinking was clear, his style accurate, and he was conscientious in his statement of facts. Many of his slighter works contained suggestions in politics and social science which were both valuable and original, some of which were afterwards appropriated by, or ascribed to, others. In the first class we may mention the idea of mutual citizenship; and in the second, that of the representation of minorities, which unquestionably originated with him. Between 1849—1852 appeared his *Romance of the Peerage;* in 1855, his *Outlines of the History of the English Language;* in 1857, *The English of Shakspeare*.

CRAIK, MRS. Miss Dinah Maria Mulock, well known as the author of *John Halifax, Gentleman*, and other popular novels, was born at Stoke-upon-Trent in 1826, and married in 1865 a nephew of Prof. Craik. Mrs. Craik's more recent works include *Fair France*, *Hannah*, *Adventures of a Brownie*, and *The Life of John Martin*.

CRAIL, a royal and parliamentary burgh and seaport in the 'East Neuk' of Fifeshire, 2 miles south-west of Fifeness, and 10 miles south-east of St. Andrews. Pop. (1881) 1148. Along with St. Andrews, East and West Anstruther, Cupar, Kilrenny, and Pittenweem, it returns one member to parliament. C. was a town of some note in the middle ages, being then called Caryll. There are traces of an old castle and of a priory college. The Established Church, though it has undergone many alterations, is still substantially the ancient structure, and the square tower, with the broach (q. v.) which springs from it, are in their original condition, and very perfect in form. It was after a sermon preached in this



Crail Church (before the restoration).

church by Knox in 1559, that his hearers rushed in an infuriated mob to St. Andrews, and burnt the magnificent cathedral of the Episcopal metropolis. Archbishop Sharp was for some time minister of Crail. The harbor of C., though small, is safe; but there is a much more commodious site for a harbor in what is called Roome Bay, in the immediate neighborhood, the desirableness of converting which into a harbor of refuge has often been urged on government. Could this improvement be effected, it is believed that C. would again become, as it was formerly, the great rendezvous for the herring-fishery. Even without this advantage, there has been a great revival in this branch of trade of late years, and fish is now cured to the value of £20,000 to £30,000 annually in the little fishing towns in this neighborhood. Being in a retired

spot, with many traces of the well-being and good taste of earlier times still clinging to it, C. is eminently suited for a summer residence for sea-bathing purposes. Its bold coast offers pleasant rambles, and interesting excursions to the geologist and botanist. The town is lighted with gas, possesses good shops and markets, a reading-room, lecture institute, &c.

CRAKE (*Crex*), a genus of birds of the rail family (*Rallidæ*), differing from the true rails in having the bill shorter than the head and comparatively thick. The wings are also armed with a small concealed spine. The name is derived from the harsh call-note of the male. The best known species is the common CORN-CRAKE or LAND-RAIL (*C. pratensis*), the frequent call-note of which is heard from every field of corn or rye-grass in valleys and low grounds in the early part of summer, and is associated by almost every inhabitant of Britain with all that is pleasant in that pleasant season. The corn-crake is a very pretty bird, of a reddish-brown color, marked with dark-brown in streaks along the middle of the feathers, lighter below; it has rather long legs and long toes; the tail is rather short and pointed. It runs rather swiftly, so as to be able sometimes to escape from a dog; but flies

Corn-Crake (*Crex pratensis*).

rather heavily, although it is a bird of passage, and is seen in Britain only in summer. It visits, in like manner, all the northern parts of Europe, and extends its migrations even to Iceland, spending the winter on the shores of the Mediterranean and in Africa. Its call-note may be so exactly imitated by passing the edge of the thumb-nail briskly along the points of the teeth of a small comb, that it can thus be decoyed within a short distance, although it is a very shy bird, and multitudes are familiar with its cry who never saw it in their lives. Its weight is ordinarily about six ounces. It is very highly esteemed for the table; and, according to Drayton, 'seldom comes but upon rich men's spits.' Two or three other species, very rare in Britain, but more common in the southern parts of Europe, are chiefly found in marshy grounds, and sometimes receive the name SORA (*Zapornia*). With them is ranked the CAROLINA RAIL or SORA RAIL (*C. Carolinus*) of North America, which spends its winters in the States near the Gulf of Mexico, but migrates northwards in summer, and is sometimes seen in vast numbers about marshes and the reedy margins of lakes and rivers, particularly in its migration southward in autumn. Its size is about equal to that of the corn-crake; and its color is very similar, but with mingled short streaks of white. It is much esteemed for the table.

CRA'MBÉ, a genus of plants of the natural order *Crucifetæ*; having a pouch (*silicle*) of two unequal joints, of which the upper is globose and one-seeded, the lower abortive. The cotyledons (q. v.) are conduplicate. The species, which are not very numerous, are scattered over the world. One is a native of Britain, *C. maritima*, the well-known SEA-KALE (q. v.). Another, *C. Tartarica*, with much divided leaves and a great fleshy root, a native of Hungary and other central parts of Europe and of Asia, is sometimes called Tartar Bread; and its root is eaten in the countries of which it is a native, either boiled, or more generally peeled and sliced with oil, vinegar, and salt.

CRAMP, an irregular, involuntary, and painful contraction of a voluntary muscle, without insensibility or other disturbance of the general system. C. is often the effect of cold, and has proved fatal to swimmers by attacking them suddenly when in the water. Otherwise it is a disease of little importance, and readily removed by warmth and friction, with regulated movement of the muscles affected. Cramps are a distressing sympton in cholera (q. v.), in which disease it has been proposed to treat them by applying a tight bandage or tourniquet (q. v.) to the affected limbs. See SPASM.

CRAMP RINGS, were rings which were supposed to cure cramp and the 'falling-sickness.' They are said to have originated as far back as the middle of the 11th c., in a ring presented by a pilgrim to Edward the Confessor, which, after that ruler's death, was preserved as a relic in Westminster Abbey, and was applied for the cure of epilepsy and cramp. Hence appears to have arisen the belief that rings blessed by English sovereigns were efficacious in such cases; and the custom of blessing for distribution large numbers of C. R. on Good Friday continued to exist down to the time of Queen Mary. The accomplished Lord Berners, ambassador to Spain in Henry VIII.'s time, writes from Saragossa to Cardinal Wolsey: 'If your grace remember me with some crampo ryngs ye shall doo a thing muche looked for; and I trust to bestow thaym well with Goddes grace.' The metal the rings were composed of was what formed the king's offering to the cross on Good Friday, usually either gold or silver. The superstitious belief in the curative property of C. R. made out of certain pieces of silver obtained in particular ways, still lingers in some of the less enlightened English counties.

CRANACH, LUCAS, a celebrated German painter, was born in the bishopric of Bamberg in the year 1472. Little is known of his early life, except that he was instructed in art by his father—that he visited Palestine in 1493 with the Elector Frederick the Wise of Saxony, who made him his court painter in 1504, at which period we find him in high reputation, especially noted for his facility. In 1508, the elector made him a grant of armorial bearings, having for crest a winged serpent. He made a journey into the Netherlands in 1509, and there drew a picture of Charles V.—the future emperor—then nine years old. C. seems to have acted as *factotum* at the court of the elector and his two successors, preparing for and directing the ceremonies and festivities, and knew besides how to follow other lucrative trades. In 1520 he bought an apothecary's business at Wittenberg, where he was also a bookseller and paper-maker, became councillor and chamberlain, and was twice chosen burgomaster of the town.

C. was closely bound up with the early reformers. He was the intimate friend of Luther, whose picture he several times painted. In 1550 he went to Augsburg to share the imprisonment of the elector, and returned with him to Saxony in 1552. C. died at Weimar, on the 16th October, 1553, in the 81st year of his age, and was buried in the court church there. He had two sons, one of whom, Lucas, was known by the name of 'the younger Cranach,' an excellent colorist and portrait-painter.

C. has left behind him an unusually large number of authentic pictures—indeed, he painted beyond his powers. He excelled in portraits, in painting animals, in fabulous and droll pieces, and was an excellent colorist; but failed in form, grace, and unity, and in the higher walks of art. His last and greatest work is an altar-piece in the church of Weimar—a mystical representation of the crucifixion. His peculiar humor is best seen in such pictures as his 'Samson and Delilah' and his sylvan scene containing 'Apollo and Diana.'

CRA'NBERRY (*Oxycoccus*), a genus of small evergreen shrubs of the natural order *Vaccineæ*, distinguished from the genus Vaccinium (see WHORTLEBERRY) by the wheel-shaped corolla, with segments rolled back and the filaments leaning to the pistil. The species are few, natives of the colder regions of the northern hemisphere. The fruit is acid, and is in great request for making tarts.

The only British species is the Common C. (*O. palustris*, formerly *Vaccinium Oxycoccos*), a native also of the northern parts of Europe, Asia, and America. It grows in peaty bogs and marshy grounds, and is a small wiry shrub with creeping thread-like branches, and small oval leaves rolled back at the edges. The blossoms are small but beautiful, of a deep flesh color. Large quantities of the fruit are collected in some places in the north of England, and in other countries, although the draining of bogs has now made it scarce where it was once plentiful. In Germany it is collected by means of a wooden comb, and preserved with sugar. In England, cranberries are often preserved in bottles closely corked or filled with pure water, in which they may be kept for a long time. They are an excellent addition to sea stores. Wine is made from them in Siberia, and a beverage made from them is sold in the streets of St. Petersburg.—The AMERICAN C. (*O. macrocarpa*) is a much larger and more upright plant, with leaves much larger and less rolled back at the margin. The berries are also larger and of a brighter red. It is a native of North America, frequent in Canada, and as far south as Virginia, growing in bogs, and particularly in elevated situations and where the soil is sandy. The berries are collected by means of a rake. Large quantities of them are exported to Europe. Cranberries are imported into Britain from Russia and other parts of the continent. Both kinds may be cultivated in gardens, in a peat-soil kept very moist or round the margin of a pond, and the produce of a small space properly managed is so great, that it is surprising that a C. plot should not be much more frequent.—The berries of the Red Whortleberry (*Vaccinium vitis idaea*) are sold under the name of cranberries in Aberdeen and other places, and are used in the same way.—A third species of C. (*O. erecta*, formerly *Vaccinium erythrocarpon*), a native of lofty mountains in Virginia and Carolina, is a shrub two feet high, and with a habit more like that of the whortleberries than of the other cranberries; it has a fruit remarkable for transparency and of exquisite flavor, and ap-

pears to deserve an attention and cultivation which it has not yet received.—The TASMANIAN C. is the fruit of *Astroloma humifusum*, a little shrub with trailing stems, leaves somewhat resembling those of juniper, and beautiful scarlet blossoms, which is found in all parts of Van Dieman's Land. It belongs to the natural order *Epacridaceæ*. The fruit is of a green or whitish color, sometimes slightly red, about the size of a black currant, and con-

Cranberry (*Oxycoccus palustris*):
a, part of stem and branches, with roots, leaves, and flowers;
b, a berry; *c*, transverse section of a berry.

sists of a viscid apple-flavored pulp, enclosing a large seed.—*Styphelia adscendens*, a small prostrate Australian shrub of the same natural order, has a fruit very similar to this; and in New South Wales the name C. is likewise given to the red acid berries of *Lissanthe sapida*, a low evergreen shrub, with small white flowers, also belonging to *Epacridaceæ*.

CRA'NBROOK, a small town in the south of Kent, 30 miles south-west of Canterbury. It lies near the Crane, on an outlying ridge of the Hastings sand formation, and is the chief village of the Weald. Pop. of parish (1871) 4331. It has a large hop business. It was once the center of the clothing manufacture, introduced by the Flemings in the time of Edward III.; but this branch of industry has long since disappeared.

CRANE, a machine employed for the purpose of lifting weights. Cranes are of various kinds, but the most common consist of an upright revolving shaft, with a projecting arm or jib, having a fixed pulley at the extremity, over which is passed one end of the rope or chain to receive the weight, the other end being attached to a cylinder with wheel and pinion, by means of which the weight is raised to the required height. By the revolving motion of the upright portion, the load can be deposited on any spot within the sweep of the jib.

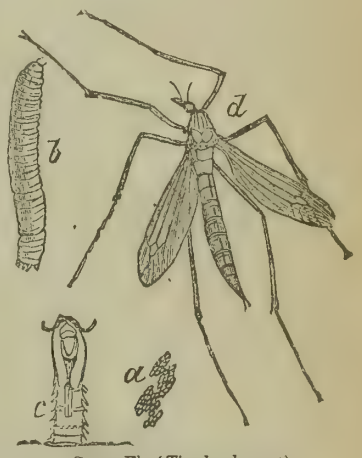
CRANE (*Grus*), a genus of birds of the order *Grallatores*, the type of the family *Gruidæ*. This family differs from herons, bitterns, storks, &c., in having the hind toe placed higher on the leg than the front ones. It consists also of birds less addicted to marshy places, and which feed not only on animal, but, to a considerable extent, on vegetable food. They are all large birds,

Crane (*Crus cinerea*).

long legged, long necked, and of powerful wing, although their wings are rounded and not elongated; some of them performing great migrations, and flying at a prodigious height in the air. One of these is the COMMON C. (*G. cinerea*), which breeds in the northern parts of Europe and Asia, retiring in winter to tropical or subtropical regions. Flocks of cranes periodically pass over the southern and central countries of Europe, uttering their loud harsh cries in the air, and occasionally alighting to seek food in fields or marshes. The C., when standing, is about four feet in height; the prevailing color is ash-gray, the face and throat nearly black, the wing primaries black.

The tertial feathers of the wings are elongated, reaching beyond the ends of the primaries, and their webs are unconnected; they are varied and tipped with bluish-black, and are the well-known plumes once much used in ornamental head-dresses. The visits of the C. to Britain are now very rare, although in former times they were comparatively frequent. It feeds on roots, seeds, &c., as well as on worms, insects, reptiles, and even some of the smallest quadrupeds. It is much esteemed for the table.—There are several other species of Crane. The WHOOPING C. (*G. Americana*) is considerably larger than the common C., which it otherwise much resembles except in color; its plumage, in its adult state, is pure white, the tips of the wings black. It spends the winter in the southern parts of North America. In summer it migrates far northwards, but rather in the interior than the eastern parts of the continent.—To the C. family belong also the Demoiselles (q. v.), with which, rather than with the true cranes, the Balearic Cranes or Balearicans are ranked.—Cranes use their bill as a dagger, and when wounded are dangerous to the eyes of a rash assailant.

CRANE-FLY (*Tipula*) a genus of dipterous (two-winged) insects of the family *Tipulidæ*, to the whole of which the name C. is often extended, nearly allied to the Gnat family (*Culicidæ*), which they resemble in their beautifully feathered and tufted antennæ, but from which they differ in having a comparatively short proboscis. The true crane-flies are also of comparatively large size. They have lanceolate spreading wings, and very long legs. One species (*T. oleracea*) is the well-known *Daddy* (or *Harry*, or *Peter*) *Long-legs*. This and other species abound in arable lands, gardens, meadows, &c., in summer; and their larvæ—remarkably tough worms without legs, sometimes confounded with wire-worms by farmers—are extremely destructive to crops of various kinds, devouring the roots of corn and pasture grasses, potatoes, turnips, and almost all the plants ordinarily cultivated either in field or garden. Rolling of fields is used in killing them; and soot, salt, and other applications are employed in gardens.



Crane-Fly (*Tipula oleracea*):
a, eggs; *b*, larva; *c*, pupa case as left by the insect, sticking out of the earth; *d*, perfect insect.

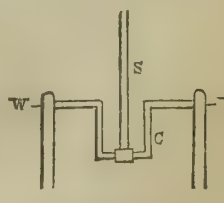
CRANE'S-BILL. See GERANIUM.

CRANGANO'RE, a maritime town of the district of Malabar on the west coast of Hindustan, stands at the mouth of a river of its own name, otherwise called the Aycotta. It is 19 miles to the north of Cochin, and 75 to the south of Calicut, being in lat. 10° 14′ N., and long. 76° 16′ E. At one time possessed by the Portuguese, it was taken from them by the Dutch about 1663; and after being purchased by the rajah of Travancore in 1789, and wrested from him by Tippoo Sultan in 1790, it was conceded by the latter to the British. But the more ancient history of the place is still more interesting, for here have existed from the 4th and 5th centuries respectively congregations of Jews and Christians.

CRA'NGON. See SHRIMP.

CRA'NIUM. See SKULL.

CRANK, in Machinery is an arm or a bend on an axle or shaft, which may be driven by a connecting-rod or by the hand, its use being to convert an alternating straight motion into a continuous revolution. A crank may have part of the shaft on both sides, so that one rod, S, may drive two wheels, W, W, as in the fig. There are two positions in a C. in which the connecting-rod exercises no power whatever—viz., when the arm of the crank, C, is parallel to the connecting-rod, as in the fig., and again when the crank is at the opposite point of its course. A push or pull of the rod in such circumstances can only press the shaft against its bearings. The effect is greatest when the rod and the crank-arm are at right angles, and it decreases gradually on both sides of that position, until at top and bottom it is reduced to nothing. In order to carry the C. over these *dead points*, as they are called, a fly-wheel is fixed on the shaft; this receives



part of the force of the rod while at its best, acts as a reservoir, and by its stored-up momentum carries the shaft round when the rod is powerless.

CRA'NMER, THOMAS, one of the chief reformers of the English Church, and the first Protestant Archbishop of Canterbury, was born at Aslacton, in the county of Nottingham, on the 2d of July 1489. He was descended from an old Norman family, which is said to have come into England with William the Conqueror. In his 14th year, he went to Jesus College, Cambridge, of which he was elected a fellow in 1510. He devoted himself diligently to the study of the learned languages, and also to the study of Scripture. His mind seems to have been early interested in the writings of Erasmus, Luther, and Le Fevre, and especially in their interpretations of Scripture. In his 23d year, he married, and so lost his fellowship; but his wife dying about a year after marriage, he was restored to it by his college. In 1523, he took his degree of D. D., and was appointed lecturer on theology.

In 1528, during the prevalence of the sweating sickness in Cambridge, he retired with two pupils to Waltham Abbey; and Henry VIII. in company with Gardiner and Fox, afterwards Bishops of Winchester and Hereford, happening to be in the neighborhood, the event proved a turning-point in the life of Cranmer. The king was then seriously concerned about his divorce from Catharine of Aragon, and in conversation on the subject with Gardiner and Fox, Cranmer suggested that the question should be 'tried according to the word of God.' Fox having mentioned this suggestion to the king, Henry was greatly pleased, and 'swore by the mother of God, that man hath the right sow by the ear.' From this time, Henry never lost sight of Cranmer. He was asked to reduce his suggestion to writing, and to have it submitted to the European universities. After this he was appointed Archdeacon of Taunton, and one of the royal chaplains. He was also sent to Rome on a special embassy about the divorce, but met with little success. Subsequently, he was despatched to the Emperor on the same errand, and while in Germany, he married a second time, a niece of the German divine, Osiander. This took place in 1532; and shortly afterwards, on the death of Archbishop Warham, he was recalled to fill the vacant see. Under his auspices, Henry's divorce was speedily carried through, and C. married the king to Anne Boleyn, on the 28th May, 1533. In Anne's subsequent disgrace, and again, in the affair of Anne of Cleves, the archbishop took a part not very creditable to him. His position was no doubt a difficult one; but his character was naturally pliable and timid, rather than resolved and consistent. The same spirit characterizes the measures of religious reform which were promoted by him. On the one hand, he joined actively with Henry in restricting the power of the pope, and in suppressing the monasteries; but, on the other hand, he was no less active in persecuting men like Frith, Forrest, and others, who, on matters of religious faith, were disposed to advance further than himself or the king. He did what he could, however, to resist the reactionary movement which took place in 1539, and which is known by the institution of the 'Six Articles.' He was also instrumental in promoting the translation and circulation of the Scriptures. On Henry VIII.'s death, Cranmer was appointed one of the regents of the kingdom, and along with Latimer and others, largely contributed to the advance of the Protestant cause during the reign of Edward. He assisted in the compilation of the Service-book and the Articles of Religion. The latter are said to have been chiefly composed by him. He was also the author of four of the Homilies.

On the accession of Mary, he was committed to the Tower, along with Latimer and Ridley. In March 1554, they were removed to Oxford, and confined there in the common prison, called the Bocardo. Latimer and Ridley bore their cruel fate with magnanimous courage; but the spirit and principles of C. temporarily gave way under the severity of his sufferings. He was induced, in the hope of saving his life, to sign no fewer than six recantations; but his enemies were determined to be satisfied by nothing short of his death. On the 21st March 1556, he suffered martyrdom, as his fellow-reformers had done, opposite Baliol College. His courage returned at the end, and he died protesting his repentance for his unworthy weakness in changing his faith, and showing an unexpected fortitude in the midst of the flames.

CRANNOGES, the name given in Ireland and in Scotland to the fortified islands in lakes which were in common use as dwelling-places and places of refuge among the Celtic inhabitants. The etymology of the word is uncertain, but it is believed to refer to the timber which was employed either in the fortification of the island, or in the construction of the houses which were placed upon it.

The earliest notice of such lake-dwellings which has been observed, is in the pages of Herodotus (book v. chap. 16). Writing of the Persian invasion of Thrace and Macedonia under Darius—about 500 years before the Christian era, and less than 100 years before his own death—he relates how the satrap Magebazus, warring against the Pæonians, led certain tribes of them captive into Asia, but failed to conquer those who inhabited Lake Prasias. 'He sought, indeed,' says the historian, 'to subdue the dwellers upon the lake, but could not effect his purpose. Their manner of living is the following. Platforms, supported upon tall piles, stand in the middle of the lake, which are approached from the land by a single narrow bridge. At the first, the piles which bear up the platforms were fixed in their places by the whole body of the citizens; but since that time the custom which has prevailed about fixing them is this: They are brought from a hill called Orbelus, and every man drives in three for each wife that he marries. Now, the men have all many wives apiece, and this is the way in which they live. Each has his own hut, wherein he dwells, upon one of the platforms, and each has also a trap-door giving access to the lake beneath; and their wont is to tie their baby-children by the foot with a string, to save them from rolling into the water.

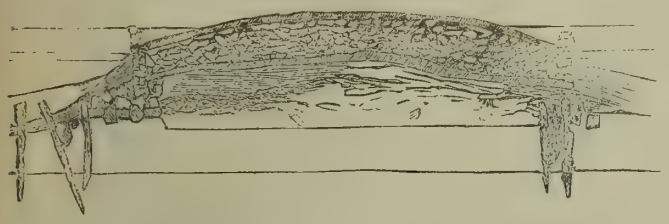
'They feed their horses and their other beasts upon fish, which abound in the lake to such a degree, that a man has only to open his trap-door, and to let down a basket by a rope into the water, and then to wait a very short time, when he draws it up quite full of them. The fish are of two kinds, which they call the paprax and the tilon.' The Lake Prasias of the Father of History seems to be the modern Lake Takinos, on the Strymon or Kara-su, a river which, rising on the borders of Bulgaria, flows southward through Roumelia, and, after expanding its waters into a lake, falls into the Gulf of Contessa. The fish named by Herodotus have not been identified by naturalists; Lake Takinos abounds in carp, tench, and eels.

The island-dwellings of Lake Prasias met with comparatively little attention until archæologists, quite recently, found the remains of similar habitations in other parts of Europe. The first discovery was made in Ireland in 1839, by Mr. W. R. Wilde, one of the secretaries of the Royal Irish Academy. The small lake of Lagore, near Dunshaughlin, in the county of Meath, having been drained, a circular mound, which had been an island in its waters, was observed to be thickly strewed with bones. As these were to be carted away for manure, it was found to be an artificial structure. Its circumference, measuring 520 feet, was formed by upright piles of oak about 7 feet long, mortised into oak-planks laid flat upon the marl and sand at the bottom of the lake. The upright piles were tied together by cross-beams, and the space which they enclosed was divided into compartments by oak-beams, some of which had grooves, so as to allow panels to be driven down between them. The compartments thus formed were filled with bones and black peaty earth. Portions of a second tier of upright piles were observed rising from the first tier. The bones were ascertained to be those of several varieties of oxen, of swine, deer, goats, sheep, dogs, foxes, horses, and asses. Along with them were found a vast number of weapons, ornaments, and utensils, fashioned of stone, bone, wood, bronze, and iron; such as swords, knives, spears, javelins, daggers, whetstones, querns (or hand-mills), beads, pins, brooches, combs, horse-trappings, shears, chains, axes, pots, and bowls. On reference to the ancient annals, in which Ireland is so rich, it was seen that, in 848 A.D., a hostile Irish chief 'plundered the island of Loch Gabhor [as Lagore was then written], and afterwards burned it, so that it was level with the ground;' and that again, in 933 A.D., 'the island of Loch Gabhor was pulled down' by the piratical Norsemen.

Mr. Wilde's discovery at Lagore was followed by other discoveries of the same kind elsewhere in Ireland, so that in 1857 the existence of about fifty C. had been ascertained; and every succeeding year has seen an increase of the number. They show several varieties of construction. The island at Lagore is a type of the purely artificial crannoge. But most frequently the crannoge was partly natural. An islet just level with the water, was raised artificially a foot or two above it. An islet too small to be a convenient habitation, or too easy of landing to be a place of defence, had its area artificially enlarged, or its banks artificially strengthened, generally by piles or stockades, but occasionally by heaps of stones. The space thus enclosed is generally a circle of from 60 to 80 feet in diameter; but in some cases the enclosed space is larger, and of an oval shape. The piles are generally of oak, mostly young trees, from four to nine inches broad, still bearing marks of the hatchet; usually a single row has been considered enough, but there are instances of two, and even of three rows. It would seem that originally the piles had risen several feet above the water, and it has been supposed that they were interlaced with branches placed horizontally, so as to form a screen or breastwork. The area within the stockade is sometimes wholly or partially covered with a layer of round logs, from four to six feet long, having stones, clay, or gravel above them. Fragments of oak-framing, with mortises and cheeks cut in them, have been found within the piles. In almost every instance, a few flat stones, apparently serving as a hearth, have been observed near the middle of the enclosure: in several C., two or three hearths have been met with. In some cases, a causeway leads from the

island to the mainland; but in general the crannoge was to be reached only by boat, and scarcely any crannoge has been discovered without the remains of a primitive canoe, hollowed out of the trunk of an oak, being found beside it. In at least one crannoge, a pier or jetty projected from the island; it was a double row of piles and stretchers, running parallel to each other at a distance of about eight feet, and supporting a platform of logs. On almost every crannoge one or two querns (q. v.) have been found, along with bones of oxen, deer, goats, and swine, horns of cattle, deer, sheep, and goats, boars' tusks, and sharpening stones: fragments of pottery, and articles of stone, bone, horn, wood, glass, copper, bronze, brass, and iron, are of somewhat rarer occurrence. Many of the C. had been submerged by the gradual rise of the lakes in which they stood, so that their existence only became known as the great drainage-works of late years reduced the waters to their old level.

The accompanying woodcut shows a section (on the scale of 1 inch to 20 feet) of the crannoge in Ardakillin Lough, near Stokes-



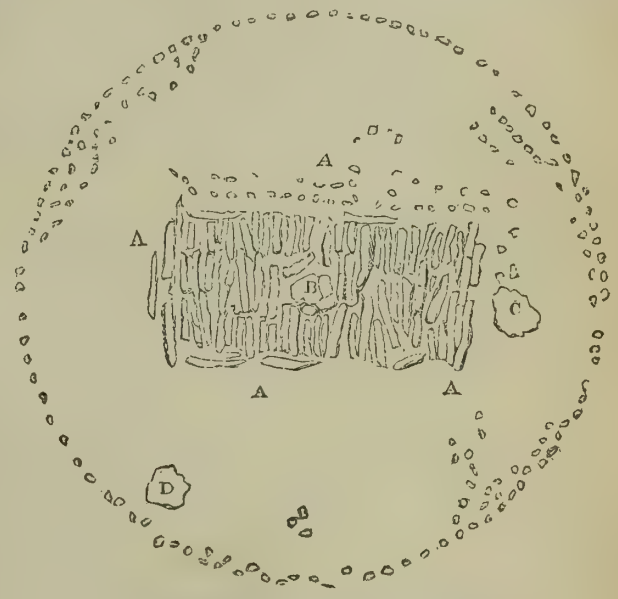
town, in the county of Roscommon. The uppermost line marks the highest level of the waters of the lake; the middle line, the common winter level; the third line, the common summer level. The upper surface of the crannoge was formed of a layer of loose stones, surrounded by a wall, partly supported by piles. The stones rested on the natural clay, peat, and boulders of the island, in digging through which strata of ashes, bones, and logs of timber were met with. The stockades were of oak; the oblique or slanting stockade shown in the woodcut represents a girdle of sheet-piling which quite encircled the crannoge.

The woodcut in the next column gives a ground-plan (on the scale of 1 inch to 20 feet) of one of two C. in Drumaleague Lough, in the county of Leitrim. The circle within the ring of stockades is 60 feet in diameter; in some places there are two, and in others, three rows of stockades; and within this outer ring, there are groups of piles, some of them arranged apparently for some special purpose. The oblong space in the middle, marked A, is covered by a rude platform of round logs, chiefly of alder, from four to six feet in length; it was probably the floor of the log-house, which was the chief or only dwelling-place on the islet. B shows where the hearth stood—a collection of stones, still retaining traces of fire; C marks a heap of stiff clay; D, the root of a large tree nearly buried in the peat, the surface of the wood being beveled off with a hatchet, so as to form a sort of table, under which was found a heap of bones, apparently of deer and swine.

The Irish annals, it has been seen, make mention of C. as early as the 9th c., and they figure in history down to the middle of the 17th century. The crannoge of Lough Lynch, in Antrim, is shown as the birthplace of Colkitto, a chief who figured in Montrose's wars, and has found a place in one of Milton's sonnets. The crannoge of Roughan Lake, near Dungannon, was the last retreat of Sir Phelim O'Neil in 1641. Two years later, there is record of an attempt to flood the crannoge of Loughinsholin, in the county of Londonderry, by turning a stream into the lake, and damming up its outlet. This attempt failed; but in 1645 the garrison were compelled by hunger to give the crannoge to the flames, and make their escape. In 1567, an agent of the English government, who was asked what were the castles of the O'Neil, wrote in reply: 'For castles, he trusteth no point thereunto for his safety, as appeareth by the razing of the strongest castles of all his countries; and that fortification that he only dependeth upon is in certain fresh-water lochs in his country, which from the sea there comes neither ship nor boat to approach them: it is thought that there, in the said fortified islands, lieth all his plate (which is much), and money, prisoners, and gages [i. e., hostages]; which islands have in wars heretofore been attempted, and now of late again by the lord-deputy there, Sir Harry Sydney, which for want of means for safe conduct upon the water hath not prevailed.'

While archæologists were still exploring the C. of Ireland, structures of a similar kind were discovered in the heart of the European continent. The winter of 1853—1854 was one of the driest that had been seen in Switzerland, and the lakes sank to a lower level than was ever known before. The inhabitants of the village of Meilen, on the Lake of Zurich, took advantage of this unusual subsidence to reclaim a piece of land from the lake. As the work went on, a learned antiquary, Dr. Ferdinand Keller, discovered the remains of rows of deeply driven piles, and, imbedded in the mud around them, found heaps of primitive weapons, tools, and utensils, made of stone and bone. Closer examination satisfied him that the piles had supported a platform; that on this platform huts had been raised; and that after being thus occupied, probably for centuries, the structure had been destroyed by fire. The discovery in the Lake of Zurich of these *Keltische pfahlbauten* (Celtic pile-buildings), as Dr. Keller called them—*habitations lacustres* (lake-dwellings), as other Swiss archæologists have termed them—was followed almost immediately by the discovery of erections of the same kind in other lakes of Switzerland. No fewer than from 30 to 40 have been found in the upper and lower lakes of Constance; as many as 30 in the Lake of Geneva; more than 20 in the Lake of Neuchâtel; 10 in the Lake of Bienne; besides others in the deep peat-bogs which surround the hill of Chamblon, in the Vallée de l'Orbe, and in the lakes of Morat, Inkwyl near Soleure, Moosseedorf near Bern, Pfaffikon near Zurich, Wauwyl near Lucerne, and Nussbaumen in the canton of Thurgau. The site chosen for these lake-dwellings was generally a sunny and sheltered bay, with a gently shelving bottom of mud or clay. The piles, from four to ten inches in diameter, were rudely fashioned of whatever wood was at hand, oak, fir, ash, beech, birch, cherry, or apple. They were driven in a depth of not less than six or seven feet of water, at a distance of from 100 to 300 feet from the shore.

They were ranged generally from one to two feet apart, in the form of a narrow parallelogram, having its longest side in a line with the edge of the lake. At Wangen, on the lower lake of



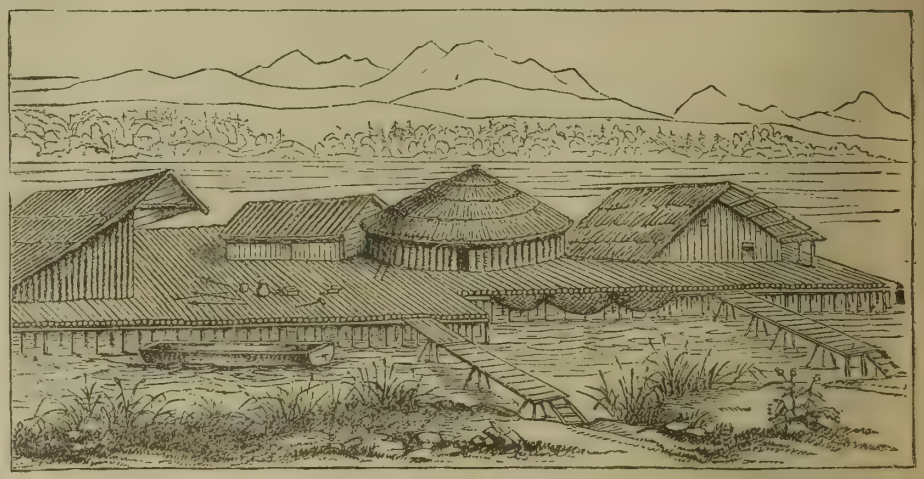
Ground-plan of Crannoge in Drumaleague Lough.

Constance, the piles, from 30,000 to 40,000 in number, extend about 700 paces in length, and about 120 in breadth. At Morges, on the Lake of Geneva, the piles stretch 1200 feet in length, by 120 feet in width, so that they would have supported a platform with an area of about 18,000 feet, sufficiently capacious, according to the calculations of M. Frederic Troyon of Lausanne, to contain 316 huts, with a population of 1264 persons. The huts, it would seem, were for the most part circular in shape, measuring from 10 to 15 feet in diameter; they were of wattles, plastered with clay, masses of which hardened by fire, still bearing the marks of the wattles which it had received when wet and soft, have been recovered from the beds of the lakes. In at least one instance, the remains of a bridge or gangway, leading from the platform to the shore, have been discovered. Many small boats, hollowed out of the trunks of trees, have been found; and one large vessel of the same kind, 50 feet long, and 3½ feet wide, has been observed at the bottom of the Lake of Bienne. The woodcut in the preceding column shows the *pfahlbauten*, as the Swiss archæologists believe them to have been in their original state.

The lake-dwellings of Switzerland have obviously much more resemblance to those of Lake Prasias, described by Herodotus, than to the C. of Ireland. But the Swiss at the same time can show examples of the Irish type. At Nidau Steinberg, in the Lake of Bienne, there is an artificial mound of stones, resting on horizontal planks, and encircled by a row of upright piles. It is now submerged, but when—as the Swiss believe—the lake stood at a lower level, it must have been an island. At Moringen, in the same lake, there is another pile-building, enclosing a mound of stones which has an area of about half an acre. A canoe which had been used in its construction lies with its load of stones at

the bottom of the lake. Structures still more nearly resembling the Irish C. have been found in the lakes of Inkwyl, Nussbaumen, and Wauwyl.

History and tradition are alike silent as to the pile-buildings of the Swiss lakes. That they belong to a remote age, will readily be granted, even by those who may hesitate to accept 'the stone, bronze, and iron periods' on which the Swiss antiquary rests their claims to 'pre-historic' antiquity; or who may question the grounds on which the Swiss naturalist assigns them to the 15th c. before the Christian era. Of the remains found in them, many appear to be those of a rude people—such as spear-points, arrow-heads, axes, chisels, knives, and even small saws, of flint and stone; arrow-heads, daggers, hammers, bodkins, needles, pins, rings, bracelets, necklaces, of bone or horn. Articles of bronze, some of them richly ornamented, are at the same time of common occurrence; and swords and other objects of iron are met with in considerable numbers. Some of the Swiss archæologists seem at one time to have thought that the piles surrounded by stone and bone implements showed marks of greater age than the piles surrounded by bronze implements. It is now admitted, however, that both stone and bronze objects, and bronze and iron objects, are to be found in the same group of piles. It is to be remarked, too, that many of the objects of stone, bone, horn, bronze, and iron, are fashioned of the same shape and for the same use, differing only in the substance of which they are made. Whoever the dwellers on the *pfahlbauten* were, their remains show that they grew wheat and barley; that they ate the flesh of the ox, the goat, the sheep, and the pig; that among the beasts of the chase which they hunted down was the now extinct species of the aurochs (see BISON); that they had horses, dogs, and cats; that they had apples, pears, wild-plums, and wood-raspberries; that they baked pottery; that their women plied the distaff and knitted; that they made hempen mats; and that they wove linen cloths.



Crannoge restored.

Hitherto, archæologists knew of lake-dwellings as existing only in Ireland and Switzerland; but in 1857, Mr. Joseph Robertson read a paper to the Society of Scottish Antiquaries, proving that they were to be found in almost every province of Scotland. He not only ascertained the existence of about 50 examples, but was able to show from records that they were known in Scotland by the same name of C. which they received in Ireland. The resemblance between the Scottish and Irish types seems, indeed, to be complete. Every variety of structure observed in the one country is to be found in the other, from the purely artificial island, framed of oak-beams, mortised together, to the natural island, artificially fortified or enlarged by girdles of oak-piles or ramparts of loose stones; from the island with a pier projecting from its side, to the island communicating with the mainland by a causeway. If there be any difference between the C. of the two countries, it is that the number of C. constructed altogether of stones is greater in Scotland than in Ireland—a difference which is readily explained by the difference in the physical circumstances of the two countries.

Among the more remarkable of the Scotch C. is that in the loch of Forfar, which bears the name of St. Margaret, the queen of King Malcolm Canmore, who died in 1097. It is chiefly natural, but has been strengthened by piles and stones, and the care taken to preserve this artificial barrier is attested by a record of the year 1508. Another crannoge—that of Lochindorb, in Moray—was visited by King Edward I. of England in 1303, about which time it was fortified by a castle of such mark that in 1336, King Edward III. of England led an army to its relief through the mountain-passes of Athol and Badenoch. A third crannoge—that of Loch Cannor or Kinord, in Aberdeenshire—appears in history in 1335, had King James IV. for its guest in 1506, and continued to be a place of strength until 1648, when the estates of parliament ordered its fortifications to be destroyed. It has an area of about an acre, and owes little or nothing to art beyond a rampart of stones and a row of piles. In the same lake there is another and much smaller crannoge, which is wholly artificial. Forty years after the dismantling of the crannoge of Loch Cannor, the crannoge of Lochan Eilean, in Strathspey, is spoken of as 'useful to the country in time of troubles or wars, for the people put in their goods and children here, and it is easily defended.' Canoes hollowed out of the trunks of oaks have been found as well beside the Scotch, as beside the Irish crannoges. Bronze vessels, apparently for kitchen purposes, are also of frequent occurrence. Deer's horns, boars' tusks, and the bones of domestic animals, have been discovered. Our knowledge of Scottish C. (of which in 1880 about 35 were known) was extended by the examination of one near Tarbolton, Ayrshire, by Mr. Cochran-Patrick and Dr. Munro.

Since 1857, the existence of lake-dwellings has been discovered in Savoy, in Upper Italy, in Hanover, in Prussia, and in Denmark. Less certain traces have been found in England, in draining a mere at Wretham Hall, near Thetford, in Norfolk. The savages of Borneo and New Guinea still live on the water, in huts perched upon platforms supported by piles; and wooden houses raised upon piles are common in Burmah and Siam, on the creeks and rivers of the Strait of Malacca, and it is believed elsewhere in Asia. A bas-relief from the palace of Sennacherib, engraved in Mr. Layard's *Monuments of Nineveh*, represents what seem to be artificial islands, formed, it would seem, by wattling together the tall reeds of the marshes on the lower part of the Euphrates.

The C. of Ireland are described in the *Proceedings of the Royal Irish Academy*, vols. i., v., vii.; Mr. Wilde's *Catalogue of the Museum of the Royal Irish Academy*; *The Archæological Journal*, vols. iii., vi.; Mr. Digby Wyatt's *Observations on the Early Habitations of the Irish* (Lond. 1858); *The Ulster Journal of Archæology*, No. 26; *Proceedings of the Kilkenny Archæological Society*, No. 27. The chief works on the lake-dwellings of Switzerland are Dr. Ferdinand Keller's three papers on *Pfahlbauten*, and Dr. L. Rutimeyer's *Untersuchung der Thierreste aus den Pfahlbauten*, all published in the *Mittheilungen der Antiquarischen Gesellschaft in Zurich*, band ix., xii., xiii.; M. Frederic Troyon's *Habitations Lacustres de la Suisse* (Lausanne, 1857); his *Ossemens et Antiquités du Lac de Moossedorf* in the *Bibliothèque Universelle de Genève*, for May, 1857; his *Details of Discoveries at the Lake Habitations of Switzerland*, in the *Ulster Journal of Archæology*, No. 29; MM. Alb. Jahn and J. Uhlmann's *Die Pfahlbau-Alterthümer von Moossedorf* (Bern, 1857); and M. A. Morlot's *Etudes Géologico-Archéologiques en Danemark et en Suisse* in the *Bulletin de la Société Vaudoise des Sciences Naturelles*, t. vi. (Lausanne, 1860). The Scottish C. are described in the *Proceedings of the Society of Antiquaries of Scotland*, vol. iii., and in Dr Munro's *Ancient Scottish Lake-dwellings or Crannogs* (1882). On pile-buildings generally, reference may be made to Mr. Wylie's paper *On Lake-dwellings of the Early Periods*, in the *Archæologia*, vol. xxxviii., and to papers in the *Gentleman's Magazine* for 1860 and 1861.

CRAPE, a thin fabric made of raw silk, which has been tightly twisted without removing the viscous matter with which it is covered when spun by the worm. It is simply woven as a thin gauze, then dressed with a thick solution of gum, which in drying causes the threads to partially untwist, and thus gives a wrinkled and rough appearance to the fabric. It is usually dyed black, and used for mourning apparel.

CRAS-CROM, an ancient and rude instrument of agriculture in the Highlands, consisting, as its name in Gaelic imports, of a crooked stick shod with iron, with a small projecting bar to rest the foot upon.

CRA'SHAW, RICHARD, an English poet, whose devotional strains exhibit imagination of a high order, with great copiousness and beauty of language, was the son of a clergyman in the English Church, and was born in London, at what date is unknown. He was educated at the Charter-house, and at Cambridge, where he obtained a fellowship in 1637.

He entered the church about 1641, it is said, and became an earnest and eloquent preacher; but in 1644 he was ejected from his fellowship by the parliament, for refusing to take the Cove-

nant. He went to France, adopted the Roman Catholic faith, and suffered great pecuniary distress, until, through Cowley's influence he was introduced to Queen Henrietta Maria, who recommended him to certain dignitaries of the church in Italy. He soon obtained a secretaryship to one of the cardinals at Rome, and was made a canon of the church of Loretto. In this office he died about 1650. In 1634, C. published a volume of Latin poems, in which appeared the famous line, sometimes attributed to Dryden and others, relative to the miracle of the water being turned into wine.

'*Nympha pudica Deum vidit et erubuit.*'
'The modest water saw its God and blushed.'

In 1646 appeared his *Steps to the Temple, The Delights of the Muses*, and *Carmen Deo Nostro*, in which there is much fervid poetry. C. greatly resembles George Herbert in his cast of thought, and is not inferior to him in richness of fancy, though we find in him more exaggeration and conceit.

CRASSULA'CEÆ, a natural order of exogenous plants, some of them shrubby, and some herbaceous, all remarkable for their succulency. About 300 species are known, among which are house-leeks, stone-crops, rose-root, &c. They are widely distributed over the world, but South Africa particularly abounds in them. Most of them grow in dry places, and derive their nourishment from the air rather than from the soil, their roots seeming chiefly intended to fix them to the spot. Many of them are much cultivated in green-houses, more on account of their grotesque forms than for the beauty of their flowers. Some are refrigerant, and one or two are even used as food; others, on account of the tannin which they contain, are astringent; and some are acrid.

CRA'SSUS, the surname of several old Roman families, among which that of the Licinii was most remarkable.—CRASSUS (LUCIUS LICINIUS), born in 140 B.C., was the best orator of his age, and was as distinguished for his wit as for his rectitude in the capacity of proconsul. In 95 B.C. he was elected consul, along with Quintus Mucius Scævola (who had been his colleague in all his previous offices). During their consulship was enacted the *Lex Licinia Mucia de Civibus regundis*, banishing from Rome all who had not the full rights of citizens. This imbittered the feelings of foreigners toward Rome, and partly led to the Social War. As censor, C., in 92 B.C., closed all the schools of the rhetors—asserting that they had exercised a bad influence on the minds of young men. In consequence of the excitement attending a debate in the senate, C. died in 91 B.C.

CRASSUS, MARCUS LICINIUS, the triumvir, was born sometime before 115 B.C. His father and brother suffered death from the party of Marius, 81 B.C., and he himself—though young—was subjected to a jealous and dangerous surveillance. In 85 B.C., to escape from this, he went to Spain. He afterwards joined Sulla (83 B.C.), and distinguished himself in the battle against the Samnites at the gates of Rome. As prætor he crushed the Servile revolt, by the conquest of Spartacus at the battle of Lucania (71 B.C.), and in the following year was made consul with Pompey, a colleague whom he hated. On the other hand, Cæsar valued the friendship of C., the most wealthy of Roman citizens. During his consulate, C. gave a feast to the people, which was spread on 10,000 tables, and distributed a provision of corn for three months. Plutarch estimates the wealth of C. at more than 7000 talents, and Pliny states that the lands of C. were worth 8000 talents. About 60 B.C., Cæsar, Pompey, and C. entered into a private arrangement for their common benefit. This paction is known as the first *triumvirate*. See CÆSAR. In 57 B.C., as consul with Pompey, he gained the province of Syria, and professed to make preparations of war against the Parthians; but the acquistion of more wealth seems to have been his main object, and this he effected by plundering the towns and temples in Syria. At length, however, he set out, but was misguided by a treacherous Arab, and utterly defeated at the river Bilecha by the Parthians. C. now retreated to the town of Carrhæ, intending to pass into Armenia; but was beguiled into a conference with the Parthian general, Surenas, and was slain at the appointed place of meeting. His quæstor, Cassius, with 500 cavalry, escaped into Syria; but the remaining Romans were scattered and made prisoners, or put to death.

CRATAE'GUS, a genus of plants of the natural order *Rosaceæ*, sub-order *Pomeæ*, very nearly allied to *Mespilus* (Medlar) and *Pyrus* (Pear, Apple, &c.), but distinguished by the acute calycine segments, and by the round or oval fruit, closed at the apex, and concealing the upper end of the bony cells. The species are pretty numerous, natives of the temperate parts of the northern hemisphere, and in general have flowers in beautiful terminal corymbs. They are all large shrubs or small trees, more or less spiney, whence the name THORN has been very generally applied to them. The only native of Britain is the common HAWTHORN (q.v.), (*C. oxyacantha*).

Most of the species resemble it considerably in habit, size, form of leaf, &c. A number of them are now frequent in plantations and shrubberies in Britain, of which perhaps the most common is the COCK'S-SPUR THORN (*C. crus-galli*), a native of North America from Canada to Carolina. Its leaves are not lobed; its fruit rather larger than that of the hawthorn. The AZAROLE (*C. Azarolus*), a native of the south of Europe, and the ARONIA (*C. Aronia*), a native of the Levant, are occasionally cultivated for their fruit, which is about the size of the Siberian crab, and is used either for dessert or for pies. *C. Orientalis* (or *odoratissima*) and *C. tanacetifolia* have also fruit of considerable size. The latter is much eaten in Armenia. *C. Mexicana* has a large fruit, like a small apple, but not eatable. It is, however, very ornamental. The wood of most of the species much resembles that of the hawthorn. It is common to graft the rarer species on the hawthorn.—*C. pyracantha* differs much in appearance from most of the genus; being a pretty evergreen shrub, with lanceolate crenate leaves, and rich clusters of red berries, which remain on it all winter; a native of rocky places in the south of Europe and the Caucasus. It is often employed in Britain as an ornamental covering for walls, and is known as the PYRACANTHA.

CRA'TER (Gr. a cup), the central cup-shaped cavity in the summit of a volcano (q. v.), through which the lava, stones, scoria, &c., are for the most part ejected. These materials sometimes escape from immense rents in the sides of the volcano, as was the case in the famous eruption of Hecla in 1783, when two enormous

Crater of Kilauea in the island of Hawaii, Pacific Ocean: Depth about 1500 feet; circumference about 2 miles.

streams of lava poured from its side to the distance, the one of 40, the other of 50 miles. Nor are the volcanic materials, when they escape through a crater, always ejected through the old vent on the summit; some other portion of the mountain may yield more readily to the pressure from within, and thus one or more lateral craters be formed, which, however, increase in height from the accumulation of ejected materials, and eventually, if the eruption continues, overtop the former cone.

CRATI'NUS, a Greek comic poet, born about 519 B.C. Next to his younger contemporaries, Eupolis and Aristophanes, he is the most valuable representative of the Old Attic comedy. He changed its outward form considerably, and also sought to add to its vigor and power. Before his time, the number of actors had been indefinite; he limited them to three. He was the first to make comedy pungent and personal. The habits, manners, institutions—in fact, the whole public and private life of the Athenians—were considered by C. a legitimate mark for censorious satire. The greatest men did not escape. Pericles, for instance, was frequently and fiercely abused. C.'s style was very metaphorical and ingenious. Of his twenty-one comedies, nine of which obtained the first prize in the public competitions, we possess only some fragments. These have been collected by Meineke in his *Fragmenta Comicorum Græcorum* (Berlin, 1840).—There was also a younger CRATINUS, a contemporary of Plato, who belonged to the school of the Middle Comedy.

CRATI'PPUS, a Peripatetic philosopher, was a native of Mitylene, and a contemporary of Cicero. He appears to have been held in the highest estimation by the great men of his age. Cicero calls him the prince of all the philosophers whom he had known. Pompey visited him after his defeat at Pharsalia, and received at his hands the consolations of philosophy; and Brutus went to Athens, to which city C. had latterly betaken himself, to listen to his prelections, even while making preparations to meet Octavius and Antony. Nothing that C. wrote has survived.

CRAYER, CASPAR DE, a Flemish historical and portrait painter, was born at Antwerp in 1582. He lived first at Brussels, and afterwards at Ghent, where he died in 1669. For the churches at Ghent he executed twenty-one altar-pieces. His works are to be found all through Flanders and Brabant. The galleries of

Vienna and Munich also possess a few. Their main characteristics are vigor and boldness of design, and care and truthfulness in execution. Rubens was a great admirer of Crayer.

CRAY'FISH, or CRAW'FISH (*Astacus fluviatilis*), a crustacean of the order *Decapoda* (see CRAB), sub-order *Macroura* (i. e., long-tailed — characterized by the elongation of the abdomen, and its termination in a sort of fin composed of five pieces and expanded laterally); nearly allied to the lobster, from which, however, it differs in having the middle plate of the tail-fin transversely divided by a suture. It inhabits the rivers and streams of many parts of Europe, and is common in some of those of England, making burrows in clayey banks, and coming forth at night in search of food, which consists chiefly of molluscs, small fishes, larvæ of aquatic insects, and animal substances of almost any kind. It is esteemed for the table, and is readily attracted by a bait of decaying flesh or animal garbage, which being enclosed in a net or in a bundle of twigs, numbers of C. may be captured at a time.—Other species of C. abound in some of the warmer parts of the world. See Huxley's *Crayfish* (1879).

Crayfish (*Astacus fluviatilis*).

CRAYON (Fr. a pencil). Though used in French, and occasionally in English, to designate pencils generally, including those made of lead, the word C. is more frequently applied, in England, to those small cylinders of charcoal, or of pipe-clay or chalk colored with various pigments, which are used for drawing. Cohesiveness is given to the paste of which the cylinders are formed by means of gum, wax, soap, &c. C. drawings are often remarkable for the delicacy and softness with which objects are represented, but they are deficient in power. See PENCIL, CHALK.

CREAM, the butyraceous and richer portion of milk, which as lighter rises and settles on the surface. See MILK. The term C. is applied in a variety of ways, indicative of something superior in quality; as, *Cold Cream* (q. v.), and *Cream of the Valley*, a fine kind of English gin. The French, in referring to persons in the height of fashion, speak of *La crême de la crême*—The cream of cream.

CREAM OF TARTAR exists naturally in grape juice, but being insoluble in alcohol, it is gradually deposited, in the form of argol, as the sugar of the juice becomes converted into alcohol by fermentation. In the preparation of C. of T., the argol is dissolved in hot water, to which charcoal or fine clay is added, to take up the coloring matter; by boiling and filtering, a clear colorless solution is obtained, from which, on cooling, the C. of T. separates as crystals. Some of the crystals form at the bottom; others form a crust on the top, like cream, whence the name cream of tartar. In chemical composition, it is the Bitartrate of Potash (KO,HO,T), and contains potash, water, and tartaric acid. It is readily soluble in hot water, though it takes 60 parts of cold water to dissolve one part of the cream of tartar. It has an acid taste, and gritty feel. When taken repeatedly in small doses of a scruple to a drachm, it acts as a refrigerant and diuretic; in doses of one to two drachms, it is useful as an aperient; and in larger doses of from two to three drachms, it acts as a purging agent, accompanied by flatulence and griping. *Imperial liquid* is prepared by dissolving about a drachm of C. of T. in a pint of boiling water, and adding a little lemon-peel and sugar to flavor it; when an agreeable refrigerant drink is obtained, which is highly serviceable in allaying thirst in feverish cases. C. of T. whey is obtained by adding two drachms of the salt to a pint of milk.

CRE'ASOTE, or KRE'ASOTE, is an artificial organic substance, generally obtained from the products of the destructive distillation of wood. It is procured incidentally as one of the constituents of wood-tar, from which it is separated by a tedious process. The principal supplies are obtained from Stockholm, Archangel, and America. In the pure condition, C. is a colorless oily liquid, with high refractive powers; but the commercial specimens are generally colored yellow or light brown. It boils at 398° F.; does not readily inflame; but when set fire to burns with a smoky flame. It has a hot burning taste, and is very poisonous to plants and animals. It has a great power of coagulating albumen, and hence may be employed with advantage in toothache; a drop placed on the exposed nerve coagulates the albuminous tissue, and destroys its vitality and sense of pain. The most important property possessed by C., however, is its antiseptic or preserving power over vegetable and animal organs and structures. Thus, ordinary meat treated with only one-hundredth of its weight of C., and exposed to the air, does not putrefy, but becomes hard and dry, and assumes the taste and odor of smoked meat. Again, timber treated with C. does not suffer from dry-rot or other disease; and thus C., in a crude form, is employed in the preservation of wood (q. v.). The crude pyroligneous acid of commerce, which is often employed in the curing of hams, &c., owes part, at least, of its preserving powers to the presence of a trace of C., which leaves its characteristic odor so well known as obtained from the burning of wood for the smoking of hams, &c.

When used medicinally, C. acts externally by destroying the cuticle; internally, in small doses of a drop or two, it is serviceable in arresting obstinate vomiting; whilst in large doses it produces nausea and severe vomiting, and, in many cases, fatal results.

CRE'ATINE, or KRE'ATINE (Gr. *kreas*, flesh), was discovered in 1835 by Chevreul, but little was known about it till Liebig published his *Researches on the Chemistry of Food*, in 1847. From his investigations, and those of subsequent chemists—amongst whom we may especially name the late Dr. William Gregory of Edinburgh—the following facts regarding its properties and occurrence have been established.

C. forms transparent, glistening crystals, belonging to the clinorhombic system, and usually occurring in groups, the character of which is exactly similar to that of sugar of lead. Although usually grouped among the basic bodies, it is neutral in its reaction. It dissolves in 74·4 parts of cold water, and in boiling water in such quantity that the solution on cooling solidifies into a mass of delicate needles. These crystals contain two atoms of water and one atom of anhydrous C., whose composition, according to Liebig, is represented by the formula $C_8H_9N_3O_4$. There is no direct chemical test for the detection of C., and the methods which have been employed to obtain it are too complicated for insertion in this article.

C. is constantly present in the juice both of voluntary and involuntary muscles. The quantity differs in the flesh of different kinds of animals, and even in different muscles of the same animal, but is always very small; and lean animals yield relatively more than fat ones. According to Liebig, the flesh of hens yields the largest amount, viz., 0·32 per cent., the average quantity from horse or ox flesh being 0·07 per cent. Gregory determined its amount in the flesh of various mammals, birds, and fishes; and Schlossberger found 0·067 per cent. in human flesh. It has likewise been detected in very small quantity in the blood of oxen, also in the liquor amnii of women who have died in advanced pregnancy, and it can usually be obtained from the urine, although it is doubtful whether it is a normal constituent of that fluid. It does not exist in the liver or kidneys, but has been found among the soluble constituents of the brain.

Although the view has been advocated that, from its occurrence in flesh, and from its large amount of nitrogen (32·06 per cent.), it must be an important nutritive agent, there are most decisive reasons for opposing this opinion, and for ranking it among the products of excretion; for, in the first place, if it could be employed with further advantage in the organism, it (or its near ally, creatinine) would not be allowed to escape by the kidneys; secondly, the readiness with which it may be converted into unquestionable products of excretion (as, for instance, into urea, by the action of heat and baryta water), proves its approximation more nearly to these substances, than to such bodies as albumen or fibrin; and thirdly, there is no instance of a tissue-forming food occurring in a crystalline form.

CREA'TININE is closely allied in its chemical and physiological relations to creatine. Liebig found that, when heated with a strong mineral acid, a solution of creatine no longer yields crystals of that substance, but a new body of totally different chemical properties, to which he gave the name of creatinine. Its chemical composition is represented by the formula $C_8H_9N_3O_2$, and on comparing this formula with that for creatine, we see that the conversion of the latter into the former, by the action of mineral acids, depends upon the separation of the elements of water. Liebig shortly afterwards detected C. as a constituent of the muscular juice. In the latter fluid, it occurs in less quantity than creatine; while in the urine, where it is also found, it is the more abundant of the two. Traces of it have also been found in the blood and in the liquor amnii.

C. crystallizes in oblique rhombic prisms, is a most decided alkoloid, reacting strongly on vegetable colors, and having almost as caustic a taste as ammonia; it further differs from creatine in its far greater solubility in water, alcohol, and ether. There can be little doubt that C. takes its origin from creatine.

CRÉBILLON, PROSPER JOLYOT DE, a French dramatist, was born at Dijon in 1674. He was sent to Paris to study law, but ended by devoting himself wholly to poetical pursuits. His first piece, *La Mort des Enfants de Brutus*, was rejected by the actors; but the succeeding dramas of *Idoménée* (1705) and *Atrée* (1707) were successful. *Rhadamiste* (1711), a tragedy of the dismal kind, was reckoned C.'s masterpiece, and established his reputation. After pro-

ducing some other pieces, C. fell into pecuniary difficulties and neglect, and for more than twenty years produced nothing. His talents were then called again into requisition by Madame de Pompadour, who wished to humble Voltaire. He received from the king a pension of 1000 francs, and completed the tragedy of *Catilina*, for which the king himself supplied all the properties. When 81 years old, C. wrote his tragedy *The Triumvirate*, and still later, commenced, but did not finish, another called *Cleomède*. He died June 17, 1762, and Louis XV. erected a monument to his memory. C., in general, displays little skill in the conduct of his plots; the monologues of the speakers are too numerous and too long; but in the opinion of his countrymen he is surpassed, in 'the grandeur of his sentiments,' only by the author of the *Cid* and *Horace*. The best edition of C.'s works is that published by Didot (2 vols., Paris 1818).

CRÉBILLON, Claude Prosper Jolyot de, the younger, son of the dramatist, was born in Paris, February 14, 1707. In an age of licentious manners, he acquired popularity by a series of romances, remarkable chiefly for their violation of decency; the principal of which are *Le Sopha*, *Le Hasard du Coin du Feu*, *Les Egarements du Cœur et de l'Esprit*. His own moral character is described as correct, but his writings undoubtedly served to extend the influence of the immoralities which he described. C. died in Paris, April 12, 1777.

CRÉCY, or CRESSY, a small town of France, in the department of Somme, situated on the Maye, about 12 miles north of Abbeville. C. is chiefly celebrated on account of the brilliant victory obtained here, 26th August 1346, by Edward III., with 40,000 English soldiers, over a French army amounting, according to Froissart, to 100,000 men, under the command of the Count of Alençon. In this great battle, one of the most honorable to English prowess recorded in history, the flower of French chivalry was slain, as well as the kings of Bohemia and Majorca, who were fighting on the side of France. Altogether, about 30,000 of the French army bit the dust. In this battle the Black Prince, who greatly distinguished himself, gained his spurs; and the crest of the slain Bohemian king, composed of three ostrich feathers, with the motto, *Ich Dien*, 'I serve,' was adopted by him in memory of the victory, and still continues to be borne by the Prince of Wales. C. is an ancient place, but its population in 1872 amounted to only 1359.

CRE'DENCE, a small table beside the altar or communion-table, on which the bread and wine are laid before being consecrated. In the Greek Church this is called the *Trapeza Prothesis*. Archbishop Laud was a great stickler for the C., and pleaded the authority of Bishop Andrews and other bishops for its use. There are credences in various Anglican churches; among others, in the Collegiate and St. John's Churches, Manchester; and in the parish church at Ludlow, where they have been in use from time immemorial. Sometimes the place of the C. was supplied by a mere shelf across the fenestella (q. v.). The term was also used for a buffet, or sideboard, at which the meats were tasted in early times before being presented to the guests, as a precaution against poison. Hence the origin of the word, which is derived from the Ital. *credenzare*, to taste meats and drinks before they were offered to another, an ancient court practice, which was performed by the cup-bearers and carvers, who for this reason were called in Ger. *credenzer*. The getting up of credences or side-altars is one of those restitutions of old usuages which has marked the Puseyite movement in England. See Pusey.

CREDE'NTIALS, papers or letters given to an ambassador, or other public minister, to a foreign court, in order to enable him to claim the confidence of the court to which he is sent.

CRE'DIT, in Political Economy, is one of many terms used in that science, of which it is said that we yet possess no scientific definition. This is the less to be regretted, as the practical meaning of the word is thoroughly known, so as to enable every one to understand what is meant, when economists speak of the extent to which C. is safe and proper, unsafe or improper, in this or that class of cases. We have come, perhaps, thus far towards an exact scientific notion of the nature of C., that while it serves the purpose of capital, it can only do so while there is capital ready to come and take its place if necessary. Credits which are not in this position—though they may happen to serve their turn, as a ship may sail some distance unwrecked without a steersman—do not accomplish the purpose of capital. The real power of C. properly resting on capital, is that it enables that capital to be devoted to more than one purpose. A bank is a great emporium of C.; that is to say, it consists of a certain amount of capital, which can be operated on by a whole community—not all at one time, but by individuals as occasion requires. Thus, a comparatively small stock of money can be made to do duty for carrying on numerous transactions. But it is indispensable for insuring a safe system of C. that money must be instantly available when wanted; and this principle applies not alone to banking, but to every species of transaction in which postponed payment is concerned. Unfortunately, this principle is too often set aside, and C. is grossly abused. The facts brought out in great bankruptcies generally teach the moral, that men who have every element of human wellbeing in their power, ruin themselves both in purse and fortune, by trying to make £30,000 do the work of £100,000. In many bankruptcies, too, there is a curious illustration of the power of C. as a representative of capital, in enabling men to keep up for a considerable time the appearance of being wealthy traders, though they never had a farthing they could honestly call their own. In the few instances where such projects succeed, there is the kind of applause which is given to the successful winner in any game of chance; and it is naturally felt that if the successful are applauded, it is hard to condemn the unsuccessful; so that there is perhaps a dangerous leniency in public opinion towards speculators on credit.

In a modified shape, C. is a thing which, to all appearance, can never be abolished. There is scarcely a human being in a civilized country, who does not transact a piece of credit business almost every day of his life. The workman hired by the week, and paid at its end, gives his employer C. from Monday morning to Saturday evening. The same workman, when getting a coat made for himself, even although he engaged to pay ready money on delivery, gets C. from the tailor during the making.

It is necessary to consider these things, because a course of C. is often so hurtful to people of the working-classes, by fastening ruinous obligations on them, that some people have proposed to abolish all C. where they are concerned, by rendering them free from all legal procedure for the recovery of debts. The answer to this is, that although it is practicable to relieve any class from obligations, and their legal enforcement, it is impossible in a trading country to suppress debt and credit. It is practicable, however, so far to modify the legal remedies against debtors of the poorer class, that there may not be, as there too often is, a temptation to traders to transact a special business, in holding out temptations to working-people to purchase on credit.

CREDIT, Cash. See Cash Account.

CREDIT, Letter of. This is the term applied to accounts, usually in the form of a *letter*, addressed by one party to another, whereby the former requests the latter to pay a sum therein specified to the bearer of the letter, or some other third party named in it, and authorizes him to reimburse himself for such payment, either by debiting it in account between the parties, or by drawing on the first party for the amount. This arrangement may take place between merchants and others, but in general it occurs between *bankers* residing in different places—as, for example, between a banker in Edinburgh and his correspondent in London; and it is designed for enabling a party who has money lodged at either place, to obtain the use of it at the other, without the risk or trouble of actually carrying it between the two cities. For this convenience a small charge is made by the bank issuing the letter, termed the exchange or commission. Sometimes the letter is addressed to *all* or *several* of the correspondents of the bank issuing it, in which case it is termed a *Circular Credit;* and any of them may pay the sum mentioned, or sums to account as desired, taking the holder's receipt, or his draft on the granter, in exchange; and the sums so paid are *indorsed* on the letter, to show how far the credit has been used. If the party holding a circular letter can be properly introduced, even at a place where the granter has no correspondent, little difficulty will be experienced in obtaining money upon it; and the practice is to reimburse any one who has given the money, if within the amount of the credit. It will thus appear that the system is productive of much convenience to all parties who have occasion to travel, or transact business away from home, especially in foreign countries, where it might be difficult otherwise to make their way, except by carrying with them an unsafe amount of coin or other valuables.

Some bankers, having an extensive correspondence abroad, issue what are called *Circular Notes*, usually of the value of £10 or £20 each, which any of the granter's correspondents, or indeed any one else, may cash to the holder, on his 'indorsation;' but a third party must take his risk of its being questioned. For this kind of credit, the receiver at once reimburses the granter; whereas for the ordinary letter of C., he is only reimbursed when the drafts under it are advised to him, the holder continuing during the interval to raise interest on his money deposited for covering it. The circular-note plan was devised about 1770 by Mr. Herries, the founder of the eminent London banking-house of Herries, Farquhar, and Company, who had originally been a continental merchant, and well knew the difficulties which travelers or traders then had to encounter in foreign countries. Although the system is now highly appreciated, it cost him no little trouble and perseverance to establish it in public estimation See Circular Notes.

CREDIT FONCIER, a peculiar method of borrowing money in France on the security of landed property, It was established

by an edict of 28 February 1852. Its peculiarity is, that the repayment of the loan is by an annuity terminable at a certain date; the date and the amount of annuity being so calculated, that when the last payment is made, the loan and the interest on it will be extinguished. Another method of describing it is as a loan repayable by instalments. The transaction is precisely regulated by the edict, which prohibits an advance on more than half of the value of the property pledged or hypothecated. Three several companies were established by the French government, with the privilege of making such advances.

CREDIT MOBILIER. See MOBILIER.

CRE'DITION, or KI'RKTON, a borough in the middle of Devonshire, on the Creedy, a tributary of the Exe, 8 miles north-west of Exeter. It lies in a narrow vale between two steep hills. Pop. (1881) 4541. At C. was born the Anglo-Saxon Winfred, or St. Boniface, who was the first to preach Christianity in Central Germany, founded the monastery of Fulda, and was Archbishop of Mainz. C. was the seat of a bishopric from 909 to 1050, when the sees of Devon and Cornwall were united and placed at Exeter. The chief manufactures were formerly woollens and serges, but now shoes. C. was much injured by fires in 1743 and 1769.

CRE'DITOR. See DEBTOR, BANKRUPT.

CRE'DO (Lat. *I believe*), a part of the service of the mass, beginning with the words, *Credo in unum Deum*.

CREEDS AND CONFESSIONS are the names given to the authorized expressions of the doctrine of the church at large, or of the several main sections into which it is divided. Such statements of doctrine sprang up naturally in the course of the church's progress. As the simple truths taught by Christ in an unreflective and mostly concrete form became the subjects of thought, of argument, of controversy, they could not fail to receive a more defined intellectual expression, and to be drawn out into more precise dogmatic statements. Men's minds could not be exercised on subjects of such vast importance to them without this result; and the great creeds, as they rise in succession before us, and mark the climax of successive controversial epochs in the church, are nothing else than the varied expressions of the *Christian consciousness and reason*, in their efforts more completely to realize, comprehend, and express the originally simple elements of truth as they are recorded in Scripture. The study of the creeds would be nothing else than the study of theology in its highest historical development—in its reflex settlements after the great agitations of Christian thought had run their course.

Corresponding to this view, we find that the creeds of Christendom grow in complexity, in elaborate analysis and inventiveness of doctrinal statement, as they succeed one another. The first are comparatively brief and simple in sense and form; the last are prolix and largely didactic. From the Apostles' Creed to the decrees of the Council of Trent, or the chapters of the Westminster Confession of Faith, there is a wide change, during which the Christain consciousness has grown from a childlike faith to a critical opinionativeness.

What has been called the *Apostles' Creed* is the earliest form of Christian creed that exists, unless we give the precedence to the baptismal formula at the close of St. Matthew's Gospel, out of which many suppose the Apostles' Creed to have grown. There were in the early church differing forms of this primitive creed: that which is received and repeated in the service of the Church of England, has come to us through the Latin Church; and in several of its clauses, as, for instance, 'He descended into hell,' and again, 'The communion of saints,' is supposed to have been interpolated according to later notions. A great variety of opinions has been held as to the origin of this creed. The Roman Catholic Church has not only attributed it to the apostles directly, but profess to settle, on the authority of a spurious sermon of St. Augustine, the clauses respectively contributed by the several apostles: 'Petrus dixit, Credo in Deum Patrem omnipotentem. Joannes dixit, Creatorem cœli et terræ. Jacobus dixit,' &c. The earliest account of its origin we have from Rufinus, a historical compiler and traditionalist of the 4th century.

His statement is, that the apostles, when about to separate to preach the truth to different nations, agreed upon a 'form of sound words' which should express the sum of their common teaching. 'When met together, and filled with the Holy Ghost, they composed this compend of what they were to preach, each one contributing his share to the one composition, which they resolved to give as a rule of faith to those who should believe.' No great weight belongs to this testimony; Rufinus is no historical authority. It is not improbable in itself, however, that even in the age of the apostles some formula of belief existed. The exact form of the present creed cannot pretend to be so ancient by four hundred years, but a form not much different from it was in use long before. Irenæus, the scholar of Polycarp, the disciple of St. John, when he repeats a creed not much unlike to the present, assures us that, 'the church dispersed throughout the whole world had received this faith from the apostles and their disciples;' and Tertullian also affirms that a similar creed had been 'prevalent as a rule of faith in the church from the beginning of the gospel.' The same thing is proved by the creeds administered to the candidates for baptism in the 2d and 3d centuries. They correspond, with slight variations, to the Apostles' Creed. The true view of this formula of church belief, therefore, seems to be that which regards it as the Roman or Latin form of the creed which prevailed in all the early churches. It is not strictly apostolic—certainly not in the order of words derived through the Latin Church, in which it is now received and repeated; but it is substantially apostolic—fairly representative of the different elements of Christian faith as handed down from the apostles, and well claiming, therefore, the credence of the universal Christian church. Since the Reformation in England, it has been the usage to exhibit the Apostles' Creed and Ten Commandments in legible characters on boards near the communion-table in churches, in order that they might be seen and repeated by the common people, who were unprovided with books.

The *Nicene*, or rather, the Niceno-Constantinopolitan Creed, is the next great expression of doctrinal truth that we meet with in the history of the church. It sprang out of the conflict, which had begun even in the 2d c., as to the dignity and character of Christ. From the beginning, Ebionitism had looked upon Christ as merely a Jewish teacher of distinction; Theodotus and Artemon openly taught such a doctrine in Rome towards the close of the 2d century. Others, on the contrary, taught a doctrine which identified Christ with God absolutely in such a manner as to destroy all distinction of persons in the Godhead. Monarchianism, as it was called, which held rigorously and formally to the unity of God, was the ruling principle of both doctrines, opposite as were the expressions it assumed in the two cases.

The controversy thus begun in the 2d, perpetuated itself in the 3d c,. under various modifications. Paul of Samosata carried out the Unitarian tendency, which reduced Christ to the level of a mere man; Sabellius carried out the same tendency in the opposite direction, which made Christ not merely divine, of the same substance with the Father, but looked upon him as merely a manifestation of the Father, without any distinct personality. Sabellianism recognized a Trinity of manifestations, but not a Trinity of essences. God was one and all-comprehending, and the Son and the Spirit were merely names or expressions for the different modes in which he reveals himself. Sabellius flourished about the middle of the 3d c., and Paul of Samosata somewhat later. Arius who was a presbyter of Alexandria, grew up in the midst of these heretical influences, and soon distinguished himself in the Alexandrian church for his advocacy of the doctrine that Christ, although in a true sense divine, or the Son of God, was yet not the very God. He denied that he was 'of the substance of God,' or 'without beginning;' he was only the highest of created beings, in a sense divine, but not the same in substance with the Father, nor equal with him in power and glory. Athanasius came forward as the opponent of Arius, and the contest between them raged keen and wide throughout the church.

The Council of Nicæa was summoned in 325 by Constantine, with the view of settling this controversy; and the Nicene Creed was the result. There were these three parties in the council—the Athanasians, or extreme orthodox party; the Eusebians, or middle party; and the Arians, or heretical party. The heretics were few in number, and possessed but little influence; but the Eusebians were a strong party, and, for sometime resisted certain expressions of the orthodox or Athanasians, which seemed to them extreme and unwarranted; but at length the Homöousians, as they were called, carried the day; and Christ was declared not merely to be of like substance (*homoiousios*) but of the substance (*homöousios*) with the Father. At the later Council of Constantinople, the additional tenet of divinity of the Spirit was added, and the creed completed in the form in which it is familiar to the English reader in the communion service in the Book of Common Prayer. In it we confess, as has been said, to the holy and undivided Trinity, and distinctly own the divinity of each person. We commemorate the creation of the world by 'God the Father Almighty;' we acknowledge Jesus Christ to be our 'Lord;' to have been 'begotten' from all eternity; to be 'of one substance with the Father,' and with him Creator of all things; that 'for our salvation he came down from heaven, was made man, and suffered and died for us.' We commemorate his resurrection, ascension, and sitting at God's right hand; express our expectation of his second coming; and declare that 'his kingdom shall have no end.' We confess to God that He hath appointed baptism for the remission of sins, and given us leave 'to look for the resurrec- of the dead' and 'the life of the world to come.'

The next remarkable monument of doctrinal truth in the church is what is called the *Athanasian Creed*, a product of the 5th c., much later than Athanasius himself, but representing, with great formal minuteness and fidelity, his doctrine of the Trinity, as apprehended

and elaborated by the Western Church. See ATHANASIAN CREED.

The Apostles', the Nicene, the Athanasian, may be said to form the great catholic creeds of the church. After the time of the last-mentioned formula, there is no general symbol of faith that claims our attention till the period of the Reformation. Theology continued to be cultivated during the middle ages, and especially during the 12th and 13th centuries, with great assiduity. Scholasticism is nothing else than the vast expression of the intellectual labor bestowed upon this subject during these ages, when scarcely any other subject can be said to have engaged men's minds. It was characteristic of scholasticism, however, to work mainly upon the doctrinal *data* already adopted and authorized by the church, developing these data in endless sentences and commentaries. There was, withal, no real freedom of inquiry, nor life of speculation. But as soon as the eye of free criticism and argument was turned upon Scripture with the Reformation, new Creeds and Confessions began to spring up. On the one hand, Protestantism had to defend its position and its scriptural authority by appeal to its system of belief; and, on the other hand, the Church of Rome, after many delays, gave forth at the Council of Trent (1545—1563), a more extended and detailed statement of its doctrine than was to be found in any previous creeds. The *Decrees of Trent* are the fixed authoritative symbol or confession of faith of the Church of Rome.

Of the Protestant churches, the most notable confessions of faith are the Lutheran; the continental Calvinistic or Reformed; the Anglican, or Thirty-nine Articles of the Church of England; and the Puritan, or Westminster Confession of Faith.

The Lutherans call their standard books of faith and discipline, *Libri Symbolici Ecclesiæ Evangelicæ;* and reckon among them, besides the three catholic creeds, the Augsburg Confession (q. v.), the Apology for that confession by Melancthon, the Articles of Smalkald drawn up by Luther, Luther's Catechisms; and in some churches, the Formula of Concord, or the Book of Torgau.

Of the continental Calvinistic or Reformed Churches, there are numerous confessions, the principal of which are—1. The Helvetic Confessions—that of Basel, 1530, and Bullinger, *Expositio Simplex*, 1566; 2. The Tetrapolitan Confession, 1531; 3. The Gallic Confession, 1559; 4. The Palatine or Heidelberg Confession, 1575; 5. The Belgic Confession, 1559.

The *Thirty-nine Articles* of the Church of England have been already described. See ARTICLES. They were originally forty-two, and are supposed to have been chiefly composed by Cranmer. In 1571, they were revised and approved by convocation and parliament.

The Westminster *Confession of Faith* was the product of the great Puritan agitation in the 17th century. As soon as the Long Parliament assembled in 1640, it set itself to consider the question of the reformation of religion. It carried resolution after resolution directed against the existing government of the Church of England; and at length, on the 23d of November, 1641, it passed the famous Remonstrance, in which it proposed that, 'in order the better to effect the reformation in the church, there should be a general synod of grave, pious, learned, and judicious divines, who should consider all things necessary for the peace and good government of the church.' Out of this proposal sprang the Westminster Assembly, although the parliamentary ordinance actually summoning the Assembly was not issued till a year and a half later—viz., June 12, 1643. According to this ordinance the Assembly was to consist of 121 clergymen, assisted by 10 lords and 20 commoners as lay assessors. Many of these appointed members, however, never took their seat in the Assembly. The bishops were prevented from doing so by a counter ordinance of the king.

Among the most notable divines who did assemble were Burgess, Calamy, Gataker, and Reynolds, and Gillespie, Henderson, Baillie, and Samuel Rutherford, the commissioners from Scotland, of the Presbyterian party; Goodwin, Nye, and Burroughs, of the Independent party; and Lightfoot and Coleman, with Seldon, of the Erastians. The Presbyterians greatly predominated, and the acts of the Assembly bear throughout the stamp of Calvinistic Presbyterianism. It began its sittings in the autumn of 1643, and sat till the 22d February, 1649, having lasted upwards of five years and a half. During this period it had met 1163 times.

The most important labors which it achieved were the Directory of Public Worship and the Confession of Faith. This latter document was completed in the third year of its existence (1646), and laid before parliament in the same year. It was approved by the General Assembly of the Church of Scotland in 1647, and again in 1690, on the renewed establishment of Presbyterianism after the Revolution.

The Confession of Faith, as it is the latest of the great Protestant creeds, so it is one of the most elaborate of them all. It extends to thirty-three chapters, beginning with *Holy Scripture*, and ending with *The Last Judgment*. Of its thirty-three chapters, twenty-one may be said to be distinctly doctrinal—the first nineteen and the last two. The others concern such subjects as *Christian Liberty, Religious Worship, Oaths and Vows*, the *Civil Magistrate*, the *Church*, the *Sacrament, Synods and Councils*.

The tone of the doctrinal chapters is that of the later and formal Calvinism which spread from Holland among the English Puritans. The ecclesiastical spirit is Puritan-Presbyterian. 'God alone' is declared to be 'Lord of the conscience;' yet the 'publishing of opinions contrary to the light of nature, or to the known principles of Christianity,' is at the same time declared to be matter of censure by the church, and of punishment by the civil magistrate. In composition, the Confession is an able and comprehensive summary of theological truth, showing great logical skill in the deduction of particular doctrines from certain main principles. The third chapter, *Of God's Eternal Decree*, may be said to be the key-note from which its most characteristic doctrines follow in immediate sequence and harmony. It is well deserving the attention of all students of theology, not only as a remarkable monument of Christian learning, but as the most representative expression of a great spiritual movement which has deeply tinged the national thought of Britain, and modified the course of its history. It is issued, under authority, as a cheap duodecimo volume by printers in Edinburgh, for general use throughout Scotland. Incorporated in the volume is the text of the Covenants, but these are not esteemed part of the Confession. See COVENANTS.

CREEK, in Geography, is a small inlet on a low coast, and in rivers formed by the mouths of small streams. In America, the term C. is applied to small inland rivers.

CREE'PER (*Certhia*), a genus of birds, the type of the family *Certhiadæ;* having a longish, slender, arched, and pointed bill; a

Common Creeper (*Certhia-familiaris*).

long, narrow, sharp-pointed tongue, jagged near its tip; the tail rather long, and the tips of the tail-feathers firm and pointed, extending beyond the webs. The feet are rather slender; the hinder toe about as long as the other toes. Of this conformation of feet and tail great use is made in climbing trees, the stiff feathers of the tail being employed for support. Although the family is large, it is doubtful if the genus contains more than one true species, the COMMON C. (*C. familiaris*), a bird found in all temperate parts of the northern hemisphere, wherever wood abounds.

It is common in Britain, but it is not so well known as many other birds, in consequence of its restless habits, its rapid movements, and prompt retirement to the opposite side of a tree or branch from a spectator. It searches for insects and their larvæ in the crevices of the bark, and generally ascends from the root to near the top of a tree before it flies off to another tree or branch. It generally builds its nest in a hole of a decayed tree. It is one of the smallest of British birds, although considerably larger than the wren. Its note is monotonous, and often repeated. Its prevalent color is reddish-brown above, different shades being beautifully intermingled, and speckled with white; the under parts white. In Scotland, it is frequently called *Bark-speeler* (Anglicè, Bark-climber).—The WALL C. (*Tichodroma muraria*) of the south of Europe, frequents walls and the faces of rocks; it has a more slender bill, and the tail-feathers are not pointed.

CREEPS, a miner's term for the depression which takes place on the surface from the removal of beds of coal beneath. Masses of the coal-seam, like huge pillars, are left by the miners for the support of the superincumbent strata; the pressure, however, of these beds is so great that, in course of time, the ceiling gradually sinks, or, as is more frequently the case, because of the ceiling consisting of hard rock, the softer shale pavement rises, until the intervening spaces between the pillars, left by the removal of the coal are filled up. A consequent depression takes place in the beds above, as also an alteration of the surface-level. But this

being so gradual is seldom noticed, except when it is made evident from the accumulation of surface-water, or in districts where railways pass over the coal-fields.

CRE'FELD. See KREFELD.

CRE'MA, a town of Lombardy, province of Cremona, situated on a plain 25 miles E.S.E. of Milan. C. has an old castle and cathedral. Pop. (1881) 9111.

CREMATION, the reduction of the dead human body to ashes by fire, was a very early and widespread usage of antiquity. The early Aryans, as opposed to the non-Aryan aborigines of India, Greeks, Romans, Slavs, Celts and Germans, burned their dead, so that C. may be regarded as the universal custom of the Indo-European races. The graves of North Europe throughout the 'bronze age' contain only jars with ashes. It was Christianity that gradually suppressed the practice of cremation. In India it is still a usual method for disposing of corpses, and is practiced by numerous uncivilized peoples of Asia and America (see BURIAL). A return to the practice has been strongly insisted on by many in modern Europe. This is opposed mainly on grounds of kindly feeling for the dead, and for religious reasons, connected with the belief in the resurrection of the dead. Advocates of cremation assert that these are prejudices founded on misapprehension, and allege that the question is solely a sanitary one.

The damage to the health of such as live near church-yards and cemeteries, from the exhalations of noxious gases and the poisoning of water supplies, is an indisputable fact, and is in many cases quite inevitable. By burning, the body is reduced more swiftly to its constituent elements, without disrespect to the dead, or hurt to the living. In Italy cremation has been legal since 1877, and is not unusual at Milan, Lodi, and elsewhere. In Berlin, Dresden, and Leipzig there has been strong agitation in favor of cremation: and at Gotha there is a large mortuary and crematorium, where between 1878 and 1881 upwards of 50 dead bodies were consumed by fire. Societies for securing the legalisation of the process exist in Holland, Belgium, France, England, and the United States. Interest in this movement was awakened in England in 1874 by Sir Henry Thompson: the council of the society established in that year purchased ground at Woking in Surrey, in 1878, and there erected a crematory on the principle of that at Lodi. This apparatus reduced part of the carcase of a horse weighing 140 lbs. to 6 lbs. of white ashes in two hours; but a special act legalising cremation of human corpses is still awaited by the society. The human body consists of 60 per cent. of water and 40 per cent. of solid matter; and quickly to reduce this to ashes requires a strong furnace. A special form of Siemens' regenerator furnace is that which has found most favor. The essential parts of the apparatus, besides the furnace, are a hall, a receiver, and a tall chimney. The literature of the subject is extensive: see Thompson, *The Treatment of the Body after Death* (1874); Eassie, *Cremation of the Dead* (1875); Ullersperger, *Urne oder Grab* (1874).

CREMO'NA, an important city of Northern Italy, situated on the north bank of the Po, which is here crossed by a bridge, about 48 miles south-east of Milan. It is surrounded by walls with flanking towers and wet ditches, its circumference being nearly 5 miles. A canal uniting the Oglio and the Po passes through the city; and the latter river is navigable for large boats from this point to the sea. The streets of C. are wide and regular, and it has some fine buildings—the principal of which are the cathedral, dating partly from 1107, but exhibiting various styles of architecture; several other churches; the Palazzo Publico, Campo Santo, and the Torazzo or belfry—one of the loftiest and finest towers in Italy, being 396 feet high, and commanding magnificent views over the fertile plains of Milan. By means of the Po, C. carries on a considerable trade in the produce of the district; and it has manufactures of silk, cotton, earthenware, and chemicals. It was formerly greatly celebrated for its manufacture of violins, the most famous maker being Amati, who flourished in the beginning of the 18th century. Pop. (1881) 31,930. C. is the capital of a province of the same name; area, 650 square miles; pop. (1881) 302,064.

CRENE'LLE, sometimes used for a Battlement (q. v.), or the embrasures in a battlement.—CRENELLE, in Heraldry, embattled, signifies that any ordinary is drawn like the battlements of a wall.

CRE'NIC A'CID is one of the constituents of vegetable mould, and is produced wherever leaves and other plant matter are decaying, especially in peat-bogs and marshes.

CREO'LE (Span. *criollo*) is a word used of the inhabitants of South America, the West Indies, and Mauritius. In its widest sense, it designates any one born in the country, but of a race not native to it. It is usually applied, however, to persons born in the colony or country, and of pure European blood, as distinguished from immigrant Europeans, and also from the offspring of mixed blood.—CREOLE LANGUAGES are corruptions of Dutch, French, Spanish, Portuguese, English, arising in various colonies.

CRESCE'NDO, in Music, means a gradual increasing of sound, or changing from piano to forte and fortissimo. The swell of a good organ produces a most perfect crescendo.

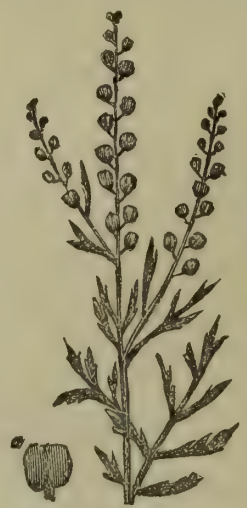
CRE'SCENT. A representation of the half moon with the horns turned upwards, called a C., is often used as an emblem of progress and success. It was the emblem of the Greek before it became that of the Turkish rule; and at the present day, is frequently to be seen on churches in Moscow and elsewhere in Russia, generally surmounted with the cross.

CRESCENT, TURKISH ORDER OF. In 1799, after the battle of Aboukir, the Sultan Selim III. testified his gratitude to Nelson by sending him a C. richly adorned with diamonds. It was not intended as an order, but Nelson wore it on his coat, and called himself the knight of the C. Selim was flattered by the value attached to his gift, and resolved, in 1801, to found the Order of the Crescent. Mohammedans being forbidden in the Koran to carry such marks of distinction, the order is conferred only on Christians who have done service to the state. See MEDJIDIE, ORDER OF. There was an old order of the C., instituted by René, Duke of Anjou, in 1464.

CRESCENT, in Heraldry, is used both as a bearing or charge, and as a difference, or mark of cadency. In the latter case, it designates the second son, and those that descend from him. See CADENCY.

CRESCE'NTIA. See CALABASH TREE.

CRESS, a name given to many plants, of which the foliage has a pungent, mustard-like taste, and is used as a salad. It is sometimes more strictly confined to the genus *Lepidium*, a genus of the natural order *Cruciferæ*, having small white flowers, and oblong or rounded laterally compressed pouches (silicules), with the cells one-seeded, and the valves keeled or winged on the back. The COMMON C., or GARDEN C. (*L. Sativum*), is an annual, a native of the East, frequently cultivated in our gardens, and used in a young state as a salad; being easily procured in a few weeks from the time of sowing, and, by the aid of a little artificial heat, even in winter. There is an esteemed variety with curled leaves. Like most of the other plants of similar pungent taste, particularly those of the order *Cruciferæ*, the garden C. is powerfully



Cress (*Lepidium Sativum*): *a*, silicule.

Bitter Cress (*Cardamine armara*): *a*, silique, opening.

antiscorbutic. Still more pungent, and almost like pepper in taste, is its congener, PEPPERWORTH, *Dittander*, or *Poor Man's Pepper* (*L. latifolium*), found in wet places near the sea in some parts of Britain, and occasionally used as a condiment by the poorer classes. It was once in high repute as a remedy for various diseases. VIRGINIAN C. (*L. Virginicum*) resembles the garden C. in its properties, and is eaten as a salad, and is used as a diaphoretic medicine in North America and the West Indies. *L. piscidium*, a native of the South Sea Islands, is there used to stupefy fish; it is also one of the plants used by sailors for prevention or cure of scurvy. The name WINTER C. is given to species of the genus *Barbarea*, also cruciferous biennial or perennial plants, with racemes of yellow flowers, quadrangular pods, and lyrate or pinnate leaves. The Common Winter C. (*B. vulgaris*), formerl yknown as Herb St. Barbara, is plentiful in moist pastures and hedge-banks in Britain, and throughout Europe and North America. It is occasionally cultivated as winter salad; in Sweden it is used as a boiled vegetable. Its pungency is combined with some degree of bitterness. A double variety is common in flower-borders, and bears the name of YELLOW ROCKET. Very similar to this, and also oc-

casionaly cultivated, is the Early Winter C., or AMERICAN C. (*Barbarea præcox*), a native also of Britain, the continent of Europe, and North America.

BITTER C. (*Cardamine*) is another cruciferous genus, with linear pods, and flowers sometimes of considerable beauty, as in the common Bitter C. or Cuckoo-flower (*C. pratensis*), also known by the name of Lady's Smock—a very common ornament of moist meadows in Britain, with white, bluish-colored, or light purple flowers; the flowers of which are stimulant and diaphoretic, and had at one time a high reputation for the cure of epilepsy, particularly in children, and still retain a place in the pharmacopœias.

Water-Cress (*Nasturtium officinale*).

The young leaves of this species, as well as of *C. amara*, a species with still more beautiful flowers, and *C. hirsuta*, a small flowered species, both British, are used as salads, but more generally in some continental countries than in Britain, being pungent with a little bitterness. The leaves of *C. amara* are brought to market in large quantities in Bohemia and Saxony. The juice of *C. pratensis* is much used as an anti-scorbutic in the north of Europe, to counteract the effect of the constant use of salted meat and salted fish. WATER C. (*Nasturtium officinale*) is a perennial aquatic cruciferous plant, much used both in England and on the continent of Europe as a spring salad. The genus *Nasturtium*, which contains a considerable number of species, has a spreading calyx, and a nearly cylindrical pod. *N. officinale* is a native of almost all parts of the world. The leaves have a pungent bitterish taste, with a little saltness. They possess medicinal properties similar to those of SCURVY-GRASS. In favorable weather, they may be procured in winter as well as in spring, and may be frequently cut over during the season. The plant is cultivated to a considerable extent both in Germany and near London, in wide ditches, which are filled with slowly flowing and pure water. It grows best in clear shallow running water, with a bottom of sand or gravel. Mud is injurious both to its growth and to the flavor of its leaves. For INDIAN CRESS, see TROPÆOLUM.

CRESSET (Fr. *croisette*, diminutive of *croix*, cross), a name given to a great light on a beacon or watch-tower, to a lamp or torch, or a light fixed on a pole. The name owes its origin to the fact that formerly beacons were usually surmounted by a cross.

CREST (Lat. *crista*, a tuft, from *cresco*, to grow up). Though popularly regarded as the most important feature in heraldic emblems, the C., in the eyes of heralds, is an external adjunct to the shield, without which the bearing is complete, and which may consequently be altered without materially affecting its significance. Occupying the highest place on the helmet (see illustration), it is the member of the bearing by which the knight was commonly known in battle; and from this circumstance, it is to it that the term *cognizance* (from *cognosco*, to know) is properly given. Its claim to a classical origin is probably better than that of any other portion of coat armor. Jupiter Ammon is represented as having borne a ram's head on his helmet, and Mars the figure of a lion or a tiger. Alexander the Great, on the pretence that he was sprung from Jupiter, assumed the ram's head; and Julius Cæsar bore a star, to denote that he was descended from Venus. The helmet, as we see it represented on ancient statues and gems, was frequently adorned with a crest. Sometimes it was of horse-hair; at other times a lion or other animal was placed on the helmet, either erect or couchant.

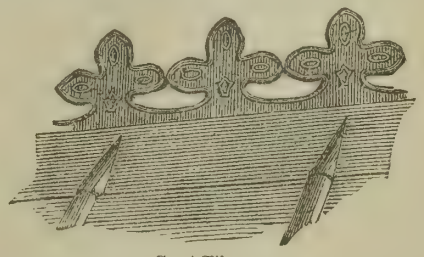
Helmet and Crest of Roger de Quincy, Earl of Winchester.

Newton, in his *Display of Heraldry*, says that the first C. to be met with it in the monuments of English chivalry, is that on the great seal of Richard Cœur de Lion. The helmets in this instance, and in that of Roger de Quincy, Earl of Winchester, differ in form from those afterwards used, the C. occupying a much larger space. Crests are said to have come into general use about the time of Henry III., and to have been used as marks of distinction by commanders in the holy wars, as they had formerly been by the Roman centurions. For lightness they were often made of stuffed leather, which was gilt, silvered over, or painted—a circumstance which explains their greater size then than in later times, when they were made either of wood or metal. The earliest example of the wreath on which the C. is now invariably placed, is that on the monument of Sir John Harsick. It consisted of two pieces of silk, of the colors of the armorial bearings of the wearer, twisted together by the lady who had chosen him for her knight. Though crests are now invariable appendages to shields, and many of them are appropriated to particular families by hereditary descent, they are believed to have been originally assumed at the pleasure of the wearers; and they are even now less strictly under the cognizance of the heralds than the devices on the shield, which must always be assigned by competent authority. Crests are so various that a classification of them is scarcely possible.

The following is an abridgment of that given by Newton, who has written very fully on the subject in his *Display of Heraldry*. The most ancient class of crests he believes to have consisted of ferocious animals, which were regarded as figuratively representing the bearer and his pursuits. Secondly, they were devices assumed as memorials of feats of chivalry, and for the purpose of perpetuating traditions and family legends, either in addition to, or differing from, those represented on the shield. Thirdly, they served only to give a more prominent place to objects already represented on the shield. Fourthly, they commemorated religious vows, or expressed the religious or knightly aspirations of the bearer. Fifthly, they were mere whims, and were adopted for no very definite reason, and served no very definite purpose. As many of them belonged to persons not only unconnected by family, but of different names, they no longer served the purpose of distinction when separated from the shield. To this latter class belong the vast majority of modern crests assumed at the suggestion of seal-engravers and coach-painters.

The lion assumed by Richard I., during the crusade in the Holy Land, to express the bravery for which he was proverbial, was borne by Edward III., Henry VII., Edward VI., and James I.; and since that time has been recognized as the appropriate C. of the royal family of England. In early times, the same C. was not always borne even by the same person. Besides the lion, Edward III. occasionally bore a white raven crowned; and other monarchs made use of similar additions. Anciently, the nobility mostly bore plumes of feathers. But several of the Earls of Warwick, of the Beauchamp family—the last of whom died in 1445—bore for C. a bear with a rugged staff, muzzled, collared, and chained, as it is still to be seen on signs (see woodcut). The origin of the wreath has been already mentioned. It is now represented as consisting of two stripes of gold or silver lace, twisted into a circular cord. Its tinctures are always those of the principal metal and color of the arms. It is a rule in delineating the wreath, which is shown edgewise above the shield, that the first coil shall be of metal, and the second of color. Civic, triumphal, and other crowns were used as wreaths; and this practice is supposed to have given rise to the use of coronets, out of which crests are sometimes represented as issuing, even in the case of persons who are not noble.

CRESTE, in Architecture, an ornamental finishing, either carved in stone, or of tiles running along the top of a wall, or the ridge of a roof. *Crest-tiles*, or, as they are corruptly called, Cress-tiles,



Crest-Tiles.

or Crease-tiles, are frequently in the form either of small battlements or Tudor flowers, as in the accompanying illustration from Exeter Cathedral. See COPS.

CRESTED, in Heraldry. When a cock or other bird had its comb of a different tincture from its body, it is said to be C. of such a tincture, naming the tincture.

CRE'SWICK, THOMAS, R.A., one of the best and most popular of recent English landscape-painters, was born at Sheffield, 1811. He early exhibited a taste for drawing, and in his 17th year removed to London, with a view to study the art as a profession. But already he had so far advanced, that two of his pictures were, during that year, admitted into the Royal Academy's exhibition. C. loved to paint the beautiful streams, and glens, and wooded dells of his native land; and these, which form the subject of his best paintings, are represented on his canvas with the very fidelity and freshness of nature itself. Among his greatest works are

'England,' 'London Road a Hundred Years Ago,' and the 'Weald of Kent.' His knowledge of aërial perspective was unsurpassed. C. also painted some admirable sea-side studies. He was elected an associate of the Royal Academy in 1842, and R.A. in 1851. C. was one of the artists to whom the arrangement of the Gallery of Modern Paintings at the Manchester Exhibition of 1857 was intrusted. He died in 1869.

CRETA'CEOUS GROUP, or CHALK FORMATION, the upper strata of the Secondary series, immediately below the Tertiary beds, and resting on the Oolite. This group is separated from the Eocene Tertiary beds by a decided change in both the rocks and fossils. The Eocene strata rest unconformably upon the chalk; it is, however, more than probable that a number of beds may yet be discovered to fill up the gap which apparently here exists in the sequence of the rocks.

The C. G. covers a large extent of surface in Europe and the east of Asia; beds of the period have also been noticed in North and South America. The typical strata occur in the south-east of England, and are connected with similar beds in the North of France and Germany, and in Denmark. Indeed, the bed of the German Ocean seems to be composed of rocks of this group, as is evidenced by the masses of chalk and flint thrown on the shores of Scotland after storms.

The strata of the group have been arranged in the following order. The maximum thickness of the divisions is given in feet.

		Feet.
Upper	1. Maestricht	100
	2. Chalk with Flints	500
	3. Chalk without Flints	600
	4. Chalk Marl	100
	5. Upper Greensand	100
Lower	6. Gault	150
	7. Lower Greensand	850
	8. Wealden beds	1300

1. The Maestricht beds (q. v.) consist of pisolitic limestones in the north of France, and of loose yellowish sandstones in Holland. 2. The chalk with flints is a great mass of pure white pulverulent limestone, usually too soft for a building-stone, but sometimes passing into a more solid state. It occurs in beds of great thickness, with the stratification often obscure, except when rendered distinct by interstratified layers of flint a few inches in thickness, occasionally in continuous beds, but oftener in nodules, and recurring at intervals from two to four feet distant from each other. Iron pyrites is found frequently in these beds in radiated nodules; it readily decomposes, and produces rusty stains on the rock. 3. Chalk without flints; this differs from the upper chalk only in the want of flints. 4. Chalk Marl; the white chalk, by the gradual admixture of argillaceous matter, becomes hardened, until it passes into a pale buff-colored marl, or argillaceous limestone, sometimes of sufficient compactness to be used as a building-stone. 5. Upper Greensand (see GREENSAND), composed of alternating layers of sands, clays, and limestones, occasionally, but not always, colored with green particles of a chloritic mineral. 6. Gault (q. v.), a stiff dark clay, used for brickmaking, with many beautifully preserved shells. 7. Lower Greensand (q. v.), so like petralogically to the Upper Greensand, that when the intervening Gault is absent, it is impossible to separate them, except by their organic contents. The Specton Clay, a local Yorkshire bed of dark clay, is of the same age. 8. Wealden (q. v.), divided into the two groups, the Wealden clay and Hastings sand, consists of a great series of shales and sandstones, with scattered beds of lime and ironstone.

The most remarkable petralogical characteristic of the group is the chalk, which exists in such abundance as to have given its name to the formation (Lat. *creta*, chalk). It is a white, soft, and pulverulent limestone, consisting almost entirely of carbonate of lime; the only foreign matter in any quantity being silex, which is aggregated together in an amorphous condition, in nodules or layers of flint. Occasional pebbles are also found, but they are extremely rare. Chalk was formerly supposed to be a chemical precipitate: the microscope has, however, shown it to be composed of minute shells mixed with the broken fragments of larger ones; and, very recently, the use of an improved deep-sea sounding apparatus has revealed a sediment now accumulating in many places, which agrees in every point, save solidity, with the chalk. When a piece of white chalk is rubbed down to powder with water, by means of a soft brush, and the powder examined by the microscope, it will be found that the greater portion consists of shells of the minuter kinds of Foraminifera, mixed with the disintegrated prisms of Pinna or other large shells of like structure, the shells of Cytherina, a marine Entomostracan, and probably a few Diatoms. Deep-sea soundings have disclosed a formation precisely similar, as taking place at the present time. Of some gatherings obtained at a depth of two miles from the great Atlantic plateau, Professor Bailey says: 'I was greatly delighted to find that *all* these deep soundings are filled with microscopic shells; not a particle of sand or gravel exists in them. They are chiefly made up of perfect little calcareous shells (Foraminifera), and contain also a small number of siliceous cells (Diatomaceæ).' The occurrence of pebbles in the chalk can easily be accounted for, if we suppose them to have been floated in, attached to the roots of trees, or more probably to sea-weeds. It is more difficult to account for the origin of the flint. Professor Bailey found that some seas, especially in the Arctic regions, supplied an enormous quantity of the siliceous frustules of the Diatomaceæ, and spicules of sponges. That such organisms may have been converted into the flint nodules seems very probable, when we remember that many of the nodules have the external conformation of sponges, and show occasionally also the internal structure. Mr. Bowerbank's microscopic examination of flint nodules, seems to lead to the conclusion that all flints are produced from the siliceous skeletons of organic beings. Chalk, then, seems to have been a deposit in very deep seas, far out of the reach of land-currents, which would certainly have brought with them argillaceous and arenaceous debris.

The C. G. is highly fossiliferous. The remains of plants are abundant in the fresh-water Wealden beds; amongst them have been found fragmentary portions of dicotyledons. If we except the microscopic Diatomaceæ, which are not unfrequent in the white chalk, vegetable remains are rare in the other members of the group. The various divisions of the animal kingdom are represented in the organic remains of the chalk, if we except the warm-blooded vertebrata, which have hitherto—if they existed—escaped notice. Foraminifera were enormously abundant in the seas, and active in the secretion of the soluble carbonate of lime, fixing it in their minute shells, which, after their death, as has been shown, formed the principal material of the chalk. In the lower beds, Polyzoa have been found in great abundance on the continent. Echinoderms are in immense numbers, and beautifully preserved. Crustacea are occasionally found. Of mollusca, the Brachiopoda and Cephalopoda are especially abundant, both being pelagic types. Ctenoid and Cycloid fishes appear in this group for the first time, though yet in small numbers—the Placoids and Ganoids being still the predominant forms. Reptiles, though not so numerous as in the former period, were yet far from rare. For further details of the fossils, see DIATOMACEÆ, VENTRICULITES, FORAMINIFERA, TEREBRATULA, RHYNCHONELLA, HIPPURITES, AMMONITES, PTYCHODUS, MOSOSAURUS, PLESIOSAURUS, ICHTHYOSAURUS, PTERODACTYL, &c.

CRETE. See CANDIA.

CRE'TINISM, from *crétin* (French), an idiot of the Alps, and this again probably from *chrétien*, a Christian, one who, from his state of fatuity, could not sin, and was viewed with some degree of religious respect. The name of C. is now applied in a more general sense to idiocy, or defective mental development depending upon local causes, and associated with bodily deformity or arrested growth. C. is very often found in connection with Goitre (q. v.), in the lower Alpine valleys, not only of Switzerland and Italy, but of the Pyrenees, Syria, India, and China. In Europe, it is rarely met with at a higher elevation than 3000 feet, and haunts chiefly the valleys surrounded by high and steep walls of rock, which exclude the light, and limit the free circulation of air. Cretins are always pitiable, and frequently repulsive objects; they are generally dirty, shameless, and obscene; their appetite is commonly voracious; the mouth is large and open, the tongue often protruded, the eyes small, the nose flat and broad, the skull narrow and small in all its dimensions, the forehead retreating, the complexion cadaverous; in addition to which, the whole body is dwarfish, the hands and feet large, the limbs often rickety, the belly protuberant.

The cause of C. is still imperfectly understood; the recent researches of Virchow tend to the conclusion that it is a physical degeneration, dependent on the reception of an undue amount of calcareous matter into the system; and this agrees with the general result of numerous observations previously made, as to the prevalence of goitre and C. in places where calcareous waters are alone accessible to the inhabitant. See GOITRE. Many attempts have been recently made to improve the condition of the cretin in childhood, by removing him from the locality of his birth, and by careful training; the institution founded by Dr. Guggenbühl on the Abendberg (q. v.), near Interlaken in Switzerland, having been the prototype of many others on the continent, and of some in England and Scotland, for the education of idiots.

CREUSE, a river and a department in the center of France. The river rises in the mountains on the southern border of the department of C., and flows in a generally north-north-west direction through that department, then in a north and westerly direction through Indre, and dividing the departments Vienne and Indre-Loire, falls into the Vienne, a tributary of the Loire, about 12 miles north of Chatellerault, after a course of about 150 miles.—The department to which the river gives its name lies in lat. 45° 39′—46° 26′ N., and long. 1° 24′—2° 36′ E. On an area of about 2200 square

miles, it had a population, in 1872, of 247,663; at the census of 1881, the pop. was 268,131. Low mountains and chains of hills occupy the greater part of the land. The streams, with the exception of the C., are insignificant. The climate is moist and variable, and the soil thin and light in the southern hilly district, which is interspersed with stretches of heath and pasture, but better in the lowlands of the north-east. The products are rye, buckwheat, oats, and potatoes; but agriculture is backward, and the rearing of cattle forms the chief branch of rural industry. Large quantities of chesnuts and fruit are grown. The minerals are not important. The people of C. are but slightly educated, and use a coarse patois; but are generally industrious, and annually migrate in large numbers to find work in various parts of France. C. is divided into the arrondissements Aubusson, Bourganeuf, Boussac, Guéret, with Guéret for its capital.

CREUZER, Georg Friedrich, a learned German philologer, was born at Marburg, March 10, 1771, and studied there and at Jena. In 1802, he was appointed a professor at Marburg, and in 1804 obtained the chair of Philology and Ancient History at Heidelberg, which he occupied for 44 years in the worthiest manner. In 1848, he retired into private life, the infirmities of age having forced him to renounce the fatigue of teaching. He died at Heidelberg, 15th February 1858.

C.'s whole life was devoted to the study of antiquity. His first, and probably his greatest work, was *Symbolik und Mythologie der alten Völker, besonders der Griechen* (4 vols., Leip. 1810—1812). This treatise, which asserted the symbolical character of ancient mythologies, excited a lively controversy, in which Hermann and Voss appeared as the opponents of Creuzer. His next work in importance was a complete edition of the works of Plotinus (3 vols., Oxford, 1835). Along with G. H. Moser, C. edited several works of Cicero—*De Natura Deorum* (1818), *De Legibus* (1824), *De Republica* (1826), and *De Divinatione* (1828), &c. Between 1837 and 1848, he published a partial collection of his writings in 10 vols. (*Deutsche Schriften*. Leip. and Darms.), the last of which contains an autobiography of C. under the title *Aus dem Leben eines Alten Professors*. He was also the writer of essays on archæological topics too numerous to be mentioned. In 1854 appeared *Friderici Creuzeri Opuscula Selecta*.

CREUZOT, Le, a town of France, dep. of Sano-et-Loire, 12 miles south-south-east of Autun. It is situated in the midst of a district rich in coal and iron, and possesses large iron foundries, which turn out cannon, anchors, steam-machinery, &c., and which employ 10,000 workmen. There is also a glass manufactory. Pop. (1841) 4000; (1876) 15,599.

CRÈVECOEUR (*Heart-breaker*), the name of a Dutch port in the province of North Brabant, on the left bank of the Meuse, where this river receives the Dieze, about 4 miles north-north-west of Boise-le-Duc. It figures somewhat prominently in the wars of the Dutch and Spaniards.

CREVILLE'NTÉ, a town of Spain in the province of Alicante, about 20 miles west-south-west of the city of that name. It is situated at the foot of the hills forming the boundary of Murcia, and has a population of about 8000, who are chiefly engaged in weaving and in agricultural pursuits.

CREW, of a ship, is a collective name for all the persons employed therein, but usually limited to designate petty officers and seamen only. In men-of-war, the entire C. are divided into five groups: 1. Commissioned and warrant officers; 2. Chief petty officers; 3. First-class working petty officers; 4. Second-class working petty officers; 5. Able seamen, ordinary seamen, landsmen, and boys. In the very largest war-steamers now afloat, there are upwards of 152 different ranks, grades, or offices among the crew, excluding officers and marines.

In a merchant-ship, under the new Mercantile Marine Act, the master, before he starts on a voyage, must send a list of his C. to the customs' comptroller at the port of departure, and a similar list within forty-eight hours after his return. The masters of coasting vessels, however, are required to do this only twice a year. Emigrant officers insist that ships to Australia shall have four seamen as C. to every 100 tons burden, and three to ships bound for America. In the large sea-going steamers, however, the number of hands is relatively greater, owing to the various duties relating to the machinery; a steamer of 1000 tons will have as many as 60 or 70 hands, if bound for a long voyage.

CREWE, a town in the south of Cheshire, forming a central station of five important railways, to which it owes its present importance. Pop. (1871) 17,810; (1881) 24,372, chiefly employed in the railway stations, and in the manufacturing of railway carriages and locomotives. About the year 1840 there were only two or three houses where Crewe now stands. The London and North-Western Railway Company have erected a handsome church, and a large mechanics' institute, containing an assembly-room.

CREW'KERNE, a town in the south-east of Somersetshire, in the fertile valley of the Parret and Isle, 10 miles south-south-west of Ilchester, and surrounded by a wide amphitheater of highly cultivated hills. Pop. (1871) 3557. The chief manufactures are sailcloth, sacking, hair-seating, webbing, and girths. Its weekly market, and annual fair, which is held on 4th September, for sheep, cattle, and horses, are much frequented and well supplied. The word C. means 'hermitage of the cross.'

CRI'BBAGE is a game with cards, played by two, three, or four persons, the whole pack being used. When three are engaged, each plays for himself; when four, they take sides; the value of the cards is the same as at whist; but there are no trumps. The number of cards dealt is usually five or six, the mode of playing the game varying slightly with the number of cards used. The points are scored on a board with holes for pegs, and 61 constitutes game. The terms used in the game are as follow: *Crib*, the cards laid out by each party, the points made by them being scored by the dealer. *Pairs* are two similar cards, as two aces or two kings; they reckon for two points, whether in hand or playing. *Pairs royal* are three similar cards, and reckon six points. *Double pairs royal* are four similar cards, and reckon twelve points. These various points are thus made: if your adversary plays a seven, and you another, a pair is made, which entitles you to two points; if he then play a third seven, he makes a pair royal, and marks six; and if you play a fourth seven, it constitutes a double pair royal, and entitles you to twelve points. *Fifteens*.—If any combination, whether of two or more cards, in your hand, or in play, make together fifteen, such as a ten and a five, a two, a five, and an eight, &c., you reckon two points. *Sequences* are three, four, or more successive cards, and reckon for an equal number of points; and in playing a sequence, it is of no consequence which card is played first; for instance, if your adversary plays an ace, and you a five, he a three, you a two, and he a four, he scores five for the sequence. *Flush* is when the cards are all of one suit, and reckons for as many points as there are cards. A knave of the same suit as the turn-up card counts for one in any hand. If a knave be turned up, it counts two for the dealer. For full directions for playing the game, see *Chambers's Information for the People*, article 'Indoor Amusements.'

CRI'B-BITING is a bad habit met with especially in the lighter breeds of horses, and those spending a considerable amount of leisure in the stable. The act consists in the animal seizing with his teeth the manger, rack, or any other such object, and taking in at the same time a deep inspiration, technically called *wind-sucking*. C. springs often from idle play, may be first indulged in during grooming, especially if the operation is conducted in the stall, and the animal be needlessly teased or tickled; is occasionally learned apparently, by imitation from a neighbor; and in the first instance is frequently a symptom of some form of indigestion. Its indulgence may be suspected where the outer margins of the front teeth are worn and rugged, and will soon be proved by turning the animal loose where he can find suitable objects to lay hold of. It usually interferes with thriving and condition, and leads to attacks of indigestion. It can be prevented only by the use of a muzzle or throat-strap; but in those newly acquired cases resulting from gastric derangement, means must further be taken to remove the acidity or other such disorder.

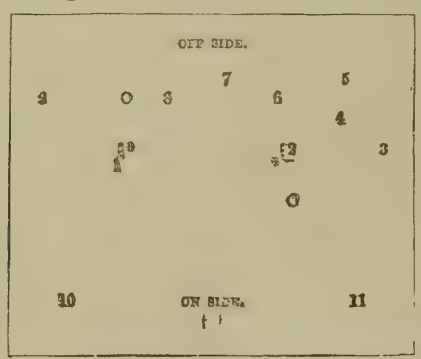
CRICE'TUS. See Hamster.

CRI'CHTON, James, surnamed the 'Admirable,' was a native of Scotland, where he was born in 1551, or, according to others in 1560. His father, Robert Crichton of Elliock, in the county of Perth, was Lord Advocate of Scotland from 1561 to 1573. On the mother's side, C. was descended from the old Scottish kings, a circumstance of which he used to boast on the continent. He was educated at St. Andrews University. Before he reached his 20th year, he had, it seems, 'run through the whole circle of the sciences, mastered ten different languages, and perfected himself in every knightly accomplishment. Thus panoplied in a suit of intellectual armor, C. rode out into the world of letters, and challenged all and sundry to a learned encounter. If we can believe his biographers, the stripling left every adversary who entered the lists against him *hors de combat*. At Paris, Rome, Venice, Padua, Mantua, he achieved the most extraordinary victories in disputation on all branches of human knowledge, and excited universal amazement and applause. The beauty of his person and the elegance of his manners also made him a great favorite with the fair; while, as if to leave no excellence unattained, he vanquished, in a duel, the most famous gladiator in Europe. The Duke of Mantua, in whose city this perilous feat was performed, appointed him preceptor to his son, Vincentio di Gonzago, a dissolute and profligate youth. One night, during the carnival, C. was attacked in the streets of Mantua by half-a-dozen people in masks. He pushed them so hard that their leader pulled off his mask, and disclosed the features of the prince. With an excess of loyalty which proved his

death, C. threw himself upon his knees, and begged Vincentio's pardon, at the same time presenting him with his sword. The heartless wretch plunged it into the body of his tutor. Thus perished, in the 22d year of his age, the 'Admirable Crichton.'

What measure of truth there may be in the hyperbolical eulogies of his biographers, it is impossible to determine, as C. left no writings by which they might have been judged.

CRI'CKET (of doubtful derivation), a well-known game, is of very ancient date. The author of the *Cricket Field*—one of the best manuals on the subject—believes it to be identical with 'Club-ball,' a game played in the 14th c.; it went originally by the name of 'handyn and handoute.' C. is a truly national English game. There is hardly a town, village, or school, that does not own its C. ground, and military authorities hold it in such estimation as a healthy recreation, that soldiers are encouraged to occupy their leisure time in its pursuit. Of late years, C. has been introduced largely into Scotland and Ireland, and is rapidly becoming naturalized all over the world. The requirements for carrying on the game are—1st, a piece of level turf an acre or two in extent; 2d, a sufficient number of players to form two sides of eleven each, for *double* wicket, and a lesser number for *single* wicket; 3d, for double wicket (the mode in which the game is usually played), two bats, two sets of wickets and bails, and a ball. When a match is to be played between two 'elevens,' the first thing to be done is to 'pitch' the wickets. *Wickets* consist of six wooden stumps, 27 inches high, and are placed in the ground in sets of three, at a distance of 22 yards apart. On the top of each set of stumps are placed two small pieces of wood, called *bails*. The rival sides next toss for first 'innings,' and the director of the side that is to go in first, places two of his men at the wickets as batters; while a bowler, wicket-keeper, long stop, and fielders (see accompanying illustration), are placed in their several positions by the director of the opposite side. When these arrangements are satisfactorily made, and the markers or scorers are at their post, the umpires take their places, and the game begins. It may be well to mention here that the relative merits of rival sides are decided by the total number of *runs* made by each eleven batters during two innings—the side whose players score the most being, of course, victorious.



Plan of Cricket-field, showing positions of parties engaged at double wicket:

Names of parties indicated by the figures: **, Batters; 1, Bowler; 2, Wicket-keeper; 3, Long-stop; 4, Short-slip; 5, Long-slip; 6, Point; 7, Cover-point; 8, Mid-wicket; 9, Long Field-off; 10, Long Field-on; 11, Leg; OO, Umpires; ††, Scorers. This is the usual placing of the field-men, but bowlers make such alterations as they deem best to oppose the batters.

We may further premise that the bowler's object is to direct his ball, by a swift movement of the arm, towards the opposite wickets, at which one of the batsmen stands, and, if possible, to strike down the stumps or knock off the bails; while the object of the batsman, on the other hand, is to protect his wickets from the bowler's attack, by either stopping the ball when it reaches him (blocking), or driving it out to the field. And much of the beauty of the game depends upon the precision with which the bowler can direct ball after ball in a straight line for the wickets, and the corresponding skill displayed by a good batsman in guarding them.

We will now suppose the two batsmen to be at their places, the bowler at his, ball in hand, and the other players arranged in theirs: at a signal from the umpire, the bowler cries 'Play!' and immediately after, *delivers* his first ball. If the batsman misses the ball, and it passes the wicket, the wicket-keeper stops it, and returns it to the bowler, who delivers another ball, and so on. When the batsman strikes the ball fieldwards, he immediately runs to the opposite wicket, passing his companion batsman, who crosses to his, and so on, till the ball has been returned by a fielder to the wicket-keeper or bowler's hand. Thus, if the stroke be a long one, the striker may have time to run perhaps three times between the wickets before the ball is thrown up, when three 'runs' are accordingly placed at his name by the scorers, on their sheet. If, however, the bowler or wicket-keeper receives the ball, and touches the wickets with it, before the advancing batsman has reached his 'ground' or touches it with his bat, the striker is out, and another man takes his place. Besides, if a ball from a stroke of the bat be caught by one of the opposite party before it reaches the ground; or if in striking at a ball the striker hits down his wicket; or if he wilfully prevents a ball being caught, or strikes it twice; or if any part of his person stops a ball which would otherwise have hit his wicket, the striker is out. It frequently happens that two skilful batsmen guard their wickets so effectually, and score so many runs, to one particular style of bowling, that a change either of the bowler, or style of bowling, is adopted by the other side. This change, say from swift to slow bowling, or *vice versâ*, generally produces the required results, and leads to the speedy retirement of the hitherto fortunate batsmen.

The wicket-keeper's place is a very important one, his principal duty being to stop with his hands every ball the batsman misses, it being allowable to make runs (byes) for balls that elude his grasp. Behind him stands the long stop, who is always on the outlook for balls that escape the wicket-keeper.

The fielders, who are posted in various parts of the ground, ought to possess quickness of eye and foot, and skill in picking up with either hand a ball that is running, and instantly throwing it to the wickets. They must also be well skilled in catching balls. Much depends on their judgment of distance between the point at which the ball is picked up, and the wickets, as misconception of this may lead to overthrowing the ball, or throwing it short, while the batsmen are profiting by the error, and scoring additional runs. Fielders usually throw the ball to the wicket-keeper, who returns it slowly to the bowler; this saves the hands of the latter from being unsteadied by catching long balls.

At the end of every four bowls, the bowler, wicket-keeper, long-stop, and fielders, change places, and thus every four balls are delivered from alternate wickets; four balls constitute an 'over,' which it is the umpire's duty to reckon and announce.

We have said that each side is allowed *two* innings, but it sometimes happens that one side scores more runs in one innings than the other does in two; thus, A's side, we will suppose, goes in first, and its eleven men score 180; B's side then goes in, and scores, say, 80 the first innings, and 70 the next; in that case, A would be said to have won by an innings and 30 runs.

In England, there are many professional men who make a livelihood by playing matches with amateur clubs, and by instructing the latter in the art. The Marylebone Club is the parliament of cricket, and its laws are recognized as the only genuine code all over the world; and for skill and science, the 'Eleven of all England,' and the 'United Eleven' (professionals), excel all other cricketers in the world. The attractions of C. are rapidly spreading. In America and Australia, the game is played with zeal and skill. English elevens have crossed the ocean more than once to compete with American and Australian clubs; and an Australian eleven won almost all its matches against many of the best English clubs in 1882. Good works on C. are *The Cricket Field*, *Felix on the Bat*, Lillywhite's *Guide to Cricketers*, Captain Crawley's *Cricket* (1878). See also *Cricket Scores and Biographies*.

CRICKET (*Gryllus*; *Acheta* of some naturalists), a genus of orthopterous insects, of the section *Saltatoria* (in which the hinder legs are long, very strong, and formed for leaping), allied to locusts and grasshoppers, and the type of a family *Gryllidæ* (or *Achetidæ*). The wings are folded horizontally, and form, when closed, a slender thread-like acumination beyond the wing-covers. It is supposed to be by friction of the wing-covers against each other, and from a peculiarity of their structure, that the males produce the stridulous sound which makes these insects so well known. The antennæ are long and thread-like, inserted between the eyes. The best known species is the HOUSE C. (*G. domesticus*), which is about an inch long, with antennæ of almost an inch and a half, of a pale-yellowish color, mingled with brown.

It is widely distributed over Europe, particularly the south, and is common in Great Britain. Its very frequent abode is in nooks and crevices of houses, and it sometimes burrows in the mortar; the neighborhood of the fire is very attractive to it, particularly in winter; and its merry note has, accordingly, become associated with ideas of domestic comfort and cheerfulness. Without the heat of the fire, it becomes dormant, or nearly so, in winter. It remains quiet during the day, but is lively and active at night, issuing forth to seek its food, which consists both of animal and vegetable substances. Bread-crumbs are very acceptable to it; and for the sake, apparently, both of food and warmth, it very much frequents bakehouses. The larvæ are wingless, the pupæ have mere rudimentary wings.—The FIELD C. (*G. campestris*) is larger, blackish, with the base of the wing-covers yellowish, feeds on herbs and roots, makes a louder noise than the House C., and is not unfrequent in some parts of England, but very rare in

Scotland.—A species of C. (*G. megacephalus*) found in Sicily, makes a noise loud enough to be heard at the distance of a mile.

House Cricket (*Gryllus domesticus*):
a, eggs; *b*, young just hatched; *c*, full-grown larva: *d*, pupa; *e*, perfect insect.

—The Mole C. (*Gryllotalpa*) will be noticed in a separate article.

CRI'CKLADE, an agricultural town and parliamentary borough, in the north of Wiltshire, 7 miles south-east of Cirencester, on the right bank of the Isis. The town of C. consists of one street. The government is in a high-bailiff, appointed by the town. It has a considerable retail trade; and the market for fat cattle, held on the third Thursday of each month, is well attended. The parliamentary borough called C. includes, besides its own two parishes of St. Mary and St. Sampson, nearly 50 other parishes, or parts of parishes comprising a large and rich agricultural district, which returns two members to the House of Commons. Pop. of parl. borough (1881) 51956; of the town 7000.

CRIEFF—including the burgh of barony of Crieff and the burgh of regality of Drummond—a town on the Earn, 17 miles west of Perth. It is beautifully situated at the foot of the Grampians, near the entrance to the Highlands. Pop. (1881) 4469. It has woollen manufactures, besides tanneries. The climate of C. makes it the resort of invalids, in summer, and there is a superior hydropathic establishment, with accommodation for 200 visitors. It is eminent for its schools. St. Margaret's College was opened here in 1849, for the education of young ladies of the Episcopal communion. Near is the fine scenery of Glen Almond, with Trinity College, opened in 1847, for Scottish Episcopal students. Morrison's Academy—built at a cost of £6500, and endowed by Thomas Morrison, builder, Edinburgh, with £20,000—was opened in 1860. C. is the terminus of two branches of the Caledonian Railway, and since the opening of the first in 1856 it has much improved. The greatest Scotch cattle-market stood here till 1770, when it was removed to Falkirk.

CRILLON, Louis de Berton des Balbes, surnamed 'Le Brave,' was born at Murs in Provence, in 1541. Under Francis of Lorraine, Duke of Guise, then the model of military chivalry, he was trained for war, and at the age of 16, was accounted an accomplished soldier. In 1558, he gave the first public proof of his valor at the siege of Calais. Shortly after, he covered himself with glory at the capture of Guines. The whole army celebrated the praises of the young hero, who was introduced by Duke Francis in flattering terms to Henry II. As a reward of his numerous heroic deeds, he obtained a multitude of church benefices, which he intrusted to the care of learned clerks. In the religious wars of the 16th c., he fought against the Huguenots, and distinguished himself at the battles of Dreux, Jarnac, and Moncontour. He was likewise present at the battle of Lepanto, in 1571, and though wounded, was appointed to carry the news of the victory to the pope and the French king. In the atrocities of the St. Bartholomew Massacre, C. had no part. In 1573, he took part in the siege of La Rochelle. In 1585, Henry III. made him knight of his Orders. He continued faithful to his sovereign in his struggle with the Catholic League. Henry IV. found in him a sincere friend and adviser. After the peace with Savoy, C. retired to Avignon, and, after the fashion of a true Catholic warrior, ended his days 'in the exercises of piety and penance,' December 2, 1615. The martial fire burned brightly in C., however, even in his last days; in proof of which, there is recorded the rather melodramatic story, that when listening at church one day to an account of the crucifixion, the old hero forgot himself, and brandishing his sword, cried out: 'Où étais tu, Crillon?' (Where wert thou, Crillon?)

CRIME, in its legal, as opposed to its moral or ethical sense, is an act done in violation of those duties for the breach of which the law has provided that the offender, in addition to repairing, if it be possible, the injury done to the individual, shall make satisfaction to the community. A private wrong, or civil injury, on the other hand, is an infringement on the rights of an individual merely, for which compensation to him is held, in law, to be a complete atonement. From this definition, which is that generally adopted by lawyers (Stephen's *Com.* iv. p. 77), it is obvious that legal criminality is not a permanent characteristic attaching to an action, but one fixed upon it arbitrarily, from considerations of expediency. Without changing its moral character, the same action may, and very often is, a C. in one country or in one generation, and no crime in another country or a succeeding generation. Malice, or evil intention, however, is in all cases essential to the character of C., for though there may be an immoral act which it is inexpedient to punish as a C., it can never be expedient to punish as a C. what is not an immoral act. But it is not necessary that the evil intention shall have had reference to the party injured. If the offender acted in defiance of social duty, and regardless of order, a C. has been committed, though it may not have been the particular C. which he intended. For example, it is murder if A kill B by mistake for C, unless the killing of C would have been justifiable, or excusable. The law can take no cognizance of a bare intention, which has not ripened into any sort of act. How far *attempts* to commit C. are punishable, is always a question of difficulty. The general rule seems to be, that if such acts can be unequivocally connected with the criminal intention, they are punishable, though not to the same extent as the completed crime. Pupils under seven years of age, and insane persons, as being incapable of design or intention, are regarded in the eye of the law as incapable of C.; but questions as to the responsibility of persons laboring under partial insanity are often surrounded with practical difficulties, which are positively insoluble. The defence of *compulsion*, or *vis major*, as it is called by lawyers, if completely established in fact, is generally sufficient in law. See Compulsion. The subjection of a servant to a master, or of a wife or child to a husband or parent, will be no defence for the commission of an act of the criminality of which the offender was aware, unless it amount to compulsion. Magistrates acting *bonâ fide*, and soldiers acting under their officers in the ordinary line of duty, are not liable to a criminal charge. Extreme want is no excuse for a C. in law, though it furnishes a ground for an application for mercy.

In the technical language of the law of England, the term *offence* has a wider signification than C., the latter including only such of the former as are punishable by *Indictment* (q. v.). Crimes are divided into *Misdemeanors* (q. v.) and *Felonies* (q. v.), the latter being a higher species of offence than the former.

CRIME'A (anciently, the Tauric Chersonese), a peninsula in the south of Russia, forming the greater part of the government of Taurida, in lat. 44° 44′—46° 5′ N., long. 32° 30′—36° 35′ E. It is united to the mainland only by the very narrow isthmus of Perekop, between the Black Sea and the Sea of Azof, and separated from the isle or peninsula of Taman, on the east, only by the narrow strait of Yenikalé. The C. is thus almost surrounded by water—on three sides, by the Black Sea, and on the fourth by the Sea of Azof; while a trench, 70 feet wide and 25 deep, across the isthmus of Perekop, cuts it off from the mainland. The C. is quadrilateral in shape, the four corners pointing to the four cardinal points in the compass; but a long narrow peninsula juts out on the east, which increases the extreme length of the territory from east to west to 190 miles, the breadth being 110 miles. The whole extent of the C. is between 8000 and 9000 square miles. The coast is very much broken and indented, particularly on the side of the Sea of Azof. The most easterly part of it is a mountainous peninsula, the seat of the ancient kingdom of Bosporus. From the Strait of Yenikalé, through this minor peninsula and along the whole southern coast, a chain of mountains extends, which may be regarded as a continuation of one of the chains proceeding from Mount Caucasus. This southern district of the C. is very rich and beautiful. The mountains rise with steep slopes from the sea, whilst spurs and secondary chains extend northward, richly wooded, and with most beautiful intermediate valleys, gradually sinking into the uniform and desolate steppe which form the northern and much greater part of the peninsula. The highest mountain is Tchatirdagh, i. e., the Tent Mountain, *Mons Trapezus* of the ancients, which rises to a height of more than 5000 feet. It is a table-mountain, and has many great and deep chasms, in some of which the ice remains unmelted all the summer. The southern district of the C. is well cultivated, and is adorned by many country-seats of the Russian emperor and nobles, with parks and gardens surpassed by none in Europe. Tartar villages, mosques, and Greek convents are to be seen in most picturesque situations amongst the woods and rocks, with many ruins of ancient fortresses. The vegetation may almost be called sub-tropical; olive groves are frequent; the vineyards yield excellent grapes, and some of them excellent wine; and even

oranges are produced. Grain of various kinds is produced abundantly, and silk, wax, and honey. Much attention is bestowed upon horses, oxen, and sheep, in which no small part of the wealth of the country consists. The northern part of the C. is in every way a contrast to the south, being little else than one waste uniform steppe, destitute of water and of wood, with a soil generally very unfit for agriculture, and with numerous salt-lakes and salt-marshes, some of which dry up in summer, and which seem to indicate that it was recently covered by the sea. The air is infected by exhalations from these marshes, and from the *Siwash* or *Putrid Sea*, which is a portion of the Sea of Azof, but is almost cut off from it by a narrow tongue of land called the Peninsula of Arabat.

In the summer and autumn, a most offensive and powerful smell arises from the stagnant water, but the evaporation is often so complete that the Siwash is left dry, and horses can cross upon the hardened ground, where at other seasons vessels may sail. The capital of the C. is Simferopol (q. v.); the old Tartar capital is Baktshi-serai (q. v.), both situated in the interior. Sebastopol (q. v.) is situated in the south-west; Kaffa and Kertch are situated in the south-east; Perekop on the isthmus to which it gives its name, in the north. The C. is now directly connected with the Russian railway system, lines diverging to the south-east coast and south-west. The small river Alma, on whose banks the first battle was fought between the Russian troops and the French and English invading army (20th Sept. 1854), falls into the Black Sea, where the picturesque southern district approaches the northern steppe.

The population of the government of Taurida is (1880) 879,000, two-thirds of whom are Tartars; the remainder are Russians, Germans, Greeks, &c. The chief features in the early history of the C. are given under the head BOSPORUS (q. v.). The Tartars conquered the territory in the 13th c., and converted it into the khanat of Krim Tartary. The Genoese under these rulers planted flourishing colonies here, which were destroyed by the Turks, who came into possession of the country in the 15th century. Russia finally subjected the C. in 1783. See RUSSIA.

CRI'MEN REPETUNDA'RUM, the crime of accepting a bribe by a judge. See BARATRY, JUDGE.

CRI'MINAL, one who has been convicted of a crime. A person indicted for a criminal offence is often called a culprit in England; and when undergoing trial in the Court of Justiciary in Scotland, he is spoken of as the panel, a word which has a different signification in England. See PANEL.

CRIMINAL CONVERSATION. See ADULTERY.

CRIMINAL COURTS. See JUSTICIARY, COURT OF.

CRIMINAL INFORMATION. See INFORMATION.

CRIMINAL LAW. See CRIME, PROSECUTION, PROSECUTOR.

CRIMP is the name given to an agent for supplying ships with seamen, just before a voyage; he receives so much per head for his trouble. This offensive name is applied to these persons, because in general they make use of untruthful representations and other unfair means to entrap sailors into service. Crimps are numerous in all large seaports, and are usually in league with publicans and prostitutes to deprive seamen of their wages. They also keep a sharp look-out for emigrants, and convey all who are simple enough to put faith in their statements to low lodging-houses in which they have an interest. The mere charge for lodging is often small, but the lodgers are cheated by provision-merchants and others who pay the C. a liberal commission on their custom. Fairly conducted, the C.'s business is no more objectionable than any other agency, and within recent years the system has been greatly improved by the operation of the 'Passengers' Act' and 'Mercantile Marine Act,' and especially by the appointment of registrars of seamen and government emigration agents.

CRI'MSON. See RED COLORS.

CRI'NAN CANAL, THE, is an artificial water-communication 9 miles long, in the west of Argyleshire, between Loch Gilp, a branch of Loch Fyne, and Loch Crinan, in the Sound of Jura, at the head of the peninsula of Cantire. It was constructed to avoid the circuitous passage of 70 miles round the Mull of Cantire, on the route from Glasgow to Inverness by the Caledonian Canal. It is 24 feet broad, and 12 deep, has 15 locks, and admits vessels of 200 tons. It was excavated in the end of last century, and cost £183,000. After a continuance of heavy rain in February 1859, the three reservoirs supplying the canal with water (the highest being 800 feet above the canal) burst, and a torrent of water rushed down the mountain-slope, washed away part of the canal banks, and filled the canal with debris and stones for upwards of a mile. Government repaired the damage at the cost of £12,000. The receipts of the canal and harbor during the year ending April 1881 were £4103—being more than £2000 less than the year's expenditure.

CRINED (Lat. *crinis*, the hair), a term in Heraldry. When the hair of a man or woman, or the mane of a horse, differs in tincture from the rest of the charge, the object is said to be *crined*, of such a metal or color.

CRI'NGLES, short pieces of rope, with each end spliced into the bolt of a sail; commonly containing an iron or brass ring or thimble. Smaller ropes are passed through them, to aid in managing the sails.

CRINOI'DEÆ (Gr. lily-like), an order or family of radiate animals of the class *Echinodermata* (q. v.), of which the recent species are few, but the fossil species so very numerous as to constitute great tracts of the dry land as it now appears. The C. have a central disc, in which is contained the digestive cavity, with two orfices, and from which arise arms or rays, five in number, but soon sub-dividing, so as at first sight to appear more numerous, and again sub-dividing into lateral appendages, either fin-like or filamentous, the disc as well as the rays and their subdivisions formed of a calcareous jointed skeleton, clothed with a fleshy integument, of which the fin-like expansions are formed, and which is thicker than in star-fishes, and contains imbedded in it the innumerable ovaries. The joints are also extremely numerous, and the subdivision of the rays often very great. The disc is composed of calcareous pieces and fleshy integument like the rays, as is also a stalk on which the whole is usually supported; the base, it is supposed, being fixed, and the disc and rays expanding like a flower. It appears probable that many of the fossil C. were permanently fixed in this manner, and this is supposed to be the case with the species of *Pentacrinus* still existing, as the *P. caput Medusæ*, or Medusa's Head of the West Indian seas; but others are fixed only when young, the disc and arms finally becoming detached from the stalk and moving freely in the sea, swimming in a manner analogous to that of the medusæ.

This interesting fact was first discovered by Mr. J. V. Thompson, who found in the sea near Cork the stalked young of the *Comatula rosacea*, a small but very beautiful species, and the only species of the C. found in the British seas. See ENCRINITES.

Encrinus.

CRI'NOLINE (Fr., from Lat. *crinis*, hair) was the name originally given by the French *modistes* to a fabric made of horse-hair, capable of great stiffness, and employed to distend women's attire; it is now applied in a general way to those structures of steel wire or hoops, by means of which women some years ago attained such overwhelming dimensions. This fashion of expansion is not new. The first name we find given to it is the *fardingale*, introduced by Queen Elizabeth. Walpole in his fancy description of her, speaks of her 'enormous ruff and vaster fardingale.' The upper part of the body was encased in a cuirass of whalebone, which was united at the waist with the equally stiff fardingale of the same material, descending to the feet, without a single fold, in the form of a great bell. Gosson mentions the fardingale in 1596, in his *Pleasant Quippes for Upstart Newfangled Gentlewomen*. In the end of

Ladies in time of Queen Elizabeth, showing how the Fardingale was worn.

the reign of James I., this fashion gradually declined, and was further tamed down by Puritan feeling in the time of Charles I. and Cromwell, till it quite disappeared. We next hear of it in 1711 as 'that startling novelty the hoop petticoat,' which differed from the fardingale in being gathered at the waist. Sir Roger de Coverley is made to say of his family pictures: 'You see, sir, my great-great-grandmother has on the new-fashioned petticoat, except that the modern is gathered at the waist; my grandmother appears as if she stood in a large drum, whereas the ladies now walk as if they were in a go-cart.' Hogarth, in his night-scene in 'Marriage à-la-Mode,' introduces on the floor a hoop of the time of George II.; and about 1744, hoops are mentioned as so extravagant, that a woman occupied the space of six men. An elongated oval form also came into fashion, raised at each side to show the high-heeled shoes, causing caricaturists to say that a lady looked like a donkey carrying its panniers. These hoops were of whalebone, with canvas over them, having capacious receptacles on each side for articles of convenience. In 1780, we find hoops of cane used, being advertised to 'out-wear the best sort of whalebone.' About the year 1796, hoops had been discarded in private life, but were still the mode at court, and never had been seen in more full-blown enormity, continuing so to the time of George IV., when they were abolished by royal command.

A collapsed Hoop.

We now come to the development of this fashion about the middle of the present century; which began with C. in its original and proper sense, first in the form of the inelegant 'bustle' in the upper part of the skirt, then the whole petticoat. Instead of the hair fabric, some used, for economy, cotton, thickly corded and starched. At length, about 1856, people were startled by the question: 'Have you heard that Miss So-and-so actually wears a hoop?' and it became apparent that the fashion of Queen Anne's time had returned upon us, only that the structure was somewhat lighter and more pliant; being usually composed of a series of horizontal small steel hoops, held together either by vertical bands, or by being sewed into a kind of petticoat. Unlike former times of hoops and fardingales, the fashion descended even to maid-servants, so that where the dining-room was small, table-maids have been known to give warning, because they could not clear the space between the table and the fire; and the newspapers were continually announcing 'Accident from Crinoline,' or 'Lady burned to Death from Crinoline.' The *Spectator* dealt out much cutting, though playful raillery on the hoops of his day, but apparently with little effect; and equally unavailing were the satires of *Punch* and other caricaturists of the 19th century against the hideous fashion of crinoline. The hoops were sometimes made with a circumference of four, and even five yards. At last, after indignation and ridicule had for years assailed the monstrosity in vain, and when people had given over speaking about it, the inflation began about 1866, without any apparent cause, to collapse; and rushing to the opposite extreme, ladies might be seen walking about as slim as if merely wrapt in a morning-gown or bathing-dress. The sole relic of this kind of an expansion now to be seen is a structure of lappets, called a pannier, projecting behind, immediately below the waist.

But women, it would seem, can never rest contented without adding, in one direction or another, to their proper dimensions; for the former crinoline was soon supplanted by great cushions or pads of frizzled hair, applied chiefly to the back of the head, and covered over by the natural hair or by artificial tresses. Such a cushion was known as a *chignon* (Fr., the neck or neck-hair.) The side tresses were swelled out by smaller rolls, called, we believe, rats and mice. This fashion was not new, but was now carried to greater extravagance than ever before, the head being sometimes rendered three times its natural size.

CRI'NUM, a genus of bulbous-rooted plants of the natural order *Amaryllideæ*, having long tubular flowers, the segments of the perianth hooked at the apex, the stamens straight and inserted into the tube, and a three-celled capsule. It contains a considerable number of species, natives of different tropical and sub-tropical countries, generally with umbels of large and beautiful flowers, some of them amongst the most admired ornaments of our hothouses. *C. amabile*, an Indian species, is much esteemed for its fragrance as well as its beauty, and flowers about four times a year. All the species require a rich open soil, plenty of room for their roots, and the frequent removal of suckers.—The bulbs of *C. Asiaticum* are powerfully emetic, and are used in some parts of the East in cases of poisoning.

CRIS-CROSS ROW. See CHRIST-CROSS ROW.

CRI'SIS (Gr. a judgment, from *krino*, I judge), a name used by the ancient physicians to denote the rapid or sudden determination of an acute disease in the direction of convalescence or of death. It was opposed in signification to lysis (*luo*, I relax), which denoted the gradual subsidence of the symptoms noticed in most chronic, and in some acute diseases. The doctrine of crises was closely bound up with that of a *materies morbi*, or material of disease in the blood, which was presumed to be undergoing changes, during the whole course of the malady, tending to an evacuation of some kind from the system in the form of a critical discharge (*apostasis* or *abscess*), which, when observed, was supposed to contain the matter of disease in a state of *coction*, and to be the direct cause of the sudden relief of the patient. Thus, according to the character and seat of the critical discharge, it was common to speak of a C. by sweating, by diarrhœa, by expectoration, by urine, by parotid swellings, &c.; and no C. was considered regular that was not attended by some symptom of this kind. Another curious doctrine associated with that of crises, was the belief in certain days as ruling the beneficient or injurious, the complete or incomplete, character of a crisis. The seventh, fourteenth, and twentieth (according to some, the twenty-first) days of the disease were regarded as eminently critical; less so, but still favorably critical, were the third, fifth, eleventh, and seventeenth; the fourth day was the *indicator* of a complete C. on the seventh; the sixth day was the *tyrant*, notorious for unfavorable crises; the second, eighth, tenth, thirteenth, and the rest were non-critical. Few physicians now attach much importance to critical days, but the doctrine of crises and of a *materies morbi*, is still taught, with various modifications, in our medical schools and text-books.

CRI'SPIN, a saint and martyr, was descended from a noble Roman family. About the middle of the 3d c., under the reign of Diocletian, he, along with his brother Crispianus, fled from Rome into Gaul, where he worked as a shoemaker in the town which is now called Soissons, and distinguished himself by his exertions for the spread of Christianity, as well as by his works of charity. According to the legend, his benevolence was so great that he even stole leather to make shoes for the poor! From this, charities done at the expense of others have been called Crispinades. In the year 287, he and his brother suffered a most cruel martyrdom. Both brothers are commemorated on the 25th October. King Crispin, as he is called, is the universally recognized patron saint of shoemakers, and is represented with dramatic effect in the ceremonial processions of the 'gentle craft.' There is an amusing but scarce book about shoemakers, entitled *Crispin Anecdotes*.

CRI'THMUM. See SAMPHIRE.

CROA'TIA, a kingdom forming part of the Austrian Empire. Along with Slavonia it forms one of the administrative divisions of the kingdom of Hungary, and their joint pop. was (1880) 1,191,845; their area, 8757 square miles. C. lies to the north-east of the Adriatic, and borders on one side with Turkey. It is traversed by low chains of mountains, in the south proceeding from the Julian Alps, and in the north from the Carnic Alps. These mountains are generally covered with forests, and the chains are separated by very fertile valleys. The principal rivers are the Save and its affluent the Culpa, the Drave and its affluent the Mur. Some of the valleys, especially in the south, are quite shut in, so that many of the streams have to make their way through subterranean channels. The climate much resembles that of the neighboring parts of Hungary, the more southern situation being counterbalanced by the greater elevation. The inhabitants are mostly of Slavonic race and language. The religion of C. is that of the Roman and Greek Churches. The Croatians are warlike, but the name *Croats* is employed to designate light-cavalry regiments in the imperial army, in which Magyars and others are mingled with true Croatians. Grain, chestnuts, wine, and gall-nuts are amongst the principal exports of Croatia. The keeping of cattle is neglected. The wood of the great forests, although much of it is admirably adapted for shipbuilding, is turned as yet to little account. The *Litorale* or coast district contains valuable marble quarries. The capital of C. is Agram (q. v.). C. with its *Litorale* and Slavonia (q. v.) formerly formed a crown-land, at the head of the administration of which was the Ban (q. v.) of Croatia.

C. was, in the earliest historic times, inhabited by the Pannonians, who were conquered by the Romans under Augustus, and the country made a province of Illyria. During the irruptions of the northern nations into the Roman empire, C. suffered a variety of vicissitudes. In 640, the Croats, Chrovats, or Horvats, migrated into it from the Carpathian Mountains, and gave it its present name. In the 14th c., having previously been in some measure incorporated with Hungary, C. was more completely united with that kingdom, and passed with it, in the beginning of the 16th c., to the Austrian House of Hapsburg. In the end of the 16th c., the Turks conquered a portion of it, now known as Turkish Croatia. The city of Fiume was declared in 1797 to be a constituent and integral part of the kingdom of Hungary; and after the termination of the French wars, Fiume remained united to Hungary till 1848. The Croatians long entertained a feeling of hostility to the Magyars, which manifested itself in 1848 and 1849 in a manner very unfavorable to the cause of the Hungarian revolution. The wise policy of Austria, however, in recognizing the

legal rights of the kingdom of Hungary, has had a good effect in allaying this feeling. See MILITARY FRONTIER.

CROCHET (a French word signifying a hook), a species of handiwork, which may be described as an extensive system of looping, by means of hooks made for the purpose. You take a hook of a size proportioned to the fineness of the cotton or wool employed, and begin by making a chain of loops. You then turn and with your hook still in the last loop, begin the double process of catching the thread through each loop of the chain, and also through that in which your hook is, and thus form another chain attached to the first, and so on. This is called simple or plain crochet. Endless varieties of patterns may be formed, and lightness and elegance attained, by twisting the thread one or more times in taking up the loop, and open work is formed by passing one or more loops. This work may be made round by beginning with a very few loops, joining the first to the last, and then proceeding to take several loops through one, and so widening on. C. has this advantage over knitting, that by drawing the last loop, and leaving it wide, there is no fear of the work running down as happens when knitting-needles slip. Shades of the same color, and varieties of colors in wool as well as in silk, are used for this work. In white cotton, C. can be made available, from large bed-quilts to delicate lace-like edgings. See numerous small books describing and giving patterns of crochet.

CRO'CODILE (*Crocodilus*), a genus of Saurian reptiles, the type of the family *Crocodilidæ;* which some naturalists have erected into a distinct order of reptiles (*Loricata*), on account of the square bony plates with which their bodies are covered, instead of the scales of the other saurians—the greater solidity of the skull—the lungs not descending into the abdomen—and the approach which they make to mammalia and birds in the structure of the heart. The heart has two auricles and two ventricles; but a mixture of arterial and venous blood takes place at some distance from the heart, so that the hinder part of the body receives an imperfectly aërated blood, which, however, is supposed to be further aërated in the surface of the peritoneum, two curious openings admitting the water, in which these animals ordinarily live, into the internal cavity of the abdomen. The *Crocodilidæ* may be described as lizard-like in form, with a great gape, indicative of their characteristic voracity, and with the tail flattened at the sides, so as to become a powerful organ of propulsion in water. The fore-feet have five toes, the hind-feet four, the three inner ones only being armed with claws: the feet are more or less webbed. Each jaw has a single row of numerous large teeth, which are conical and directed backwards; planted in distinct sockets, and becoming hollowed at the base, to admit the crowns of the new and larger teeth which are to succeed them as the animal increases in size. Small ribs are attached to the vertebræ of the neck, which give it a peculiar stiffness, and make it difficult for the animal to turn; and persons pursued by crocodiles may therefore make their escape by rapid turning. The eggs of the *Crocodilidæ* are hard, and small in comparison with the size ultimately attained by the animal itself. The females of some, if not of all the species, guard their eggs, and take care of their young; although the eggs, buried in the sand or mud, are hatched by the heat of the sun alone. The *Crocodilidæ* swallow stones, apparently to assist digestion.

Crocodile's Tooth. Showing the hollow at the base in which the summit of the new tooth is sheathed.

They prey on fishes and warm blooded animals; most of them seem to prefer food in a state of incipient putrefaction, and they are even said to hide their prey, and to return to it when it has reached this state. Some of the larger kinds do not scruple to attack man.—All the *Crocodilidæ* are large reptiles; they are found in fresh waters and estuaries in the warm parts of the world; none are found in Europe, nor, as far as is yet known, in Australia. They are divided into Gavials, Crocodiles, and Alligators (the latter including caymans).—The true Crocodiles are found both in the Old World and the New. The muzzle is not slender and elongated, as in the gavials, but oblong and flattened; the teeth are very unequal in size, the long fourth teeth of the lower jaw fitting into *notches* of the upper, not into pits, as in alligators. To this genus belongs the C. of the Nile (*C. vulgaris*), which abounds also in many other rivers of Africa. It is of a bronzed green color, speckled with brown, lighter beneath, and is sometimes 30 feet long. It often seizes human beings for its prey. In Park's *Travels*, an instance is recorded of a negro, one of his guides, who was thus seized in the Gambia, and escaped by thrusting his fingers into the crocodile's eyes. The ancient Egyptians held it sacred, and being exemptedfrom all danger on the part of man, it became more bold and troublesome. The individuals particularly selected as the objects of idolatrous worship were tamed, and took part in religious processions. *Souchis* was the name of the deified individual, the C. god.—The DOUBLE-CRESTED or INDIAN C. (*C. biporcatus*), is very abundant in many parts of Asia, in rivers and estuaries, and is also dangerous to man. The smaller marsh C. (*C. palustris*), abundant in stagnant waters in the same regions, flees from man, and often seeks to hide itself in the mud, into which it thrusts at least its snout, then remaining contented, as if in perfect safety. Crocodiles often bury themselves in the mud in droughts, and so abide till rain falls.—The names C. and Alligator are often indiscriminately used in popular language.

CRO'CKETS, in Gothic Architecture, are projecting leaves, flowers, or bunches of foliage, used to decorate the angles of spires, canopies, pinnacles, &c. The varieties of C. are innumerable, almost every kind of leaf and flower being copied for the purpose. The first illustration, from Parker, is copied from Salisbury Cathedral. The other illustration represents a C. from St. Alban's Abbey, of about 1240. C. only appear in pyramidal and curved lines, never in horizontal ones.

Fig. 1.

Fig. 2.

CRO'CUS, a genus of plants of the natural order *Iridaceæ*. The species have much general similarity, and are natives chiefly of the south of Europe and of the East. Several have been described as British, but are rather naturalized than native. Saffron (q. v.) is the produce of *C. sativus*. Some of the species are much cultivated in gardens for the beauty of their flowers, particularly those which, as *C. vernus* and *C. luteus*, flower very early in spring. The saffron C. and some other species flower in autumn. The flowers of one or two species are fragrant. It is necessary frequently to take up C. roots and plant anew on account of the manner in which the corms multiply. See CORM.

CROCUS OF ANTIMONY is the oxysulphide of Antimony (q. v.).

CROCUS OF MARS is the finely divided red oxide of iron.

CRŒ'SUS, the last king of Lydia, succeeded his father, Alyattes, in 560 B.C. He made the Greeks of Asia Minor his tributaries, and extended his kingdom eastward to the Halys. From his conquests, his mines, and the golden sand of the Pactolus, he accumulated so much treasure, that his wealth has become proverbial. He gave himself up to a life of pleasure and sumptuous extravagance, and is said to have deemed himself the happiest man in the world, and to have been displeased when Solon, on a visit to his court, told him that no man should be called happy till his death. He soon found how uncertain was a happiness such as his; for his beloved son Atys was killed while hunting, and there was left to him only one son, who was dumb; and having engaged in war with Cyrus, he was totally defeated, his kingdom conquered, and himself made prisoner, and condemned to be burnt (546). At the funeral pyre, his repeated exclamation of 'O Solon!' drew on him the attention of the conqueror, and the reason of it being known, his life was spared, and he was treated with great kindness.

CROFT (Ang.-Sax. *croft*), a small piece of land connected with a humble kind of dwelling, whose inhabitant, the renter of the land, is called a crofter. In the Highlands and islands of Scotland, where the crofting system is especially common, it is usual for the crofter to have, besides his cottage, a small patch of land for tillage; while the crofters of the township collectively, in certain proportions or 'summings,' have a right of pasturage on the adjoining hill pasture or moorland. Of late, grave complaints

have been made by the crofters, or on their behalf, that the great poverty and bad farming which admittedly prevail amongst them are due to removable and unjust causes. It is alleged that they have no leases; they have no compensation for any improvements they may make on their holdings, but on the contrary, usually have their rents capriciously raised; the land is exhausted by continual manuring with sea-weed only; townships have frequently been removed from fertile land and put on less fertile tracts in order to make large sheep runs or deer forests; the number of crofters on a given area has often been much increased in a given township or area without any corresponding reduction in rent; while eviction on short notice depends on the arbitrary decree of the landlord or the goodwill of the factor. Others affirm that the evils complained of are inseparable from the system, which is inherently bad; that the natural increase of the population leads to the excessive subdivision of crofts already too small to support a family; and that the smallness of areas to till makes the tillers fitful at work and lazy in habit. A royal commission to inquire into the crofters' grievances took evidence in 1883. Many of the crofters combine with their farming occupations, the calling of fishermen during part of the year. Cottars are still more dependent than the crofters, and occupy huts, occasionally with a small garden, at small rents or sometimes rent free. See AGRICULTURE, FARM, SPADE-HUSBANDRY.

CROIA, a town of Albania, Turkey, on a mountain spur, 45 miles S.E. of Scutari. It is the chief town of the Mirdites, a Roman Catholic tribe of Albanians, who are almost independent. Pop. 6000.

CROIX, STE. (or SANTA CRUZ), in English, *Holy Cross, Holyrood*, or *St. Cross*, an island of the Virgin group, is the principal Danish possession in the West Indies. With an area of about 100 square miles, it contains about 25,000 inhabitants, being generally cultivated like a garden.—St. C. is also the name of a river, otherwise known as the Schoodie or the Passamaquoddy, which falls into Passamaquoddy Bay, on the Bay of Fundy. It is the boundary throughout between the state of Maine and New Brunswick.

CRO'KER, JOHN WILSON, an English politician and *littérateur* of considerable notoriety, was born at Galway, in Ireland, December 20, 1780. Educated at Trinity College, Dublin, he entered Lincoln's Inn in 1800, and was called to the Irish bar. His first literary attempt was a satire on the Irish stage; and in 1805, he published another equally clever satire on the city of Dublin. In 1807, he issued a treatise on the *State of Ireland, Past and Present*, and was elected member of parliament for Downpatrick. A warm defence in parliament, in 1809, of the Duke of York, helped C. in the same year to the office of Secretary to the Admiralty, a post which he held for twenty years. He was one of the founders of the *Quarterly Review*, and contributed many of the most violent party articles to its pages, as well as a large number of those bitterly personal and grossly abusive reviews which were wont to disfigure that periodical. As 'Rigby,' allowance being made for the satire, his character is not badly hit off by Disraeli, in *Coningsby*. In parliament, C. steadily opposed the Reform Bill in all its stages, and its enactment ended his parliamentary career; but on all questions relative to the promotion of the fine arts, he was much ahead of the great majority of the Commons. He took an active part in the establishment of the Athenæum Club, and rendered good service to literature by his annotated edition of Boswell's *Johnson*, and his publication of the *Suffolk Papers*, and Lord Hervey's *Memoirs of the Court of George II.* His *Stories from the History of England for Children*, supplied Scott with the idea of *Tales of a Grandfather*. C. died August 1857.

CROKER, T. CROFTON, a popular author and collector of Irish stories and legends, was born in Cork, January 15, 1798. He early devoted himself to the collection of legends and songs of the Irish peasantry; and, in 1824, he published his *Researches in the South of Ireland*, characterized by a happy blending of humor and sentiment, with archæological learning.

This work was followed by the *Fairy Legends and Traditions of the South of Ireland* (1825); *Legends of the Lakes* (1828); *Daniel O'Rourke*, a sort of Irish Münchhausen (1828); *Barney Mahoney* (1832); *My Village* (1832); and *Popular Songs of Ireland* (1839). *Barney Mahoney* and *My Village* are the most original. C. also edited *Memoirs of Joseph Holt, General of the Irish Rebels*, a very interesting work, which was published in 1838. He devoted much time, and rendered considerable service, to archæology, being member of many antiquarian societies. Through the influence of John Wilson Croker, a friend, but no relative, he, at the age of 21, obtained a clerkship in the admiralty. He died August 8, 1854.

CROLL'S THEORY of climatic changes. See GLACIAL PERIOD.

CROLY, REV. DR. GEORGE, an English poet, romance-writer, and preacher, of considerable reputation, was born at Dublin, about 1785, and educated at Trinity College there. He entered the English Church, and ultimately became Rector of St. Stephen's, Walbrook, London. His first work was a poem, entitled *Paris in* 1815. From this time up to within a short period of his death, which took place November 24, 1860, his pen was almost incessantly at work—on satire, comedy, tragedy, romance, tales, biography, magazine articles, and the weightier matters of religion. Few subjects came amiss to him, and he exhibited considerable talent in the treatment of most that he touched upon. His best known work is the romance of *Salathiel*. C. was also famous for his eloquence as a pulpit orator.

CRO'MARTY, a parliamentary burgh and seaport in the united counties of Ross and Cromarty, on a low peninsula between the Moray and Cromarty Firths, on the south side of the entrance into the latter, and 18 miles north-north-east of Inverness. It is irregularly built, and its older streets and lanes are in the homely Flemish architecture prevalant in the old towns of the north of Scotland. The harbor admits vessels of 400 tons, and the bay has excellent anchorage for wind-bound vessels. Pop. (1881) 1360. It has manufactures of ropes, sacking, sailcloth, beer. The chief industry is the herring and white fisheries. C. has declined much since the rise, on the north side of Cromarty Firth, of Invergordon, which is more contiguous to the important districts of Easter and Wester Ross. C. unites with Kirkwall, Wick, Dingwall, Dornoch, and Tain, in returning a member to parliament. In the vicinity of C. are a lighthouse and coast-guard station, and within two miles are some caves, and an arch, called Macfarquar's Bed, in the old red sandstone, which rises in some parts 250 feet. Near C. are remains of ancient chapels and camps. Hugh Miller, in whose memory a monument has been erected in the neighborhood, was a native of Cromarty.

CROMARTY FIRTH, a landlocked inlet of the North Sea, on the north-east coast of Scotland, just north-west of the Moray Firth, and enclosed by parts of the counties of Cromarty and Ross. It forms a noble harbor, 18 miles long, running south-west, 3 to 5 miles broad, and 5 to 35 fathoms deep. It receives several rivers, the Conan, entering at its upper end, being 35 miles long. The entrance to C. F. is by a strait between two high wooded cliffs or headlands, the North and South Sutors of Cromarty, only 1½ mile across, with 12 to 30 fathoms of water, and with the Three Kings Reef, about half a mile off land. Near the Firth are the towns of Dingwall, Invergordon, and Cromarty. The largest fleet could ride safely sheltered in this fine sheet of water. In the old red sandstone, near the mouth of the Firth, Hugh Miller discovered the fossil fishes *Pterychthys, Osteolepis*, &c.

CRO'MARTYSHIRE, a county of the north of Scotland, intimately connected, geographically and politically, with Ross-shire, and consisting of ten detached portions in the interior, and along the northern borders of Ross-shire. Area, 344 square miles, or under an eighth of Ross-shire. See ROSS AND CROMARTY.

CRO'MDALE, a village on the east bank of the Spey, Inverness-shire, at which was fought the battle of C., May 1, 1690, between a small remnant of the adherents of the house of Stuart, who kept in arms after the death of Viscount Dundee, and the forces of King William, in which the latter were victorious. This encounter has been rendered famous by a song, entitled *The Haughs of Cromdale*, which, however, is not historically accurate.

CROME, JOHN (sometimes called OLD CROME, to distinguish him from others of his family who painted in the same manner), an English landscape painter, was born at Norwich, December 21, 1769. While a coach-painter's apprentice he devoted his leisure to sketching from nature, and a friend enabled him to exchange this work for that of a drawing-master, which became the occupation of his life. He died April 22, 1821. C. contributed largely to the exhibitions of the Norwich Society of Artists, of which he was president, and sent a few paintings to the London Royal Academy. His reputation has increased since his death, and he now takes a high place amongst English landscape painters. His subjects are chiefly drawn from the scenery of his native country, and he is a masterly draughtsman of trees. His 'Mousehold Heath,' in the National Gallery, is one of the best pictures of a broad, open heath-scene we possess.

CRO'MER, a seaport and watering-place on the north coast of Norfolk, 21 miles north of Norwich. It stands on the top of one of the highest cliffs of the coast. Nearly all the old town, called Shipden, with one of the churches, was swept away by the sea about the year 1500. The sea is still gaining on the land, and some houses have been destroyed by it within present memory. In 1825, some cliffs, 200 feet high, fell into the sea. Seamen call C. Bay the Devil's Throat, from its dangers to navigation. Vessels have to load and unload on the open beach. C. has fisheries for crabs, lobsters, herrings, and mackerel. Pop. of parish (1871), 1423.

CRO'MLECH. It has been common among British archæologists, until lately, to apply this name to a rude structure of two or

more unhewn stones, placed erect in the earth, and supporting a larger stone, also unhewn. According to its etymology, however, cromlech (Celt. *crom*, circle, and *lech*, a stone) is the proper term for circles of erect stones like Stonehenge (see STANDING STONES); and the name *dolmen* (Celt. *daul*, a table, *maen*, a stone) is now considered more appropriate for what used to be called a cromlech. Monuments of the kind above described, whether we

Kit's Coty House.

call them dolmens or cromlechs, are known among the common people by other nam s, such as 'the giant's grave,' 'the giant's bed,' 'the giant's quoit,' 'the fairies' table,' 'the devil's table,' 'the raised stone,' 'the old wives' lift,' 'the hag's bed,' and the like.

Cromlechs are found in England, Wales, Scotland, Ireland, the Channel Isles, France, Spain, Germany, Denmark, and some other countries of Europe; in Hindustan and elsewhere in Asia; and in America. They are generally without any enclosure; but occasionally they are fenced round with a ring of unhewn stones. In a good many instances, cromlechs have been discovered in the heart of earthen mounds or barrows. In such cases, the rude chamber or enclosure of the C. is found to contain sepulchral remains, such as skeletons or urns, together with weapons or ornaments generally of stone or bone, fragments of pottery, and bones of animals.

Similar remains have been found in the chambers of cromlechs not known to have been at any time covered by barrows. These facts have led modern archæologists to believe that the C. was a sepulchral monument. The theory of the older antiquaries, that the C. was a druidical altar, is without any foundation in what has been recorded of the druidical worship by trustworthy writers. In a C. found under a barrow in Derbyshire, a skeleton and fragments of urns were discovered, along with Roman coins of several emperors.

Among the more remarkable cromlechs in England are Kit's Coty House in Kent, Wayland Smith's Cave in Berkshire (commemorated by Sir Walter Scott in *Kenilworth*), and Chun Quoit in Cornwall. The weight of the flat stone in this last C. is estimated at about twenty tons. In the Marquis of Anglesey's park at Plas Newydd in Wales there are two cromlechs close beside each other: in the larger, five erect stones support a flat stone about twelve feet long, ten feet wide, and from three feet and a half to four feet and a half thick. Cromlechs are comparatively rare in Scotland. The best among the well-ascertained examples is perhaps that called 'The Auld Wives' Lift,' near Craigmeddan Castle, in the parish of Baldernock in Stirlingshire: the recumbent stone, a mass of basalt, is eighteen feet long, eleven feet wide, and six or seven feet thick, and the two stones which support it are of nearly the same size. It may be doubted if the partial elevation of the 'Witch's Stone' at Bonnington Mains, near Ratho, in the county of Edinburgh, has not been produced by natural causes. Among the Irish cromlechs, one of the most striking is that of Kilternan, about six miles from Dublin: the recumbent stone, which rests upon six blocks, is twenty-three feet and a half long, seventeen feet wide, and six feet and a half thick. A cromlech called 'The Broadstone,' in the county of Antrim, is surrounded by a circle of standing stones, or erect unhewn pillars. A cromlech in the Phœnix Park, Dublin, was discovered in 1838 in removing a large barrow: specimens of the sepulchral remains found in it are shown in the Museum of the Royal Irish Academy. See DOLMEN.

CRO'MPTON, SAMUEL, whose invention of the spinning-mule entitles him to rank as one of mankind's greatest benefactors, was born at Firwood, Bolton, Lancashire, December 3, 1753. Bolton, in those days, was nearly inaccessible, and so bleak and barren that agriculture was not followed further than to supply the wants of the population. All the farmers had looms in their houses, and their families were occupied in spinning and weaving. C.'s father, who was a small farmer, lived at the Hall-in-th'-Wood, a picturesque old mansion near Bolton. He died at an early age, leaving a wife, and a son (the subject of our memoir), and two daughters. Like his father, C. was brought up to the loom and the farm. His mother, a woman of great energy, perseverance, and stern independence, struggled hard to give him and her daughters the best education the district afforded. When he was old enough, he assisted her in the farm, and wove; going to Bolton at night to complete his education in mathematics, &c.

At the age of 21, he was so much annoyed at the difficulties in getting yarn to weave, that he set to work to invent a spinning-machine which should produce better yarn than Hargreaves', one of which his mother possessed. For five years, he labored to realize his idea, sitting up late at night to overcome the successive difficulties, and resuming his labor for daily bread early in the morning. At length he succeeded in framing a machine which produced yarn of such astonishing fineness, that the house was beset by persons eager to know how such wonderful and desirable yarn could be made. He was rendered miserable. All kinds of devices were tried to gain admission; even ladders were placed against his windows. His machine was such that if a mechanic saw it, he could carry away the leading features of it. He could not leave the house for fear of his discovery being stolen from him. He had spent every farthing he had in the world upon its completion; he had no funds wherewith to have obtained a patent, and it is doubtful whether a patent would have altered his fate. When he was thus almost driven to desperation, one of the manufacturers went to him and persuaded him to disclose the invention to the trade, under the promise of a liberal subscription. Inexperienced in the world, he agreed to this. The machine was exhibited, but all that he got was about £60. This money was not paid to him at the time, but he had to travel for many miles round the country to collect it. Some refused to pay, though he showed them their signatures. He set manfully to work with his machine, determined to make the best he could of his ill-luck. In the course of time, he saved money enough to begin manufacturing on a small scale, but not till his rivals had nearly 20 years' start of him in the business. Then his wife died, leaving him a large family. Efforts were made to obtain for him a national reward. Five thousand pounds was all he obtained, and he returned to Bolton almost broken-hearted. Misfortune upon misfortune overtook him till he died, June 26, 1827. Some idea may be formed of the vast services he has rendered to the world, and especially to his native land, by the fact, that his is by far the most used of all spinning-machines. In 1811, the number of spindles on C.'s principle was 4,600,000, while there were only 310,500 of Arkwright's, and 155,880 of Hargreaves'. At the present time, it is conjectured, that there are 25,000,000 of C.'s spindles at work. Yet this great genius was never noticed by his king, and the appointments under the Factory Acts to which his descendants might have aspired, have been filled by the relatives or nominees of her Majesty's ministers. For a complete account of this great improver of the cotton manufacture, we refer to the *Life of Crompton*, by Mr. G. French, 1860.

CRO'MWELL, OLIVER, was born at Huntingdon, April 25, 1599. His father was the younger son of Sir Henry Cromwell of of Hinchinbrook, and a substantial country gentleman, not likely to have been a brewer, as some of Oliver's earlier biographer's assert. By his mother, genealogists trace Oliver's descent from the royal House of Stuart. Of the boy Cromwell's early life, little or nothing is actually known. What is clearly ascertained is, that after having been at school in Huntingdon, he went to Cambridge, and entered himself of Sidney-Sussex College, April 23, 1616. He had but short time for study here, his father dying in the June of the year following, when he returned home to take the management of his father's affairs. The stories of his wild life about this time appear to have no better foundation than the calumnies of royalists. In August 1620, C. married the daughter of Sir James Bourchier, a gentleman of landed property in Essex, who had also a residence in London. This fact is pretty conclusive as to C.'s social position being much above what his enemies have described it. C. now became intimately associated with the Puritan party, among whom he was soon distinguished alike for his earnestness and sagacity. In 1628, having been elected by the borough of Huntingdon, C. made his first appearance in parliament. He had but time to make a short blunt speech about the encouragement of the 'preaching of flat popery at Paul's Cross' by the Bishop of Winchester, when the infatuated king unceremoniously despatched him and his fellow-commoners to their homes. C. returned to the fen-country, not much impressed in favor of kingcraft by his visit to London; and for the next eleven years devoted himself assiduously to the pursuit of farming by the Black Ouse river and the Cam, first at Huntingdon, then at St. Ives, and finally at Ely—making himself famous not by political agitation, but by an effectual resistance to certain unjust schemes of the king in council for the drainage of the Fens. In 1640, he was sent to parliament as member for the town of Cambridge. His appearance at this time was by no means prepossessing. Sir Philip Warwick describes him in a 'plain cloth suit, which seemed

to have been made by an ill country tailor; his linen was plain, and not very clean; and I remember a speck or two of blood upon his little band, which was not much larger than his collar. His hat was without a hat-band; his stature was of a good size; his sword stuck close to his side; his countenance swollen and reddish; his voice sharp and untunable; and his eloquence full of fervor;' and courtly Sir Philip adds: 'It lessened much my reverence unto that great council, for this gentleman was very much hearkened unto.' When all hope of reconciliation between king and parliament failed, through the perfidy of the former, C. was among the first to offer his substance to aid in defence of the state.

In July 1642, he moved in parliament for permission to raise two companies of volunteers in Cambridge, having been careful to supply the necessary arms beforehand at his own cost. In the following month, C. seized the magazine in Cambridgeshire, and prevented the royalists from carrying off the plate (valued at £20,000) in the university there. As captain of a troop of horse, C. exhibited astonishing military genius; and against the men trained by himself—'Cromwell's Ironsides'—the battle-shock of the fiery Rupert, which at the beginning of the parliamentary struggle none else could withstand, spent itself in vain. Soon promoted to the rank of colonel, and then to that of lieutenant-general, C., in the fight of Winceby, on the bloody field of Marston (July 2, 1644), and in the second battle of Newbury (October 27, 1644), bore himself with distinguished bravery; but owing to the backwardness of his superiors, the results of these victories to the parliamentary cause were not so great as they might reasonably have been. C. thus complained in parliament of the backwardness of his superiors, Essex and Manchester: 'I do conceive if the army be not put into another method, and the war more vigorously prosecuted, the people can bear the war no longer, and will enforce you to a dishonorable peace.' Hereupon, the 'Self-denying Ordinance'—an act excluding members of the houses of parliament from holding command in the army—was passed; but C.'s services were considered of such importance to the common weal, that they were exceptionally retained. Of the new model army, Fairfax was appointed general, C. serving under him as lieutenant-general of the horse, and in this capacity he commanded the right wing of the parliamentary army at Naseby, June 1645, and acquitted himself so well there, that the king's forces were utterly ruined. The royalists in the west were now speedily reduced. Bristol was stormed; everywhere the royal cause was failing; and Charles himself, reduced to the last extremity, in May 1646 escaped from Oxford in disguise, and threw himself into the arms of the Scotch army at Newark (May 5, 1646), by whom he was shortly given up to the parliamentary commissioners. The source of the strife now fairly within their grasp, the parliament and the army, in the former of which the Presbyterian, and in the latter the Independent, element predominated, became jealous of each other's power. With his usual sagacity, C. perceived that the advantage would lie with that party who held possession of the king's person, and with ready decision he had him removed from the hands of the commissioners into those of the army, June 1647. Some of the leading Presbyterians were now turned out of parliament by the army, and Independency, with C. at its head, was gradually obtaining the ascendency. The king still remained with the army, and with his usual duplicity, negotiated with both parties, not without hope that out of their mutual dissensions might arise advantage to himself.

On the 11th November 1647, the king made his escape from Hampton Court. Two days after, he was in custody of Colonel Hammond in the Isle of Wight. At this time the country was in a critical condition. The Welsh had risen in insurrection, a Scotch army was bearing down from the north with hostile intent, and Rupert, to whom seventeen English ships had deserted, was threatening a descent from Holland, not to speak of the rampant royalism of Ireland. Prompt measures alone could prevent anarchy and inextricable confusion, and C. was not afraid to employ them. Pembroke had to surrender, and at Preston Moor the Scotch were utterly defeated. On the return of the army to London, the Presbyterians, who were still blindly temporizing with the king, to the number of more than 100, were driven out (December 1648) by the process known in history as 'Pride's Purge.' Then that which C. thought could alone end the strife, happened. In January 1649, the king was tried, condemned, and executed. The abolition of the House of Lords followed speedily, and C. became a prominent member of the new Council of State; and in the army, though still only lieutenant-general, he had really much more influence than the commander-in-chief. The royalists being still strong and rebellious in Ireland, C. went thither in August, with the title of lord-lieutenant, and commander-in-chief of the army there; and ere nine months had passed, he had subdued the country so far, that it might be safely left to the keeping of his son-in-law, Ireton. C.'s measures for crushing the Irish rebels were indeed severe, and even sanguinary, but, nevertheless, peace and prosperity followed in a degree unknown before in the history of that unhappy country. Affairs in Scotland now claimed C.'s attention. Scotch commissioners had been negotiating with Charles II. at Breda, had urged him to come among them and take the Covenant, and they would crown him king over them at least, and do what force of arms could do to make him king of England also. Charles arrived in the north of Scotland on the 23d June 1650; three days thereafter, Cromwell—Presbyterian Fairfax having refused to fight against the Presbyterian Scotch—was appointed commander-in-chief of all the parliament forces. On the 15th of July, Charles Stuart had signed the Covenant, and was fully accepted as king. On the 3d September following, C. routed the Scotch army at Dunbar. Charles, with what force remained, and other accessions, afterwards marched southward, and had penetrated to Worcester, when C. came up with him, and utterly overthrew the royalists on the anniversary of the battle of Dunbar. This battle placed C. avowedly at the head of public affairs in England, and to write his biography from this time until his death, would be to write the history of the Commonwealth. The Long Parliament had now degenerated into the Rump—had become, in truth, an oligarchy, given to long and useless discussions about mere technicalities—intolerable to the country alike for the extraordinary power it possessed, and for the weak, pusillanimous way in which it exercised it. C., therefore, dissolved the Rump, 20th April 1653, and henceforth he alone was ruler in England.

He immediately summoned a parliament of 140 persons, 138 of whom assembled on the 4th of July, but he found it necessary to dissolve it on the 12th December; its one great work having been the legal investiture of C. with the supreme power and the title of Lord Protector, a position upon which the principal foreign powers hastened to congratulate him. C. now acted in a very arbitrary manner, so far as his parliaments were concerned, calling them and dismissing them at pleasure; but his home policy, notwithstanding, was just and liberal towards the mass of the people, and conducive to the prosperity of the country; while his foreign policy was such as to secure England a position among nations more commanding than any she had ever occupied before. Under C.'s rule, swift retribution followed any indignity or injury to Englishmen, no matter by whom or where perpetrated; and religious persecutors on the continent, in terror, stayed their bloody swords on the stern summons of the Lord Protector. He died September 3, 1658, the anniversary of some of his most important victories. C. was buried in Westminster Abbey; but on the 30th January 1661 (the anniversary of the death of Charles I.) his grave, along with those of Ireton and Bradshaw, were broken open, the coffins dragged to Tyburn, where the mouldering bodies were hanged, and then thrown into a deep hole under the gallows, while their heads were set upon poles on the top of Westminster Hall. Such was the sacrilegious brutality of the king and clergy (for the deed was done by their authority) towards England's greatest ruler. It was long a fashion with historians, content to rely upon the calumnies and falsehoods of royalist writers, to represent C. as a monster of cruelty and hypocrisy—a man with a natural taste for blood, who made use of religious phraseology merely to subserve his own ambitious ends; but after the researches of Carlyle and Guizot, the eloquence of Macaulay, and the clear statement and sound sense of Forster, such a view can no longer be upheld. C.'s religion was no mere profession, it was the very essence of the man; by nature, he was not a blood-shedder, and when necessity demanded the grim exercise of the sword, he unsheathed it with reluctance. Never was a religious man less of a bigot; he would not, in so far as his iron will could effect his purpose, permit any one to be persecuted for religious opinions. He delivered Biddle, the founder of English Unitarianism, out of the hands of the Westminster divines. He would have even given the despised and persecuted Jews the right hand of citizenship. He grasped power, and dispensed with the formality of parliaments, only because he sought to promote, in the speediest possible manner, the prosperity, happiness, and glory of his native land.

CROMWELL, Richard, son of Oliver Cromwell, Lord Protector of England, was born at Huntingdon, October 4, 1626. In early life, he was noted chiefly for his indolence and love of pleasure, qualities that united him more closely to the cavaliers than to the party of earnest men of which his father was the chief. When Oliver attained the dignity of Lord Protector, he called his son from the obscurity of a country-house, and his field-sports, to have him elected for the counties of Monmouth and Southampton, appointed him First Lord of Trade and Navigation, and made him Chancellor of Oxford. In none of these capacities did Richard C. exhibit any aptitude; and his failure as Protector, to which high office (being the eldest surviving son) he succeeded, on the death of his father, September, 1658—was still more conspicuous. With a mediocre intellect, and no energy, hardly a friend in the army, and the first parliament he called against him, the result could not be otherwise than it was—his demission (April

1659)—little more than seven months after he had assumed the sceptre of the Commonwealth. He retired to Hampton Court, from whence parliamentary stinginess and pressing creditors soon drove him to the continent, where he resided for a considerable period. At length, returning to England, he had a house provided for him at Cheshunt, near London, where he resided in strict privacy until his death, in 1712.

CROMWELL, THOMAS, an eminent English statesman and ecclesiastical reformer, of the reign of Henry VIII., was born near London in very humble circumstances, his father being a blacksmith, about 1490. After receiving but a very meagre education, he went to the continent, and became clerk in a factory at Antwerp, where he devoted his spare time to the acquisition of languages, in which he became very proficient. In 1510, he went into Italy, where he appears to have resided until about 1517, when he returned to England; and, after some time, was received into the household of Wolsey. That prelate, speedily recognizing his abilities, made him his solicitor and chief agent in all important business. As a member of the House of Commons, C. warmly and successfully defended the fallen minister, his master, against the bill of impeachment—proof enough that he was not the heartlessly ambitious man that his enemies have represented him. Henry, admiring his chivalry, and appreciating his talent, made him his own secretary; knighted him in 1531, and made him a privy-councillor. Honors rapidly flowed in upon him; partly in consequence, it is said, of his having suggested to Henry the desirableness of throwing off the papal yoke altogether—an idea which suited well with the king's impetuous nature—but chiefly, no doubt, on account of his great abilities.

In 1534, he had become chief Secretary of State, and Master of the Rolls; in the following year, he was made Visitor-general of English Monasteries—which he afterwards suppressed in such fashion as to obtain for himself the designation of *Malleus Monachorum*—and keeper of the privy seal in 1536. In 1539—to pass over a variety of minor tokens of royal approbation—he had risen to be Earl of Essex—having had some thirty monastic manors and estates given to him to keep up the dignity of his title—and Lord Chamberlain of England. C. took the leading part in establishing the doctrines of the Reformation, though he seems to have done so less on religious than on political grounds. The destruction of the pope's authority, and the establishment of the supremacy of the king in England, were what he labored to effect; and with this view, he promulgated the articles of the new faith, had English Bibles placed in the churches, and the youth of the nation taught the Creed, the Ten Commandments, and the Lord's Prayer; and ordered the removal of all images from the altar. In this matter of ecclesiastical polity, he has, says Mr. Froude, in the third volume of his *History of England*, 'left the print of his individual genius stamped indelibly, while the metal was at white heat, into the constitution of his country. Wave after wave has rolled over his work. Romanism flowed back over it under Mary; Puritanism, under another even grander, Cromwell, overwhelmed it. But Romanism ebbed again, and Puritanism is dead, and the polity of the Church of England remains as it was left by its creator.' In all that concerned the state, in its vastest and most complicated foreign relations, as well in the smallest matters of sanitary reform at home, C. took an active personal interest. But the stern, almost savage manner in which, in the carrying out of his policy, he disposed of all who opposed him, led to many and loud complaints, which damaged somewhat his popularity with the king. In order to retrieve his lost ground, he was zealous in promoting the marriage of Henry with Anne of Cleves, from whom, on account of her known Lutheran tendencies, he expected strong support. The success of his efforts in this matter proved the utter ruin of C., for the king, early conceiving a strong aversion to his unlovely queen, extended that dislike to the minister who had so strenuously promoted the marriage. Complaints against C. poured in thicker and faster, and the royal ear was not unwilling to listen now. Charges of malversation and treason were made, and he was arrested and thrown into prison (10th June 1540); a bill of attainder was quickly drawn up, and passed the two Houses of Parliament with little difficulty; and on the 28th July following, C. laid his head on the block on Tower Hill. A statesman of undoubted genius, he saw what was best for his country, and did it—not certainly in a way commending itself to the judgment of the present time—but, perhaps, among the best and only sure modes that could be devised in his age. He was undoubtedly unscrupulous, and very haughty towards the high; but the poor and weak found him easily accessible, and, when wronged, a warm defender; and though he was rapacious, the hungry had, nevertheless, to thank his generosity for many a meal.

CRONSTADT, a strongly fortified seaport, about 20 miles west of St. Petersburg, on a narrow calcareous island of about five miles in length, at the narrowest part of the Gulf of Finland, and over against the mouth of the Neva. Lat. (of cathedral) 59° 59′ 46″ N., long. 29° 46′ 38″ E. C. is at once the greatest naval station and the most flourishing commercial port of Russia. It was founded by Peter the Great in 1710, the island having been taken from the Swedes by him in 1703. Its fortifications, which protect the approach to St. Petersburg, have been an object of great attention to the Russian government. The batteries are very numerous, defending every part of the channel by which vessels can enter. They are all built of granite, and armed with the heaviest ordnance. The place, indeed, was considered by the British admiral who reconnoitred it during the Russian war of 1854—1855, so impregnable, that it would have been utter madness to make any attempt upon it. C., which is the seat of the Russian Admiralty, has three harbors: the east, intended for vessels of war, and capable of accommodating 30 ships of the line; the middle harbor, where vessels are fitted up and repaired, and which is connected with the former by a broad canal; and the west or Merchant's Harbor, for the merchant-shipping, with capacity for 1000 vessels; all are admirably defended. Not only the trade of St. Petersburg is conducted through this port, but that of a great part of the interior of Russia, which is connected with it by navigable rivers and canals. C. contains many well-built houses; the population in summer amounts, with the garrison of about 20,000 men, to 45,000 or 50,000; in winter it is much less.

CROOK, belonging to musical instruments, such as the French-horn or trumpet, is a circular tube, which fits into the end of the instrument next the mouthpiece, for the purpose of making the pitch of the instrument suit the key of the music; the notes of the parts for these instruments being always written in the natural key of C, with the name of the key of the piece marked in letters.

CROOK, SHEPHERD'S. See PASTORAL STAFF.

CROOKED ISLAND, one of the Bahamas, contains 160 square miles, and about 630 inhabitants. It lies to the south-east of Long Island, of which the north-west extremity forms nearly the middle point of the chain. In common with some others of the group, it is valuable chiefly for its salt. In the exportation of this article, C. I. appears to stand third in order, its share counting 12,000 bushels annually. The Bahama Salines are all the more important from the fact, that, for the curing of fish, salt obtained by solar evaporation is preferred to that procured from mines.

CROP, or OUT-CROP, is the edge of a stratum where it rises to the surface, or, as the miners say, comes out to the day. The line of out-crop of a bed along a level surface is called its *strike;* it is described by its relation to one or other of the points of the compass.

CROQUET, an open-air game, in which two or more players endeavor to drive wooden balls, by means of long-handled mallets, through a series of arches set in the ground according to some pattern. The player who first makes the complete circle of the hoops or arches wins the match; but during the progress of the game, each player may have the progress of his ball retarded by his adversaries, or assisted by his allies; and these friendly aids and hostile attacks constitute the chief interest of croquet. A *croquet-ground* should be a well-rolled level grass-plot or lawn, not less than thirty yards long by twenty yards wide; a full-sized croquet-ground measures forty yards by thirty yards.

CRO'SIER, a staff surmounted by a cross, which is carried before a bishop on solemn occasions. It is about five feet long, is generally made of tin, and is hollow. Crosiers are generally gilt, and are often richly ornamented. The C. differs entirely from the pastoral staff, with which it is often nevertheless confounded—the latter having a circular head, in the form of a crook. The illustration is of Archbishop Warham's crosier (1520), from Canterbury Cathedral.

CROSS. The C. was a common instrument of capital punishment among the ancients; and the death of the C. was esteemed so dishonorable that only slaves and malefactors of the lowest class were subjected to it by the Romans. It was customary to proclaim the name and offence of the person crucified, or to affix a tablet (*album*) to the C., on which they were inscribed. Malefactors were sometimes fastened on a simple upright stake, and so left to die, or they were impaled upon it, and to this upright stake the Latin name *crux* was originally and more strictly applicable; but very generally a cross-piece (*patibulum*) was added to the stake, to which the arms of the criminal were tied, or to which his hands were nailed. When the cross-piece was fastened at right angles below the summit of the upright stake, the C. was called *crux immissa;* and when the cross-piece was fastened at right angles across the top of the upright stake, the C. was *crux commissa;* and when it was

formed of two beams crossing one another obliquely, it was *crux decussata*.

The C. was erected without the gates of towns, but in places of frequent resort. The person crucified often lived for days upon the cross. The death of Christ by crucifixion led Christians to regard the C. with peculiar feelings of reverence, and to make use of the sign of the C. as a holy and distinguishing sign. The custom of *crossing*, in honor and commemoration of Christ, can be traced back to the 3d century. The Emperor Constantine, after obtaining the victory over Maxentius, through the influence—as he believed—of the sign of the C., caused crosses to be set up in public places and upon public buildings; and the veneration of the C. increased, particularly after the *Invention of the C.*, or finding of the alleged true C. of Christ in Jerusalem by the Empress Helena. See CROSS, INVENTION OF. The desire for relics was gratified, and numberless portions of the true C. were given away, without its being diminished. Iconoclasts and others contended in vain against the prevalent worship of the C.; and the *crucifix* (q. v.), a C. with an image of the Saviour affixed to it, was honored more than any other image. The sign of the C. is made not only by Roman Catholics, but by the members of the Eastern churches also; there are, however, distinctive differences in the manner in which it is made. It is admitted by the Lutherans as a commemorative sign of the atoning death of Christ, but by many Protestants is rejected as a human invention in worship, and as tending to superstition. It was very generally used during the middle ages, and still is among the less enlightened peasantry in some Roman Catholic countries as a sort of charm, or as affording some security, like an amulet, against all evil, and particularly against evil spirits and witchcraft.

It appears that the sign of the C. was in use as an emblem, having certain religious and mystic meanings attached to it, long before the Christian era; and the Spanish conquerors were astonished to find it an object of religious veneration among the natives of Central and South America. Be this as it may, it was early adopted as a symbol by Christians, with express reference to the central fact of their religion, and it has been extensively used as an ornament in Christian architecture, and in the ground-plan of churches (q. v.). The C. of the Resurrection is opposed to the C. of the Passion, by ecclesiastical writers. It is a lance, headed by a C. instead of a pike, and carrying a banner upon which a C. is depicted. It is the C. held by the paschal lamb, and carried at the head of religious processions. The large C. always placed over the entrance of the main chancel of a church, was called the *rood*, or *holy rood*. A representation is here given of the top of one of these large ornamental crosses.

The forms given to crosses in art are endless; but the two leading types are the Latin C., or *crux immissa*, supposed to be that on which Christ suffered, and the Greek C., both of which are subject to many fantastic variations. The Greek C. forms the well-known C. of St. George, which, adopted from the legends of that hero, was the national ensign of the English previous to the union with Scotland. The C. of St. Andrew differed entirely in form from the Latin or Greek cross. This C., or *crux decussata*,

Greek Cross. Latin Cross. St. Andrew's Cross.

consisted of two shafts of equal length crossed diagonally at the middle, as in the annexed cut. According to the legend, this was the form of C. on which St. Andrew, the national saint of Scotland, suffered martyrdom. As the Scottish ensign, it is now blended with the C. of St. George in the Union Jack.

Many very beautiful crosses exist in England, upon the points of gables of churches, on gravestones, and in other situations, as also in heraldry. Among these, the C. most commonly seen is called the *C. crosslet*. In this figure, as seen in the annexed cut, the extremities are intersected, so as to make several small crosses. When employed in ecclesiastical architecture, the figure is usually carved in a florid or highly decorative style. When the C. crosslet is pointed at the lower extremity instead of being crossed, it is in heraldry said to be fitched or *fitchée*. It is of frequent use in blazon.

Sanctuary, *Boundary*, or *Monumental Crosses*, as they are called, consist of an upright flat pillar or obelisk, covered with sculptured devices, and set in a socket level with the ground. Occasionally, they appear to have marked boundaries, but more frequently were monuments over the graves of heroes, kings, bishops, &c. In some instances, they probably marked the verge of a sanctuary. A characteristic type of cross is the *Celtic Cross*, most frequently found in Ireland and in the north and west of Scotland. Such crosses vary much, from a cross incised on a flat slab to an elaborate cruciform monument. The majority of the latter seem to belong to the period between the 12th and 15th centuries. One of the best known is that at Iona called St. Martin's

St. Martin's Cross, Iona.

Waltham Cross, restored.

Cross, standing in the grounds of the cathedral. It is a column of compact mica schist, 14 feet high, 18 inches broad, and 6 inches thick, and is fixed in a pedestal formed out of a massive block of red granite, about 3 feet high. In connection with certain ancient religious houses in Ireland, there were very fine Celtic crosses. Some crosses of this type show Scandinavian workmanship; hence they are often called *Runic* crosses.

Memorial Crosses are those which were erected in memory of some beloved object, or in commemoration of some event of local importance. In England, there are some superb crosses of this kind; they are popularly called *Norman Crosses*. This species of C. resembled a Gothic turret set on the ground, or on a base of a few steps, and was decorated with niches for figures and pinnacles. The best known examples are those erected by Edward I. (1290) in memory of his queen Eleanor; being placed on the spots where the body rested in its funereal progress to Westminster. The crosses at Waltham, Cheapside, and Charing were of the number. Those at Cheapside and at Charing are destroyed, but the C. at Waltham, though now much decayed, remains as a testimonial of the affection and piety of the greatest of the Plantagenets. We present a sketch of this beautiful Norman cross, as restored.

Town or *Market Crosses* were erected as stands to preach from, or in commemoration of events regarding which it was deemed proper to evoke pious feelings. As these structures were incorporated with or surmounted by a crucifix, the term *cross* was so indeliably associated with them that it survived the religious

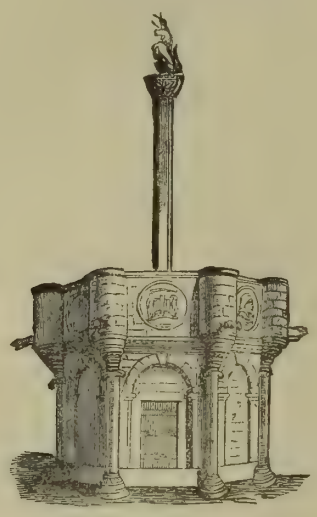
St. Paul's Cross.

character of the fabrics. 'The general intent of market-crosses was to excite public homage to the religion of Christ crucified, and to inspire men with a sense of morality and piety amidst the

ordinary transactions of life.'—Milner's *History of Winchester*. The earliest examples of this kind consisted, probably, of tall crucifixes of wood, such as are still seen by the waysides in some continental countries. Afterwards, stone shafts would be substituted; and according to the increase of market revenues, or progress of taste, these town crosses assumed that imposing character which they latterly possessed. Of the larger ornamental crosses of this kind, there are some striking specimens in England.

We may refer to that at Cheddar in Somersetshire, and that at Malmesbury in Wiltshire; both are open vaulted structures, with a commodious space beneath, as a refuge for poor market-folks during rain, and surmounted with a kind of Gothic turret. At Chichester, Bristol, and Winchester, the market-crosses, while similar in form, are of a higher architectural quality. See Britton's *Architectural Antiquities*. Adjoining St. Paul's in London, stood Paul's C., a structure which we read of as early as 1259, in

Peebles Cross.



Edinburgh Market-cross.

the reign of Henry III. It was essentially a town-preaching C., and is associated with some interesting occurrences in history. Before this C. the unfortunate Jane Shore was forced to do penance in the reign of Richard III., to whose malice she was made a victim. This event was followed by Dr. Shawe's infamous sermon, attempting to bastardize the children of Edward, and eulogizing Richard, who was present on the occasion. In front of this C. sat Cardinal Wolsey, to hear fulminations against Luther; and about ten years later, by order of Henry VIII., preachers here delivered sermons in favor of the Reformation. At this C. Queen Elizabeth attended to hear a thanksgiving sermon for the defeat of the Spanish Armada. Here, sermons continued to be delivered until 1643, when, with other so-called relics of popery, the C. incurred the displeasure of the Puritans, and was demolished by order of parliament. Whatever was the original form of Paul's C., it was in later times a plain pulpit-like fabric of wood, covered with lead, and, as seen by the adjoining cut, was provided with seats for an audience. This inoffensive and really useful preaching C., which we could wish had been spared, stood on the north side of the church, a little to the east of Cannon Alley.

Scotland offers no specimens of memorial or Norman crosses, though, perhaps, we should make an exception in favor of the Scott Monument, at Edinburgh, which is essentially a Norman C. of a gigantic order. See SCOTT, SIR WALTER. As regards the market-crosses of Scotland, they never attained to that elaborately ornate character which distinguishes such crosses as those of Chichester and Winchester. Yet the Scottish town-crosses had some distinguishing features. The more simple kind consisted of a shaft of stone, generally octangular in shape, and 12 or more feet in height. At top was an ornamental capital, which bore a dial and vane, or the figure of a unicorn. The shaft sprang from the top of a graduated flight of circular or octangular steps. A specimen of this species of C. is seen in the market-place of Melrose. Another specimen, renovated and set in the quadrangle of the Chambers Institution, Peebles, is shown in the annexed cut. The grander market C. consisted of a tall stone shaft, such as just described, but instead of steps, it sprang from the center of an imposing sub-structure.

This structure was circular, hexagonal, or octagonal, and from 10 to 16 feet high. The top formed a platform, which was surrounded with an ornamental stone parapet, and was reached by a stair inside. The sides of the building were decorated with pilasters, and bore various heraldic and other devices. Such were the crosses of Edinburgh, and such is the renovated C. of Aberdeen, the sides of which, however, are open. Losing their religious character, the Scottish market-crosses were employed for royal and civic proclamations, and as places where certain judicial writs were executed. The general removal of these ancient and interesting structures has been often matter of lamentation. The oldest C. of Edinburgh, which was the scene of a number of incidents connected with Scottish history, stood in the center of the High Street, nearly opposite the entrance to the Parliament Square. It was removed in 1617, to make way for a royal pageant, the procession of James VI., on his first visit to Edinburgh after his removal to England. A new market-C. was then erected a short way further down the street, on the south side. We give a sketch of this C., which consists of an octangular sub-structure 16 feet across, with a handsome stone shaft of about 20 feet in height; its removal in 1756, by the civic authorities, is indignantly referred to by Scott in his poem of *Marmion*. Since its removal, royal proclamations, &c., are made on the site, which for such purposes is technically the market-C. of Edinburgh. With better appreciation of objects of archæological interest than prevailed in the 18th c., the shaft, or cross proper, was re-erected in 1869 within the railings of St. Giles.

CROSS, in Heraldry. If we assume the art of blazon to have originated in connection with the Crusades, it will not surprise us to find the symbol of the Christian faith so frequently introduced into the escutcheons of ancient and noble families everywhere in Europe. It is one of the honorable ordinaries, and, indeed, from its sacred character, is esteemed by heralds as the most honorable charge. Its form varies so much that Ménestrier counts 42 crosses; La Colombière, 72; and Guillim, 39. Most of the architectural crosses occur in heraldry, along with many others.

CROSS, INVENTION OF THE, the name given in the Roman Catholic Church to a festival which commemorates the finding of the alleged true C. of our Saviour, and which is celebrated on the 3d of May. The Empress Helena, the mother of Constantine the Great, out of a desire of visiting the holy places, undertook a journey to Palestine in 326, though she was then near eighty years of age; and being animated with a great desire of finding the C. on which our Saviour suffered, she was so well directed, it is said, in the search which she instituted, that the C. was found, and with it the crosses of the two thieves; but the title being found separate from the C., a miracle readily determined which was the proper object of reverence. An order of friars, founded in honor of the Invention of the Cross, and carrying in their hand a staff, on the top of which was a C., received the name of *Croisiers* (Fr. *croix*, cross), corrupted into *Crouched* or *Crutched* Friars. They came to England in the 13th c., and had monasteries in London, Oxford, and Ryegate.—The festival of the *Elevation of the Cross* (14th September) commemorates its re-erection in Jerusalem by the Emperor Heraclius in 628, after it had been carried away by the Persians.

CROSS, VICTORIA. The peculiarities of this decoration, which was instituted on the termination of the Crimean campaign in 1856, are, that it may be granted to a soldier of any rank, and for a single act of valor.

The C. of the Legion of Honor, as was felt during the Crimean campaign, served a purpose in the French army which was served by none of our decorations, and it was in imitation of it that the Victoria C. was founded, with the inscription 'For Valor,' and which can be given to none but those who have performed, in presence of the enemy, some signal act of valor or devotion to their country. The general distribution of the crosses earned in the Crimean war took place in Hyde Park on the 26th June 1857. The recipients were 62 in number. The Victoria Cross is in the form of a Maltese Cross, and is made of bronze. In the center is the royal crown, surmounted by the lion, and below, on a scroll, the words 'For Valor.' The ribbon is blue for the navy, and red for the army. On the clasp are two branches of laurel, and from it the cross hangs, supported by the initial 'V.' The decoration is accompanied by a pension of £10 a year.

Victoria Cross.

CROSS, THE ORDER OF THE, originally a spiritual order of knighthood, which sprang up in Palestine in the time of the Crusades, and was then called the *Bethlehemite Order*. After the commencement of the 13th c., the knights of this order adopted the monastic life, settling chiefly in Austria, Bohemia, Moravia, Poland, and Silesia. Pope Gregory IX. confirmed the order in 1328. Its principal seat is now in Bohemia, and its members generally hold ecclesiastical preferments or professorships in the

university of Prague. They are distinguished by a C. of red satin, with a six-pointed star under it, and are sometimes called *Stelliferi*.

CROSS, The Southern, the most conspicuous constellation in the southern hemisphere, situated near the Antarctic Circle, and therefore never visible to our latitude. It consists of four bright stars, to which the fancy, aided by Christian associations, readily gives the cruciform shape. The two brilliant stars which mark the summit and the foot of the C. have nearly the same right ascension. The constellation, therefore, is almost perpendicular when passing the meridian, and these two stars act as pointers to the Antarctic pole.

CROSS BILL IN CHANCERY is a suit brought by the defendant against the plaintiff in the original suit, for the purpose of setting up some claim or defence which could not be maintained in the original suit.

CROSSBILL (*Loxia*), a genus of birds of the family *Fringillidæ*, much resembling bullfinches, linnets, &c., except in the bill, which is altogether singular; the two mandibles—which are rather long, thick at the base, and much curved—crossing each other at the points, when the bill is closed. In different individuals, even of the same species, the upper and lower mandibles are

Crossbill (*Loxia curvirostra*).

found variously directed to the right and left. This conformation was rashly characterized by Buffon as 'an error and defect in nature, and a useless deformity;' whereas, it is an admirable adaptation to the wants and habits of the birds, and other peculiarities of their structure beautifully correspond with it—the bill being articulated to the head in such a manner that the mandibles are capable not merely of vertical but of lateral motion, and muscles of extraordinary power, in comparison with the size of the bird, being provided for moving them. The result of all this is, that the crossbills readily obtain their principal food, the seeds of firs and pines, by tearing up the cones.

They bring the points of the mandibles together—which they can do so as to pick up a very small seed—and insert them into the cone, when a powerful lateral movement widens the opening quite sufficiently, and the tongue, which terminates in a singular movable scoop, formed of a bone articulated to the *os hyoides*, or ordinary bone of the tongue, is inserted to detach the seed. The power of the bill is such that it can be employed in its lateral movements to tear wood to pieces, and crossbills in confinement seem to take a mischievous pleasure in so employing it, and by this means, and pulling at wires, soon destroy any ordinary cage. An apple is cut to pieces almost in an instant, in order that its seeds may be reached; and flocks of these birds sometimes do great mischief in orchards. Only three species are known, all of which have been found in Britain, although only one, the common C. (*L. curvirostra*) is of frequent occurrence. It sometimes occurs in considerable numbers, but in most years is scarcely to be seen. It is a native of Europe, Asia, and North America, dwelling chiefly in pine forests, and extending as far north as they do, not dreading the coldest climates.

CROSS-BOW. See Arbalest, Archers and Archery.

CROSS BREEDING. See Breeding.

CROSS BUNS, a small cake specially prepared for Good Friday, and in many towns of England cried about the streets on the morning of that day as 'Hot-cross buns.' *Bun*, means simply a round cake—properly, a lump, being from the same root as *bunion*, Ital. *bugno*, a bump or knob; allied is the Gael. *bonnach*, a cake, a *bannock*. Good-Friday buns were appropriately marked with the cross, and hence the name. The origin of the practice is obscure. Most probably it is a relic of some heathen observance, to which the early church gave a Christian significance. At Chelsea, there were formerly two celebrated bun-houses, besieged on Good Friday from morning until night by hundreds of eager purchasers, but they have long since disappeared.

CROSS CROSSLET. See Cross.

CROSSE, Andrew, a remarkable experimenter on electricity, born at Fyne Court, in the Quantock Hills, Somersetshire, June 17, 1784, was educated at Bristol and Brasenose College, Oxford, and in 1805—1806, settled on his paternal estate, where he began to devote himself to the study of electricity. Happening on one occasion to examine a cavern near his residence, he found reason to conclude that the crystallizations on the walls and roof were partially, at least, the effect of the operation of this subtle agency. In 1807, he commenced experiments with the view of forming artificial crystals by electricity. He took home some of the water which dropped from the roof of the cave, and exposed it to the action of a voltaic battery for ten days, when he found crystals of carbonate of lime forming on the negative platinum wire. C.'s endeavors to form crystals of various sorts were very successful.

After 30 years of quiet research, during which period he remained totally unknown to the learned world, he obtained no less than 24 minerals, crystals of quartz, arragonite, carbonates of lime, lead, and copper, besides more than 20 other artificial minerals. Explaining his discoveries at the meeting held by the British Association for the Advancement of Science, at Bristol in 1836, he received high praise from its most distinguished members. On this occasion, he also expressed his belief that every kind of mineral would yet be formed by the ingenuity of man. But his most startling discovery occurred a few months after. While experimenting with some highly caustic solutions, out of contact with atmospheric air, there appeared, as if gradually, growing from specks between the poles of the voltaic circuit, certain animals of the genus *acarus*. C. never affirmed that he had developed animal life out of inorganic elements, but simply that under certain physical conditions he could make acari appear, and not otherwise. The 'discovery' made a great noise at the time. The possibility of the fact was, of course, denied by all those persons who 'take the high *priori* road,' and have made up their minds as to what facts alone are possible; but Faraday declared that he had seen, during the same year, similar appearances in his own electrical experiments. C. was accused of 'impiety,' and of being 'a reviler of our holy religion,' and although a very pious man, was actually compelled to defend himself against such pitiable charges. It is humiliating to state that, in spite of his defence, various honors to which he was justly entitled, were lost to C. in consequence of his discovery. C. also invented a method of purifying sea-water by electricity, improved wines, spirits, and cider by the same process, and showed that it might be usefully applied to vegetation. He died July 6, 1855. An excellent memoir of him was published by his widow (1857).

CRO'SS-EXAMINA'TION. The examination of a witness by the party against whom he was adduced. In England, the following are the principal rules affecting C.: 1. The witness may be cross-examined on the whole case, and not merely on the points on which he had been examined in chief. 2. Leading questions may be put in cross-examination. 3. Irrelevant questions may often be put, but if for the mere purpose of impeaching the witness's credit, they are inadmissible. 4. For the purpose of impeachiug the character of the witness, he may always be asked whether he has been guilty of a crime, but he is not always bound to answer. 5. Evidence may be brought to contradict the answer given on C., on relevant facts, but not on irrelevant, unless the irrelevant fact be the conviction of the witness of a felony or misdemeanor. 6. A witness may be cross-examined as to any previous statement made by him relative to the trial (except matter of mere opinion as to the merits of the case), and evidence may afterwards be brought to contradict him. See Evidence.

CROSSOPO'DIA, a genus of annelids determined from markings on the surface of Silurian slates. Nothing exhibiting structure has been observed—the surface of the slate is not even darkened by the organisms, which the markings show to have been nereid-like worms of some six inches in length. The extraordinary length, 'probably many yards,' which was ascribed to this animal, has been shown by Alexander Bryson to be founded on a confusion of the body with the track formed by the passage of the creature through a crisp rather than a slimy mud, the track having been filled up with dry blown dust, which gives it an appearance and structure different from those of the surrounding matter.

CROTALA'RIA (Gr. *krotalon*, a rattle), a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, deriving its name from the inflated pods in which the seeds rattle when ripe. The species are numerous; annual perennial, and shrubby plants, natives of the warm parts of the world. Many of them have long, straight, slender stems aud branches, and some of these yield valuable fibre, particularly *C. juncea*, the Sunn (q. v.), or Sunn Hemp of India, an annual species, the fibre of which is now an important article of commerce. Jubbulpore Hemp, also an important fibre, and regarded as stronger than Sunn, is the produce of *C. tenuifolia*, a perennial species about nine feet high, a

native of the south of India, which, when growing in abundant space, throws out many branches; but when sown thick, grows with little branching. *C. Burhia*, which naturally grows in very arid places, is also cultivated in Sinde for its fibre; and that of *C. retusa* is employed in the Madras presidency. *C. juncea* is also often sown in India, to be used in a young state for feeding cattle.

CROTA'LIDÆ, a family of venomous serpents, agreeing with *Viperidæ* in their general form and appearance; in their large head, which is broad behind and has a short muzzle; in their short tail; and in having long fangs in the front of the upper jaw, which is destitute of other teeth; but differing from them in having a large pit—the use of which is not known—on each side of the face between the nostril and the eye; and in having the tail terminated by a sort of horny spine or by a rattle. Many of the most dangerous serpents of the warm parts of Asia and America belong to this family, which receives its name from the rattlesnakes (q. v.), (Gr. *crotalus*, a rattle) of America, and contains also the genera *Trigonocephalus*, *Craspedocephalus*, *Lachesis*, &c.

CROTCH, WILLIAM, a distinguished musical composer, was born at Norwich in 1775. His musical genius was quite as precocious as that of the great Mozart.

When little more than three years old, it is said that he could play *God save the King* almost throughout with chords, and the accuracy of his ear was such that he could detect in a moment what note was struck, and in what key the music was composed. When only 22, C.'s abilities were so much appreciated that he was appointed Professor of Music in Oxford University, the degree of Doctor of Music being conferred upon him. In 1822, he obtained the principalship of the Royal Academy of Music. C. composed a large number of pieces for the organ and piano, as well as many vocal pieces. He was author of *Elements of Musical Composition and Thorough Bass*, and *Styles of Music of all Ages*, 3 vols. He died December 29, 1847.

CRO'TCHET. See MUSIC.

CRO'TON, a genus of plants of the natural order *Euphorbiaceæ*, having male and female flowers generally on the same plant; the male flowers with five petals; the female flowers with three styles, which are either forked or divided into many branches; the capsules 3-celled, with one seed in each cell. The species are numerous, mostly tropical or sub-tropical trees or shrubs, a few herbaceous. Some of them possess in a very high degree the acrid properties so characteristic of the order to which they belong. Among these, the most important is the PURGING C. (*C. Tiglium*), a small tree, a native of India and the more easterly tropical parts of Asia. The leaves are extremely acrid; the wood in a fresh state is a drastic, and in a dried state, a more mild purgative; and the seeds (*C. Seeds*, or *Tilly Seeds*) are an extremely powerful drastic purgative, formerly much employed in Europe, but latterly disused on account of violence and uncertainty of action, although still valuable as yielding C. OIL (q. v.). They are oval, or oval-oblong, about the size of field-beans. So great is their acridity, that dangerous effects have ensued from working for some hours with packages of them. The oil is obtained mostly by expression, and partly by treating the cake with alcohol.—The wood and seeds of *C. Pavana* are employed in some parts of the East in the same way as those of *C. Tiglium;* and the wood is supposed to be the *Lignum Pavanæ* or *Panavæ* of commerce. Other species possess similiar properties.—Very different are the properties of the species which yield Cascarilla (q. v.) and Copalche (q. v.) barks, to which a great resemblance exists in the barks of a number of species, natives chiefly of America.—Other species are still more aromatic, and some delightfully fragrant, containing in great abundance a thickish balsamic sap. The sap of *C. gratissimus* is much employed as a perfume and cosmetic at the Cape of Good Hope; that of *C. origanifolium* is used in the West Indies as a substitute for Balsam of Copaiva; that of *C. balsamiferum*, also West Indian, furnishes *Eau de Mantes* by distillation; and the balsamic sap of some South American species is dried and used as incense.

CROTON A'QUEDUCT. See AQUEDUCT.

CROTON OIL is of an unctuous consistence, and varies in color from a pale yellow to a dark reddish-brown or deep sherry color. It is not miscible with water, but dissolves in alcohol and in ether. It has an acrid taste, and an unpleasant but characteristic odor, and is a powerful purgative, one drop of the pure oil being a sufficient dose. When rubbed upon the skin, it produces rubefaction and pustular eruption, and thereby tends to relieve some affections of the internal organs. It is used either by itself in the unmixed state, or diluted with olive oil, soap liniment, alcohol, &c. It is not to be employed except with caution.

CROTON RIVER. See NEW YORK.

CROTO'PHAGA (Gr. tick-eater), a genus of birds of the order *Scansores*, or Climbers, allied to trogons and toucans, and of which some of the species are known by the names ANI and KEEL-BIRD, the former from their cry, the latter from the high, blade-like ridge which surmounts the short, much compressed, arched bill. The tail is fan-shaped. *C. Ani*, often called the SAVANNA BLACKBIRD, is common in the West Indies and warm parts of America, inhabiting savannas and open pastures, particularly those which are occupied by cattle or horses, and feeding chiefly

Savanna Blackbird (*Crotophaga Ani*).

on insects, partly also on berries. It uses the sharp ridge of the bill in opening out earth, dung, &c., in search of insect prey. It often perches on the backs of horses or cattle, to feed on ticks, and may be seen clinging to a cow's tail; the important service which it renders being apparently well appreciated.

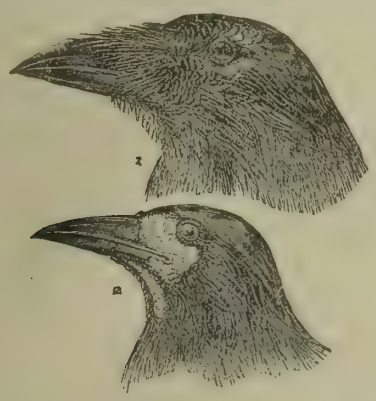
CROUP, a severe and fatal disease of infants, known from a remote period, but first scientifically described by Dr. Francis Home in 1765, as a suffocative affection of the breathing, depending upon the formation of a false membrane or fibrinous deposit on the mucous membrane of the windpipe or Larynx (q. v.). It is proper to remark that the inflammatory disease described by Home has been frequently confounded with a purely spasmodic affection of the larynx, the asthma of Millar, or *laryngismus stridulus* of Dr. Mason Good; and also with Diphtheria (q. v.), in which a false membrane is formed on the pharynx and palate, as well as in the larynx. C., in the more restricted sense, begins with symptoms resembling Catarrh (q. v.), but differing in the greater degree of feverishness and hoarseness.

In a short time, the respiration becomes difficult and noisy; a very peculiar hissing sound is heard accompanying the drawing of each breath; the cough is harsh and brassy; the countenance is injected, the expression very feverish and anxious, the voice entirely lost, or very much altered. This state is soon followed by one of suffocation, unless the little patient is relieved by expectoration, which, however, frequently takes place in the midst of vomiting or coughing, a quantity of membranous shreds being brought up from the windpipe along with glairy mucus, and sometimes streaks of blood. In the worst cases, the spasms of ineffectual coughing, and the constantly increasing obstruction to the breathing, are most painful to witness; and a period of tossing, extreme suffering, and anxiety is succeeded either by gradual insensibility, or by convulsions, which are very soon followed by death. True C. is rarely seen after the age of puberty, and is rather uncommon before the termination of the first year of life. It may occur, however, at any age, and has essentially the same characters as are above described. It is supposed to be due in some measure to Endemic (q. v.), and partly also to Epidemic (q. v.) causes. It is most common in cold and moist climates and seasons, and in low-lying, but exposed situations. The variations in its prevalence, however, are by no means fully explained. The treatment of C. requires to be very active and decided, and yet free from rashness. In cases of highly inflammatory type, and in robust children, it may be proper to take blood from the arm, or to place one or more leeches (according to the age of the child) over the top of the breast-bone. An emetic should also be given as soon as possible, composed of a full dose of tartar-emetic or of ipecacuanha, or both together. Some prefer sulphate of copper given in repeated doses: in America, a preference is given to alum and honey mixed into a paste, and given in teaspoonful doses. The emetic may be repeated, if necessary, every two or three hours, and the child should at intervals be placed in the warm bath. It needs hardly be added that medical advice should be procured without a moment's delay, whenever it is within reach, for the disease is one of extreme danger, and almost all the most effective remedies require experienced hands for their safe administration. In extreme cases, Tracheotomy (q. v.) has been resorted to with success.

CROW (*Corvus*), a genus of birds, the type of the family *Corvidæ* (q. v.). The largest species of this genus is the Raven (q. v.). The Rook (q. v.) also belongs to it. Besides these and the Jackdaw (q. v.), there are two other species found in Britain, the COMMON or CARRION C. (*C. corone*), and the ROYSTON C. or HOODED C. (*C. cornix*). They differ from one another chiefly in color,

the Carrion C. being black, the Hooded C. gray, with black head, throat, wings, and tail. The Hooded C. is also rather larger than the Carrion C., which, in size, nearly agrees with the rook, but which may readily be distinguished from that species by having the base of the bill and the upper part of the throat not naked and rough, but closely feathered.

The name Hooded C. is derived from the appearance of the black head, contrasted with the gray body, but in some parts of Scotland is, without any show of reason, popularly transferred to the Carrion C., under the form *Hoody*. Both of these species have habits much more resembling those of the raven than of the rook; they seldom or never associate in flocks, and not only prefer carrion to worms, insects, or vegetable food, but watch and attack very weak animals, such as young lambs. On this account, a premium is in many places given for their destruction, and gamekeepers relentlessly pursue them on account of their robbing nests, from which they take either the eggs or the helpless young. Their own nests are built in trees, or if these are not to be found, among high rocks. They both occasionally frequent the sea-coast, feeding on shell-fish, &c. Both are widely distributed over Europe and the



northern parts of Asia.—The C. of North America (*C. Americanus*) is very similar to the Carrion C., but rather smaller, and, after the breeding season is over, congregates into great flocks: it is also partially migratory, great numbers from the more northerly parts moving to the south on the approach of winter. Its habits are otherwise intermediate between those of the Carrion C. and the rook.—The FISH C. (*C. ossifragus*) frequents the coasts and southern rivers of the United States, feeding chiefly on fish, which it catches with great dexterity. It also sometimes assails gulls, and compels them to disgorge their prey.—The JABBERING C. (*C. Jamaicensis*) of the Blue Mountains of Jamaica is remarkable for the resemblance of its voice to human speech, which some of the other species of this genus, as the raven, it is well known, can be taught to imitate. Sir J. E. Tennent gives an interesting account of the small glossy C. of Ceylon (*C. splendens*), which frequents the towns, feeding on offal, and boldly entering rooms through open windows, to snatch some morsel from the dinner-table. Habits of pilfering are more or less prevalent among the different species of crow. The accompanying cut of the heads of the raven (fig. 1) and the rook (fig. 2) illustrates well the prevalent characters of the bill in this genus, showing also in the raven the bristles which, as in most of the species, surround its base, but which are wanting in the rook; and contrasting the greater strength of neck, head, and bill which belongs to the more carnivorous as compared with the more frugivorous species.—The RED-LEGGED C. is the CHOUGH (q. v.).—The name CARRION C. is given in America to the BLACK VULTURE. See VULTURE.—The PIPING C. of New South Wales is a BARITAH (q. v.).

CRO'WBERRY, or CRAKEBERRY (*Empetrumni grum*), a small procumbent shrub, of the natural order *Empetraceæ*, a native of the northern parts of the world, abundant in the moors of Scotland, and the north of England. The order consists of a few heath-like shrubs, which, however, are regarded as having a botanical affinity to *Euphorbiaceæ* (Spurges, &c.), with small unisexual flowers in the axils of the leaves, the fruit a small berry seated in the persistent calyx. The berries of the C. are nearly black, surround the branches in crowded clusters, and each contain 6—9

Crowberry:
b, fruit cut open; *c*, flower.

bony seeds and a watery acidulous juice, which is sometimes felt to be not unrefreshing; but they are generally little esteemed. A fermented or vinous liquor is prepared from them in some northern countries. They are a favorite food of game. *E. rubrum*, a native of the vicinity of Cape Horn, differs little from the northern plant, except in having red berries. The berries of the Camarinheira (*Corema alba*) are employed in Portugal for the preparation of an acidulous liquor, which is used as a drink in fevers.

CRO'WFOOT. See RANUNCULUS.

CRO'WLAND, or CROYLAND, an ancient town in the south of Lincolnshire, on the Welland, in a low flat district in the Fens, 48 miles south-south-east of Lincoln. There once existed here a large abbey, built about 1200, and there still exist the remains of a church founded by King Ethelwald in 716. At the confluence of the Welland and the Nene, there is a curious triangular bridge, built probably in the 14th c. on the site of an older one erected about 860. Ingulfus, the historian, was abbot of Croyland. Pop. (1871) 2459.

CROWN (Lat. *corona*, Wel. *crwn*, and Gael. *cruinn*, round). Crowns were originally garlands of leaves; and in this form they have probably been used as an ornament for the head by almost every people. They were much used by both the classical nations on joyous and on solemn occasions. Among the Greeks, the C. (*stephanos*) was sometimes used as an emblem of office, as in the case of the archons; sometimes as an ornament for the heads of the victors in the public games; and sometimes as a mark of distinction for citizens who had merited well of their country.

Corona Muralis.

Civic Crown.

Crowns of the latter class were made at first of twigs of laurel, but latterly of gold. The Romans made use of crowns to a greater extent than the Greeks, chiefly as rewards for valor. The most highly prized was the *Corona obsidionalis*, which was bestowed by a beleaguered garrison or army on the general who rescued them. It was made of grass or wild-flowers, gathered from the place which had been enclosed by the enemy. Next in order was the *Civic C.*, a garland of oak-leaves and acorns, which was given as a reward to any soldier who had saved the life of a Roman citizen in battle. For the soldier who wore it, a place next to the senators was reserved at the public spectacles, and both the senate and the assemblage rose up on his entrance. Not only he, but his father and paternal grandfather were free from all public burdens; and the person whose life he had saved was bound ever after to show him the duty which a son owes to a father. The civic C. is sometimes used in heraldry.

Another of the Roman crowns was the *Corona muralis*, which was bestowed on him who first scaled the wall of a besieged city. It was a golden ring surmounted with turrets or battlements. It is often used in modern heraldry.

The *Corona triumphalis*, which was of three kinds, was bestowed upon a general when he obtained a triumph.

But there was a totally different class of crowns, which were not honorary, but emblematical, and which were not regulated by law, like the former ones, but by custom. Of these, the most important were: 1. The *Corona sacerdotalis*, worn by the priests and bystanders when engaged in sacrifice, with the exception of the *pontifex maximus*. It was sometimes of olive leaves, sometimes of ears of corn, and sometimes of gold. 2. *Corona funebris* or *sepulchralis*, with which the dead was crowned, a custom which prevailed both among the Greeks and Romans. A law of the Twelve Tables provided that if any one had been crowned while living, the C. should be placed on his head when carried out to burial. Crowns were also placed on the bier, and scattered from the windows under which the procession passed. In Greece, these crowns were commonly of parsley. 3. *Corona convivialis*. The custom of wearing wreaths on festive occasions, which, like most of the Roman customs, was derived from Greece, is supposed to have originated in the habit of tying a woollen fillet round the head, to mitigate the effects of intoxication. As luxury increased, they were made of such flowers and shrubs as were supposed to prevent intoxication, roses, violets, myrtle, ivy, and even parsley. 4. *Corona nuptialis*, or bridal-wreath, made of flowers plucked by the bride herself, and not bought, which was of bad omen. Amongst the Romans, it was made of verbena. 5. *Corona natalitia*, a chaplet suspended over the door of the vestibule in which a child was born.

Several other classical crowns are mentioned in the very elabo-

rate article on the subject in Smith's *Dictionary*, to which we have been indebted for much of the preceding information.

As the emblem of sovereignty in modern Europe, the C. was borrowed rather from the Diadem (q. v.), than the crowns of antiquity. This decoration was originally Oriental. Alexander the Great adopted it from the kings of Persia; and Antony assumed it during his luxurious intercourse with Cleopatra. According to some, its adoption for the gods originated in the fillet, which was assigned to Bacchus for the purpose mentioned as that which led to the use of the convivial crown. In modern states, crowns were of very various forms, till heralds devised a regular series of them to mark the various gradations of sovereignty, from that of the emperor down to what are now called the coronets of counts and barons. The pope also had his triple crown. See TIARA. So entirely was the C. regarded as the symbol of sovereignty, that the word came often to be used as synonymous with the monarchy—a sense in which we still speak of the C. of England, and the domains and possessions of the crown.

The crowns of kings and emperors are closed above, whilst the coronet of a noble is merely an open circlet surrounding the head; hence, *to close the C.* has been the ambition of princes desirous of shaking off the authority of feudal superiors, and assuming a complete sovereignty.

The royal C. of Great Britain is a circle of gold enriched with stones and pearls, and heightened with four crosses pattée, and four fleurs-de-lis alternately. From these rise four arch-diadems, adorned with pearls, which close under a mound, ensigned with a cross pattée. The C. used at the coronation of Queen Victoria was adorned in accordance with the taste of the present time.

The coronet of the Prince of Wales is a circle of gold, set round with crosses pattée and fleurs-de-lis, but has only one arch, decorated with pearls, surmounted with a mound and cross, and bordered with ermine. In addition to his coronet, the Prince of Wales has a cognizance consisting of three ostrich feathers, argent, quilled or, enfiled with a prince's coronet of the last, with an escrol azure, whereon are the German words *Ich dien* (I serve). For the traditionary origin of this badge, see PRINCE OF WALES.

The younger sons and brothers of the sovereign wear as coronet a circle of gold, bordered ermine, heightened with fleurs-de-lis, crosses pattée, and strawberry leaves alternately. Nephews of the blood-royal have strawberry leaves on their coronets, where the sons and brothers have fleurs-de-lis. Princesses-royal have a circle of gold, bordered with ermine, and heightened with crosses pattée, fleurs-de-lis, and strawberry leaves alternately. For the coronets of the different orders of nobility, see their *titles*.

THE CROWN is a term often employed to signify the state, and the matters under control of the executive authority. Thus, in the interests of the state there are C. ministers, C. lawyers, C. officers, C. lands, &c.—the term, in no instance, having any special connection with the sovereign personally. In Scotland, certain high crimes are technically called Pleas of the Crown. These are four in number—murder, robbery, rape, and wilful fire-raising—and fall within the jurisdiction of the High Court of Justiciary. Likewise, in Scotland, there is a functionary styled C. agent. He is a practising law-agent or solicitor, who, under the Lord Advocate and his deputes, takes charge of criminal proceedings. His duty is to receive from the procurators-fiscal of the different counties the precognitions which they have taken, and to lay these precognitions before the lawyers for the crown, that they may determine whether there is ground sufficient to call for a prosecution. He also expedes indictments and criminal letters, and otherwise discharges the duties of an agent in preparing and assisting in the conduct of trials before the High Court of Justiciary, which are generally superintended or conducted by the Solicitor-general. The appointment of the C. A. is with the Lord Advocate, and ceases with the administration.

CROWN DEBTS. It is a prerogative of the crown to take precedence of all other creditors, and in England, to recover its debts by a summary process called an *extent*. By 33 Henry VIII. c. 39, this preference is given over all creditors who have not obtained judgment for their debts before the commencement of the crown's process; and the act 6 Anne, c. 26, extended the law of England in this respect to Scotland. The rule in Scotland, however, was limited to movable or personal property, and the crown has no privilege over a subject in a competition for heritage. It obtains, however, as opposed to the landlord's Hypothec (q. v.). Mercantile sequestration has no effect against the crown. The sanctuary of Holyrood House affords no protection to the king's debtor. See EXTENT, EXCHEQUER.

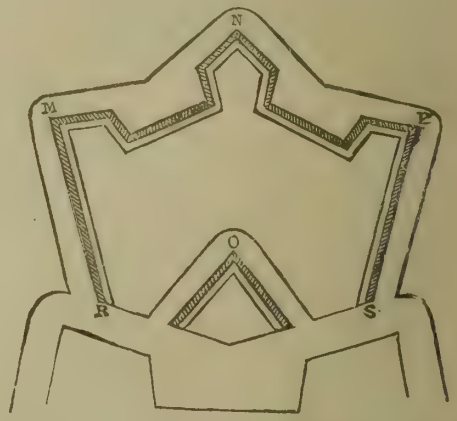
CROWN IMPE'RIAL. See FRITILLARY.

CROWN LANDS. The demesne lands of the crown are now contracted within narrow limits, having been almost entirely granted away to subjects. King William III. so impoverished the crown in this manner, that an act was passed, 1 Anne, c. 7, s. 5, the effect of which and of subsequent statutes is, that all grants or leases from the crown of royal manors, or other possessions connected with land, for a period exceeding 31 years, are void. At a much earlier period (1455, c. 41), a Scottish statute had rendered the consent of parliament necessary to the alienation of the property of the crown; but neither it, nor the subsequent statutes which were passed with a similar object, succeeded in checking the practice. The superintendence of such property as still belongs to the crown is now vested in commissioners appointed for the purpose, called the Commissioners of Woods, Forests, and Land Revenues. See WOODS AND FORESTS.

CROWN POINT, a post village in the state of New York, on the west side of Lake Champlain, about 75 miles north of Albany. Being within the basin of the St. Lawrence, it formed part of French Canada. With the view of bridling the English on the south, it was made the site of a fort famous in the American war, but of which the ruins only now remain. The immediate neighborhood is now a township of about 3000 inhabitants.

CROWN SOLICITOR, the solicitor to the Treasury, who, in state prosecutions in England, acts as solicitor for the crown in preparing the prosecution. In Ireland, there are crown solicitors attached to each circuit, whose duties correspond in some degree to those of the Procurators-fiscal (q. v.) and Crown Agent in Scotland. See CROWN. In England, there are no analogous officers, and prosecutions are consequently conducted by solicitors appointed either by the parish, or by private parties bound over by the magistrates to prosecute. But in cases of great importance to the public, such as unusual or monstrous crimes, it is of frequent occurrence that the Solicitor to the Treasury takes charge of the case and instructs counsel.

CROWN-WORK, in Fortification, is formed to strengthen a weak front, or to occupy ground which might facilitate the enemy's operations. It consists of two faces inclined to each other



at an angle, with a bastion in the middle, and half-bastions at the two ends; and it is connected with the main body of the work by two long sides. One form of C. is shown in the annexed cut, where RMNPS is the C., in front of and protecting the ravelin O. Both of these works are entirely beyond the main ditch of the place, but each has also a ditch of its own.

CROW'S-FEET, in Siege Operations. See CALTHROP.

CROW-STONE, the top stone of the gable-end of a building. See CORBIE STEPS.

CROY'DON (Fr. *croie dune*, chalk-hill), a town in the north-east of Surrey, on the London and Brighton Railway, 10¼ miles south of London Bridge. It lies on the edge of the chalk and plastic clay, near the Banstead Downs, at the source of the Wandle. C. was one of the first towns in England to grapple effectually with the question of the economical disposal of town-sewage. In 1868, owing to the rapid growth of the town, new waterworks were completed. The water, which is of great purity, is obtained from an Artesian well. There are 7 railway stations at C., from which about 200 trains are despatched daily. Pop. (1881) 78,947. The Archbishops of Canterbury had a palace here till 1750. This palace is now a factory, and the summer seat of the archbishops is now at Addington, 4 miles east of Croydon. About a mile from C. is Addiscombe House, at one time the residence of the first Earl of Liverpool, but purchased by the East India Company in 1809. When enlarged by other buildings, it became a Military Academy, at which cadets were educated for the artillery and engineer services of the Company. At a later date, the infantry cadets also received their professional education there. In 1858, when the government of India was transferred from the Company to the Crown, Addiscombe Academy was transferred in like manner, and became the Royal Military College. This college no

longer exists; the buildings were demolished in 1863; and the site has been covered with streets of villas. C. has one of the finest Gothic churches in the country.

CROZE'T ISLANDS, a volcanic group to the south of the Indian Ocean, lie between Kerguelen's Land on the east and Prince Edward's Islands on the west, about midway between Patagonia and New Zealand. The most easterly link of the chain is in lat. 46° 27′ S., and long. 52° 14′ E.

CRU'CIAN (*Cyprinus carassius*), a fish of the same genus with the Carp (q. v.) from which it differs in the want of barbules at the mouth, in the much greater depth of body, and in the almost square tail. It attains a considerable size. It inhabits lakes, ponds, and slowly flowing rivers, in the north of Europe and of Asia. It is called *Karussa* in Sweden. It exists in the Thames, although rare, and is called the *German Carp*, but has perhaps been introduced. It is an excellent article of food. The introduction of the C. into some of the waters of the northern parts of Britain seems particularly desirable.

Crucible.

CRU'CIBLES are vessels employed for the heating and fusing of glass, metallic ores, &c., and are generally made of materials capable of resisting high temperatures, such as fire-clay, black-lead, porcelain, platinum, and silver.

CRU'CIFIX (Lat. *crux*, the cross, and *figo*, I fix), a cross with the effigy of Christ fixed on it. The principal C. in Roman Catholic churches stands in the center of the high-altar. It overtops the tapers, and is only removed at the elevation of the host. In well-appointed churches, the altar crucifix is generally either of gold or silver. Crucifixes are used in Lutheran churches, and in Prussia they are often made of Berlin iron. The C. first began to take the place of the plain cross in the time of Constantine, but it was never publicly acknowledged by the Greek Church, and did not come into general use in the East till towards the end of the 8th century. It was not till the Carlovingian age that it became general in the Latin Church. On the earlier crucifixes, Christ is represented as alive, with open eyes, and generally clad, and fastened with four, not three nails. We offer a representation of an ancient form of C., with the body of Christ clothed, and four nails as fastenings, also the glory or nimbus round the head.—Fairholt's *Dictionary of Terms of Art*. In later times, all these circumstances varied. Christ was often represented as dead, naked, except a cloth round the loins, and fastened with three nails; i. e., the two feet fastened together by one nail. The earlier artists usually represented the figure of Christ as haggard, and his countenance as sorrowful to the last degree; but latterly the custom was introduced of representing him as the ideal of human beauty, and of throwing into his countenance an expression of rapture and heavenly joy. See CROSS.

CRUCI'FERÆ (Lat. cross-carrying), an important natural order of exogenous plants, including about 1600 known species, and corresponding to the class *Tetradynamia* of the Linnæan system. See BOTANY. The flowers have a calyx of four sepals, which fall off after flowering; and a corolla of four petals, which are placed in the form of a cross—whence the name C.—and alternate with the sepals. There are six stamens; four long ones in opposite pairs, and two short ones between the pairs of long ones. The ovary is superior and there are two stigmas. The fruit is either long and podlike (a *silique*), or a short and roundish *pouch* (*silicule*); one-celled or (usually) spuriously two-celled, by the parietal placentæ (see PLACENTA) meeting in the middle, and forming a kind of Dissepiment (q. v.); and contains either one seed, or many in a single row. Linnæus divided his class *Tetradynamia* into the orders *Siliquosa* and *Siliculosa*, according to the form of the fruit, and these may also be regarded as forming sub-orders of this natural order; but another division has more recently been adopted, founded on the character of the Cotyledons (q. v.); and the manner in which the radicle is folded upon them (cotyledons *accumbent*, *incumbent*, or *conduplicate*). The general character of the order is antiscorbutic and stimulant, with more or less acridity. It contains many plants extensively cultivated for the food of man and of domestic animals, or valuable in medicine, as Kale (Cabbage, Cauliflower, Broccoli, Colewort, &c.), Turnip, Rape, Radish, Cress, Horse-radish, Scurvy Grass, Mustard, Sea-kale, Gold of Pleasure, &c. The dye-stuff called Woad is produced by a plant of this order. It includes also a number of garden-flowers highly esteemed for their beauty and fragrance, as Wallflower, Stock, Rocket, &c.

The pungency and acridity of the C. seems to depend on a volatile oil, or on different volatile oils of very similar character, present in very various degree in different species, or in the same species under different circumstances, and in different parts of the same plant. This diversity is very well illustrated in the common turnip; in the different qualities of the root, as to sweetness and acridity, in different soils or seasons, and in the difference between the flesh and the rind. The seeds of the C. contain a fixed oil, which is extracted from some (Rape, Colza, in Europe; *Myagrum sativum* and *Erysimum perfoliatum* in Japan), to be used as a lamp-oil and in the arts, and the oil-cake is valuable for feeding cattle. The plants of this order belong mostly to the temperate parts of the world, and particularly abound in Europe. Comparatively few are found within the tropics.

CRU'DEN, ALEXANDER, was born at Aberdeen, 31st May 1700, and educated at Marischal College, with a view to the church, but having exhibited decided symptoms of insanity, he was for some time placed in confinement. On his release, he left Aberdeen, and after spending several years as a tutor, settled in London in 1732, first as a corrector of the press, and afterwards as a bookseller. In 1737, appeared his *Complete Concordance of the Holy Scriptures of the Old and New Testament*, a really great work, which has laid divines especially under deep obligations to the laborious author. The book was dedicated to Queen Caroline, who graciously promised to 'remember him,' but unfortunately died a few days after. C. now relapsed into insanity, and his friends were obliged to remove him to a private asylum, where he appears to have been harshly treated. On his recovery, he published an account of his sufferings. For the next fifteen years he acted as a corrector of the press, but, in 1753, he had again to be put under restraint, but only for a few days. C. now believed himself divinely commissioned to reform the manners of the world, and styled himself Alexander, *the Corrector*. He went about the country exhorting the people to keep holy the Sabbath day, &c. He also petitioned the king for the honor of knighthood, and the parliament to constitute him by act, 'the Corrector of the People,' hoping by such honors to influence the people more effectually. Several other foolish things were done by C. in the course of his life, but he also performed many virtuous and benevolent actions which shed a pleasing light over his melancholy career. C. died at Islington, November 1, 1770. There have been many editions and abridgments of C.'s Concordance published both in Britain and America. One of the best known is that of Chalmers (London, 1812; 10th ed. 1824).

CRUI'KSHANK, GEORGE, one of the most gifted of English pictorial satirists, was born in London, Sept. 27, 1792. His father was a native of Aberdeenshire, and the son of a person who had fought for Prince Charles Stuart at Culloden. C. at first thought of the stage as a profession; but some of his sketches having come under the notice of a publisher, he was induced to engage in the illustration of children's books and songs. When about twenty years of age, a publication, called *The Scourge*, afforded scope for the display of his satiric genius, and from that time forth he continued to pursue with remarkable success this his true vein. His illustrations for Mr. William Hone's political squibs and pamphlets attracted much attention, and sent some of them through no less than fifty editions. But these political caricatures, many of which were personal, were not altogether to C.'s taste. Nor, indeed, in this narrow party field did he find verge enough for the full exhibition of his rich fund of humor and the depths of moral sarcasm.

He consequently abandoned this style about 1824. In *Points of Humor*, and the designs for *Grimm's German Tales*, *Tom Thumb*, *Peter Schlemihl*, *Punch and Judy*, *My Sketch-book*, *Boz*, *Oliver Twist*, and the *Comic Almanac*, his comic genius first found ample manifestation; while in his *Sunday in London*, his *Gin-shop*, *The Upas Tree*, and especially *The Bottle*, he showed himself a moral teacher possessed of a grim Hogarthian earnestness and force. *The Bottle* consisted of a series of eight large-sized plates representing the various stages in a drunkard's career; and through temperance societies, and its own merits, the work has had an enormous circulation. As a water-colorist he left work marked by masterly and delicate skill. In his late years C. devoted himself to oil-painting, and in this province showed perhaps more humor, fervour, and inventive ability than artistic power (see his *Life* by Blanchard Jerrold, 1882). Several of his oil-paintings have been popular and have been engraved—as 'A Run-away Knock,' 'Disturbing the Congregation,' and 'The Worship of Bacchus.' The list of his works amounts to 5500. He died 1st February 1878.

CRUI'SER is a small war-vessel, employed chiefly in watching an enemy by sailing about in a suspected latitude, or in any other defined portion of sea.

CRUITHNE' (Lat. *Cruithnii*, *Cruthini*), the name given, from the 6th to the 9th c., to a people who inhabited the southern half of the county of Antrim, and the greater part of the county of Down, and at one time established themselves also in the county of Meath, in Ireland. They were otherwise called Dalaradians, and their country, Dalaradia. Their name of C. is supposed to be derived from the Celtic *cruit*, color, and to have been applied to them because they painted or tattooed their skins. It is the name by which the Irish called the Picts of Britain, of whom, indeed, the Irish C. are believed to have been a branch. See DALARADIA and PICTS.

CRUIVES AND ZAIRES are contrivances erected upon rivers in Scotland for the purpose of catching salmon. They are of great antiquity, and consisted of a 'kind of hedge formed by stakes driven into the ground, the interstices being filled with brush, and the mode of catching salmon being similar to those employed by bag and stake nets;' the earliest statute now in force, the 11th of the first parliament of James I. (1424), being entitled, 'Of Cruives, Zaires, and Satterdaies Slop.' This act is interpreted by 1477, c. 73, 'Anent cruives,' and both acts refer to an 'old statute made by King David,' requiring that 'ilk heck of the foresaidis cruves be three inch wide.' The existing arrangement, by which the stakes or hecks which prevent the passage of the larger fish must be so far apart as to permit the young salmon or fry to pass through freely, is thus as old as the time of the great founder of our Scottish monasteries and cathedrals. The Saturday's slop or opening is effected by drawing up the hecks to the height of an ell from the bottom of the river in which position they must remain from Saturday evening at sunset till Monday morning at sunrise. C. and Z. are prohibited in those parts of the river in which the tide ebbs and flows. The Fisheries Act of 1862 left the law regarding C. untouched. See SALMON.

CRUSA'DES is the name given to the religious wars carried on during the middle ages between the Christian nations of the West and the Mohammedans. The first of these was undertaken simply to vindicate the *right* of Christian pilgrims to visit the Holy Sepulchre. On the conquest of Palestine, however, the *object* of the C. changed, or at least enlarged, and the efforts of the subsequent crusaders were directed to the rescue of the whole land from the Saracens, who had repossessed themselves of it. From an early period in the history of the Church, it was considered a pious act to make a pilgrimage to the Holy Sepulchre, and to visit the various spots which the Saviour had consecrated by his presence. When Palestine was conquered by the Arabs in the 7th c., that fierce but generous people respected the religious spirit of the pilgrims, and allowed them to build a church and a hospital in Jerusalem. Under the Fatimides of Egypt, who conquered Syria about 980 A.D., the position both of the native Christian residents and of the pilgrims became less favorable; but the subjugation of the country, in 1065, by brutal hordes of Seljuk Turks from the Caucasus rendered it intolerable. These barbarians, but recently converted to Mohammedanism, were nearly as ignorant of the Koran as of the Scriptures. They hardly knew their fellow-religionists, and are said to have wreaked their vengeance on the Mussulmans of Syria, as well as on the Christians. The news of their atrocities produced a deep sensation over the whole of Christendom. The first to take alarm were, naturally enough, the Byzantine monarchs. In 1073, the Greek emperor, Manuel VII., sent to supplicate the assistance of the great pope, Gregory VII., against the Turks, acompanying his petition with many expressions of profound respect for his Holiness and the Latin Church. Gregory—who beheld in the supplication of Manuel a grand opportunity for realizing the Catholic unity of Christendom—cordially responded; but circumstances prevented him from ever carrying the vast designs which he entertained into execution, and the idea of a crusade died gradually away. It was, however, revived by his successor, Urban II., an able and humane man, whose sympathies were kindled by the burning zeal of Peter the Hermit, a native of Amiens, in France, who had made a pilgrimage to the Holy Land, witnessed the cruelties perpetrated by the Turks, and was now traversing Europe, preaching everywhere to crowds in the open air, and producing the most extraordinary enthusiasm by his impassioned descriptions of how pilgrims were murdered, robbed, or beaten, how shrines and holy places were desecrated, and how nothing but greed restrained the ruffian Turks (who made the Christians pay heavy taxes for their visits to Jerusalem) from destroying the Holy Sepulchre, and extirpating every vestige of Christianity in the land.

As soon as the feelings of Europe had been sufficiently heated, Urban openly took up the question. Two councils were held in 1095. At the second, held at Clermont, in France, a crusade was definitely resolved on. The pope himself delivered a stirring address to a vast multitude of clergy and laymen, and as he proceeded, the pent-up emotions of the crowd burst forth, and cries of *Deus vult* (God wills it) rose simultaneously from the whole audience. These words, *Deus vult*, by the injunction of Urban, were made the war-cry of the enterprise, and every one that embarked in it wore, as a badge, the sign of the cross; hence the name *Crusade* (Fr. *croisade*, from Lat. *crux*, a cross).

First Crusade.—From all parts of Europe, thousands upon thousands hurried at the summons of the pope to engage in the holy war. 'The most distant islands and savage countries,' says William of Malmesbury, 'were inspired with this ardent passion. The Welshman left his hunting, the Scotchman his fellowship with vermin, the Dane his drinking-party, the Norwegian his raw fish.' It is said that in the spring of 1096 not less than 6,000,000 souls were in motion towards Palestine. This, however, must be a huge exaggeration. What we do know positively is, that previous to the setting out of the great hosts of European chivalry, four armies—if disorderly and anarchic multitudes, the mere dregs and refuse of Christendom, deserve that name—amounting in all to 275,000 persons, had departed for Palestine. The first consisted of 20,000 foot, and was commanded by a Burgundian gentleman, Walter the Penniless. It marched through Hungary, but was cut to pieces by the natives of Bulgaria, only a few, among whom was Walter himself, escaping to Constantinople. The second, consisting of 40,000 men, women, and children, was led by Peter the Hermit. It followed the same route as its predecessor, and reached Constantinople greatly reduced. Here the two united, crossed the Bosporus, and were utterly defeated by the Turks at Nice, the capital of Bithynia. A third expedition of a similar kind, composed of 15,000 Germans, led by a priest named Gottschalk, was slaughtered or dispersed in Hungary; which also proved the grave of the *fourth*, a terrible horde, consisting of about 200,000 wretches from France, England, Flanders, and Lorraine, who had swept along through Germany, committing horrible ravages, especially against the Jews, whom they murdered without mercy. *Now*, however, the real crusaders made their appearance: the gentry, the yeomanry, and the serfs of feudal Europe, under chiefs of the first rank and renown. Six armies appeared in the field, marching separately, and at considerable intervals of time. Their respective leaders were Godfrey of Bouillon, Duke of Lorraine; Hugh the Great, Count of Vermandois, and brother of Philippe, king of France; Robert Curthose, Duke of Normandy, the son of William the Conqueror; Count Robert of Flanders; Bohemond, Prince of Tarentum, son of the famous Guiscard, under whom was Tancred, the favorite hero of all the historians of the crusade; and lastly, Count Raymond of Toulouse.

The place of rendezvous was Constantinople. The Greek emperor, Alexius, afraid that so magnificent a host—there were in all not less than 600,000 men, exclusive of women and priests—might be induced to conquer lands for *themselves*, cajoled all the leaders, excepting Tancred and Count Raymond—into solemnly acknowledging themselves his liegemen. After some time spent in feasting, the crusaders crossed into Asia Minor (accompanied by the unfortunate Peter the Hermit). Here their first step was the siege and capture of Nice, the capital of Sultan Soliman, 24th June 1097. This monarch was also defeated by Bohemond, Tancred, and Godfrey, at Dorylæum. Baldwin, brother of Godfrey, now crossed into Mesopotamia, where he obtained the principality of Edessa. After some time, the crusaders reached Syria, and laid siege to Antioch. For seven months the city held out, and the ranks of the besiegers were fearfully thinned by famine and disease. Many even brave warriors lost heart, and began to desert. Melancholy to relate, among the list of cowards was the poor enthusiast who had planned the enterprise. Peter was actually several miles on his way home when he was overtaken by the soldiers of Tancred, and brought back to undergo a public reprimand. At length, on the 3d of June 1098, Antioch was taken, and the inhabitants were massacred by the infuriated crusaders, who were in their turn besieged by an army of 200.000 Mohammedans sent by the Persian sultan. Once more famine and pestilence did their deadly work. Multitudes also deserted, and escaping over the walls, carried the news of the sad condition of the Christians back to Europe. But again victory crowned the efforts of the besieged. On the 28th June 1098, the Mohammedans were utterly routed, and the way to Jerusalem opened. It was on a bright summer morning (1099) that 40,000 crusaders, the miserable remnant of that vast array which two years before had laid siege to Nice, obtained their first glimpse of Jerusalem. The emotion was intense, the scene sublime. On the 15th of July, after a siege of rather more than five weeks, the grand object of the expedition was realized. Jerusalem was delivered from the hands of the infidel. Eight days after the capture of the city Godfrey of Bouillon was unanimously elected king of Jerusalem. His kingdom, at first comprising little more than the mere city of Jerusalem, was gradually extended by conquest until it included the whole of Palestine. A language resembling Norman French was established, a code of feudal laws drawn up—Jerusalem was erected into a patriarchate, and Bethlehem into

a bishopric. The best part of Asia Minor was restored to the Greek empire, while Bohemond became Prince of Antioch. For nearly fifty years, the three Latin principalities or kingdoms of the East—Edessa, Antioch, and Jerusalem—not only maintained themselves against the attacks of the Mohammedans of Egypt and Syria, but greatly increased in size, power, and wealth. At Jerusalem were founded the two famous orders of the Knights Hospitallers of St. John and the Knights Templars.

Second Crusade.—In 1144, the principality of Edessa was conquered by the Emir of Mosul, and the Christians slaughtered. His son, Noureddin, advanced to destroy the Latin kingdom of Syria, and Palestine. Europe once more trembled with excitement. A second crusade was preached by the famous St. Bernard, Abbott of Clairvaux, in Champagne; and early in 1147 two enormous armies, under the command of Louis VII., king of France, and Conrad III., emperor of Germany, marched for the Holy Land. Their united numbers were estimated at 1,200,000 fighting-men. The expedition, nevertheless, proved a total failure. The Greek emperor, Manuel Commenus, was hostile; and through the treachery of his emissaries, the army of Conrad was all but destroyed by the Turks near Iconium, while that of Louis was wrecked in the defiles of the Pisidian mountains. After a vain attempt to reduce Damascus, the relics of this mighty host returned to Europe.

Third Crusade.—The death-blow, however, to the kingdom of Jerusalem, and the power of the crusaders, was given, not by Noureddin, but by Salah-Eddin, commonly called Saladin, a young Kurdish chief, who had made himself sultan of Egypt, and who aspired to the presidency of the Mohammedan world. He invaded Palestine, took town after town, and finally, in October 1187, compelled Jerusalem itself to capitulate, after a siege of fourteen days. The news of this led to a third crusade, the chiefs of which were Frederick I. (Barbarossa), emperor of Germany, Philippe Auguste, king of France, and Richard *Cœur-de-Lion*, king of England. Barbarossa took the field first in the spring of 1189, but accidentally lost his life by fever caught from bathing in the Orontes. His army, much reduced, joined the forces of the other two monarchs before Acre, which important city was immediately besieged. In vain did Saladin attempt to relieve the defenders; and after a beleaguerment of twenty-three months, the place surrendered. But the crusaders were not united among themselves. Philippe soon after returned to France; and Richard, after accomplishing prodigies of valor, which excited the admiration of the Saracens, concluded a treaty with Saladin, by which 'the people of the West were to be at liberty to make pilgrimages to Jerusalem, exempt from the taxes which the Saracen princes had in former times imposed.' This, as has been previously noticed, was *all* that had been claimed by the *first* crusaders. On the 25th of October 1192, Richard set sail for Europe.

Fourth Crusade.—Crusading unfortunately now became a constituent of the papal policy; and in 1203 a fourth expedition was determined upon by Pope Innocent III., although the condition of the Christians was by no means such as to call for it. It assembled at Venice; but how entirely secular crusading had become, will be seen from the fact, that the army never went to Palestine at all, but preferred to take possession of the Byzantine empire. The leader of this host of *pseudo-crusaders*, Baldwin, Count of Flanders, was seated on the throne of the East in 1204, where he and his successors maintained themselves for fifty-six years.

Fifth Crusade.—This was commanded by Frederick II., emperor of Germany. It began in 1228, and terminated in a treaty between that monarch and the sultan of Egypt, by which Palestine was ceded to Frederick, who, being crowned king of Jerusalem, returned to Europe, leaving his new possessions in a state of tranquility.

Sixth Crusade.—In 1244, a new race of Turks burst into Syria, and once more the Holy Land fell into the hands of these ferocious barbarians. Jerusalem was burned and pillaged. In 1249, Louis IX. of France (St. Louis) headed a crusade against them, but was utterly defeated, and taken prisoner by the sultan of Egypt. By the payment of a large ransom he obtained his liberty, and that of the other prisoners. On his return to Europe, he was regarded as a sort of martyr in the cause of Christ.

Seventh Crusade.—This also was primarily undertaken by St. Louis, but he having died at Tunis in 1270, on his way to Palestine, Prince Edward of England, afterwards Edward I., who had originally intended to place himself under the command of St. Louis, marched direct for Palestine, where his rank and reputation in arms gathered round him all who were willing to fight for the cross. Nothing of consequence, however, was accomplished; and Edward soon returned to England, the last of the crusaders. Acre, Antioch, and Tripoli still continued in the possession of the Christians, and were defended for some time by the Templars and other military knights; but in 1291 Acre capitulated, the other towns soon followed its example, and the knights were glad to quit the country, and disperse themselves over Europe in quest of new employment, leaving Palestine to the undisturbed possession of the Saracens.

Effects of the Crusades.—While we cannot help deploring the enormous expenditure of human life which the C. occasioned, it is impossible to overlook the fact that they indirectly exercised a most beneficial influence on modern society. They secured for humanity certain advantages which it is difficult to see could have been otherwise obtained. M. Guizot, in his *Lectures on European Civilization*, endeavors to show their design and function in the destinies of Christendom. 'To the first chroniclers,' he says, 'and consequently to the first crusaders, of whom they are but the expression, Mohammedans are objects only of hatred; it is evident that those who speak of them do not know them. The historians of the later crusades speak quite differently: it is clear that they look upon them no longer as monsters; that they have to a certain extent entered into their ideas; that they have lived with them; and that relations, and even a sort of sympathy, have been established between them.' Thus the minds of both, but particularly of the crusaders, were partly delivered from those prejudices which are the offspring of ignorance. 'A step was taken towards the enfranchisement of the human mind.'

Secondly, the crusaders were brought into contact with two civilizations, richer and more advanced than their own—the Greek and the Saracenic; and it is beyond all question that they were mightily struck with the wealth and comparative refinement of the East. Thirdly, the close relationship between the chief laymen of the West and the church, occasioned by the C., enabled the former 'to inspect more narrowly the policy and motives of the papal court.' The result was very disastrous to that spirit of veneration and belief on which the church lives, and in many cases an extraordinary freedom of judgment and hardihood of opinion were induced—such as Europe had never before dreamed of. Fourthly, great social changes were brought about. A commerce between the East and West sprang up, and towns—the early homes of liberty in Europe—began to grow great and powerful. The C., indeed, 'gave maritime commerce the strongest impulse it had ever received.' The united effect of these things, again, in predisposing the minds of men for a reformation in religion, has often been noticed. Other causes undoubtedly co-operated, and in a more direct and decisive manner, but the influence of the C. in procuring an audience for Luther, cannot be overlooked by the philosophic historian.

CRUSCA, ACADEMIA DELLA. See ACADEMY.

CRUSHERS, or BRUISERS, are implements used for reducing to small fragments corn, beans, linseed, oil-cake, and other similar hard food of horses, oxen, or hogs, in order that it may be more thoroughly subjected to the action of the gastric juice, and that no part of it may pass through the animal undigested. Seeds which enter the stomach with their husk or outer pellicle unbroken, often resist its powers, so that they contribute nothing to nourishment; and this is the case to a very large extent with corn given to old horses; but mastication is never so perfect, however good may be the condition of an animal's teeth, that the previous crushing of hard food will not be found useful. C. are of different kinds, and those intended for oil-cake are somewhat different from those suitable for grain; but the essential part generally consists of toothed, grooved, or otherwise roughened cylinders, revolving so as to bruise the food either against each other, or against a fixed plate of similar roughness.—CLOD-CRUSHER is the name of an agricultural implement, which may be generally described as a toothed or roughened roller; and will be found noticed, with its uses, in the article ROLLER.

CRUST OF THE EARTH. It having once been believed by geologists that the interior of our globe is in a state of fusion from heat, they have given the name of crust of the earth to the external solid covering. Man has been able to penetrate but a short way into the crust, and he cannot safely reason on his observations made at or near the surface, regarding the condition of the crust to a greater depth than a few miles, at the most ten—all beyond is little more than guess-work. The materials of the crust are not thrown confusedly together, but distinct mineral masses are found to occupy definite spaces, or to exhibit a certain order of arrangement. These may be classified in reference to their origin, as Aqueous or Igneous; or to their age, as Primary, Secondary, and Tertiary. See these heads, and REFRIGERATION OF THE EARTH; also Fisher's *Physics of the Earth's Crust* (1882).

CRUSTA'CEANS (*Crustacea*), a class of articulated animals, agreeing with insects, arachnida, and myriapoda in having articulated limbs; but differing from them in important respects, and particularly from all of them in the adaptation of the organs of respiration to an aquatic life, even those of them which live on land being generally inhabitants of damp places, and breathing by a kind of gills. Some of the lowest and minute aquatic C., indeed, are not provided with gills; but the aëration of the blood is supposed to take place through the surface of the body.

The C. derive their name from the hard armor which in most of them covers the whole body, forming for it that sort of framework

which is sometimes, not very correctly, called an external skeleton; and which, in those of highest organization, is very complex in its structure, and contains a large amount of calcareous matter —carbonate and phosphate of lime, so that it is in its substance intermediate between shell and bone—whilst in many of the lower and smaller kinds it consists principally of *chitine*, and corresponds more nearly in its nature with the integuments of insects. The body of a crustacean is composed of rings (see ARTICULATA), generally twenty-one in number, and the crustaceous covering corresponds with it in this respect; the rings, alike of the body and its armor, being in some cases very distinct, whilst in others some of them in a great measure coalesce or are consolidated together, of which the thorax of a crab affords an excellent example. The first seven rings are regarded as forming the head; the next seven, the thorax; and the remainder the abdomen, corresponding with the head, thorax, and abdomen of insects. The crustaceous covering is considered as a peculiar epidermis, having beneath it a true skin, from which it is an inorganic exudation; and, like the epidermis, it is cast off from time to time, that its place may be supplied anew, as the growth of the animal requires more room for the internal soft parts. In this *moulting*, or casting of the shell, the animal divests itself of its covering not in separate parts, but in one piece, including the coverings of the limbs, and even of the antennæ, although the membranes which connect the hard plates are split and torn.

A period of apparent sickness precedes and agitation accompanies the process; and the thick muscular parts of the limbs of crabs and lobsters become soft and flaccid, so as to be much more easily extricated from their hard coverings. The loss of a limb, which sometimes takes place on such an occasion, and is otherwise a frequent occurrence, is easily repaired, for a new one grows in its stead; but it is a curious circumstance that in order to this reproduction, the limb must be broken off at a particular joint, the second from the body, thus leaving only a short stump; and when a limb is broken elsewhere, the animal exercises the remarkable power of throwing it off by this joint.

The principal organ of locomotion in many C., as in the lobster, shrimp, &c., is the abdomen, terminating in fan-like appendages; by bending the abdomen suddenly down under the thorax, they dart *backwards* in the water. The limbs—which are connected with the thoracic rings—are, in some, organs of swimming; those of others are used for walking at the bottom of the water or on dry ground. Some have what are called *false legs* or *pro-legs* attached to the abdomen, often very different from the thoracic legs. The legs of some are fitted for burrowing. The first pair of legs is not unfrequently transformed into a pair of powerful claws or pincers —the last joint but one being prolonged so as to oppose the last joint, which becomes attached as to the side of it; and these are used for seizing and tearing food. The limbs of the first thoracic rings are, in many C., organs still more intimately connected with the mouth, and have received the name of foot-jaws, the transition from the true mandibles and maxillæ to the organs of locomotion being often very gradual. The mouth of some small parasitic C. is, however, formed for sucking, and not for tearing and masticating food. The digestive organs are very simple in all; there is a short but capacious gullet, a large stomach, and a straight and simple intestinal tube. The pyloric region of the stomach, however, is furnished with a remarkable apparatus of hard tubercles or sharp teeth for grinding or tearing food, supplementary to the external organs of the mouth. Almost all of the C. feed on animal food, and they are very voracious. A few feed on vegetable food. The nervous system of C. agrees generally with that of insects, and exhibits many gradations of division and concentration. C., in general, appear to possess all the five senses. Their eyes are either simple (stemmatic) aggregate (consisting of several stemmata under a common cornea), or compound. The compound eyes are often on foot-stalks. The gills are variously placed; in the internal cavity, under the *carapace*—the enlargement of the plate of a single ring, which covers the thoracic rings in crabs, &c.; on the thoracic limbs; on the abdominal or false legs, &c. The heart is always in the middle line, and distributes the blood by arteries through the system; but the blood returns to venous *sinuses*, from which it is sent into the gills, and thence to the heart again. The sexes are distinct in most of the C.; and they are all oviparous.

The Crustacea are one of the most instructive of all groups to the comparative anatomist, on account of the extraordinary degree of differentiation, sometimes progressive, sometimes retrogressive—which they exhibit from the primitive segmented type. Their development is if possible even more remarkable, frequently exhibiting a series of metamorphoses rivaling in completeness those of insects, almost in all cases leading back to a single primitive unsegmented six-limbed form, the *Nauplius* embryo (fig. 1), and furnishing the ultimate key to the affinities of the group. Thus the free-swimming copepod cyclops and its numerous parasitic relatives, the branchiopods, the 'multivalve' cirripedes, and barnacles, the ancient Silurian trilobites, and even some of the highest forms (Decapoda), leave the egg as nauplius. The prawn *Penæus* leaves the egg as a *nauplius*, molts into a *cyclops* form, thence into a *schizopod* stage, and finally assumes its adult state; while the crab quits the egg in a *cyclops* state. The so-called *Zoea*,

Metamorphoses of the Crab:
1, young crab, or *Zoea*, magnified; 2, young crab, in prawn stage, magnified; 3, prawn stage, natural size; 4, young crab, in more perfect form, magnified; 5, young crab, natural size.

fig. 1, thence passes at once into the prawn stage, fig. 2, and finally into the adult form, the developmental history being here much more condensed.

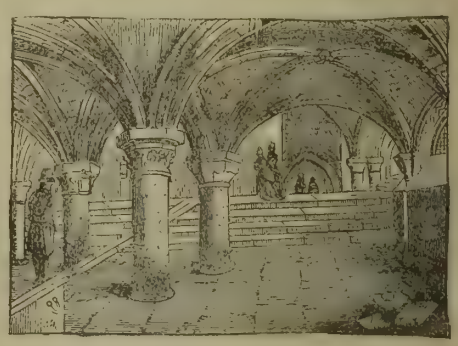
The great majority of C. are marine; some belong to fresh water and a few are terrestrial. For an outline of the classification of the group, See ZOOLOGY (under Arthropoda), also articles on CRAB, LOBSTER, CRAYFISH; and Huxley, *The Crayfish;* (Int. Sci. Series); Huxley, *Anat. of Invert. Animals;* and Muller, *Facts and Arguments for Darwin.*

CRUYS, CORNELIS, the founder of Russian maritime power, was born June 14, 1657. He was a rear-admiral in the Dutch service, when, in 1698, Peter the Great persuaded him to become vice-admiral in Russia. To C. Russia owed its first dockyards, canals, and charts, the organization of its navy, and its victories over Sweden and Turkey in 1708—1710. After a short period of disgrace, C. was received back to favor. He died in 1727, possessor of an imperial domain in Kexholm, and owner of the island Biiken in Finland.

CRY'OLITE is a double fluoride of aluminium and sodium (NaF,Al_2F_3), and is important as a source of the metal Aluminium (q. v.).

CRYO'PHORUS (Gr. *kryos*, cold, and *phero*, I carry) is an instrument consisting of a glass tube with a bulb at both ends. A little water is present in one of the bulbs, and when the second bulb, containing only water-vapor, is placed in a freezing mixture, the vapor condenses, which causes more vapor to rise from the water in the first bulb. The result of this vaporation from the first bulb is the abstraction of much heat, and ultimately the remaining water passes into a frozen state.

CRYPT (Gr. *krypto*, I hide), a vault under a church, either entirely or partly under ground. Crypts do not generally extend



Crypt of York Cathedral.

beyond the limits of the choir or chancel, and they are often of much smaller dimensions. Crypts were formerly used as chapels, and provided with altars and the other furniture requisite for the celebration of religious services; and they were also very frequently used as places of sepulture. It sometimes happens that a new church has been erected over the C. belonging to the old one. One of the largest crypts in England is that under Canterbury Cathedral; but there are few finer specimens of the C. any-

where than that under Glasgow Cathedral, which has been recently freed from rubbish and restored. Crypts seem to have originated in the customs of the early Christian ages. The tombs of the martyrs were first used as churches; and then churches were built above them.

CRYPTO'GAMOUS PLANTS (Gr. *kryptos*, concealed, and *game*, marriage) are those which have no true flowers, and no known male or female organs of fructification, and whose seeds, called *spores*, consist only of a single cell, and contain no embryo, but germinate indifferently from any point; and which Jussieu therefore designated *Acotyledonous Plants* (q. v.). The name C. P. was invented by Linnæus, and the *Cryptogamia* form a class of his sexual system, very distinct from all the rest. See BOTANY. Many C. P. have no leaves; some have not even a root, and those which are lowest in organization consist only of a single cell. Many are parasitic. Many look as if dead in dry atmosphere, and are revivified by rain. They are the lowest in organization of the vegetable kingdom, and are divided into *Filices* (Ferns), *Marsileaceæ*, *Lycopodiaceæ* (Club-mosses), *Equisetaceæ* (Horse-tails), *Musci* (Mosses), *Hepaticæ*, *Lichens*, *Fungi*, *Characeæ*, and *Algæ*.

CRYPTO'GRAPHY, the art of secret writing, more commonly called the art of writing in cipher (from Arabic *sifr*, void), has been in use from an early date in correspondence between diplomatists and others engaged in important affairs requiring secrecy. In modern times it has been the subject of learned care to Lord Bacon, the ingenious Marquis of Worcester, Dr. Wallis, Bishop Wilkins, Thicknesse, Falconer, Blair, &c. In our own history, it has at no time been in greater requisition than during the civil war, and among the politicians of the 17th century. And even now, when there is happily less need for mystery among our statesmen, the need for a perfectly undecipherable mode of secret communication has again had to be looked for, in order that information may pass by the electric telegraph without being understood by the officials in connection with the apparatus.

One of the most simple methods of C. is to use, instead of each letter of the alphabet, a certain other letter at a regular interval in advance of it in that series. Such was a mode of secret writing used by Julius Cæsar. As a variety upon this plan, the alphabet is used invertedly—*z* for *a*, *y* for *b*, *x* for *c*, and so on. Or, while the first seven letters are represented by the second seven, the next six may be represented by the last six. And many other variations may be adopted. But for all modes like these, there are modes of decipherment far from difficult. It is only necessary, in general, to bear in mind certain peculiarities of the language presumed to be used. Say it is the English. We readily remember that *e* is the most frequent letter; that *ea* and *ou* are the double vowels which most frequently occur; that the consonants most common at the ends of words are *r*, *s*, and *t*; &c. We also know how a single letter must be either the pronoun *I* or the article *a*; how *an*, *at*, and *on*, are the most common words in two letters; how *the* and *and* are the most frequent used words in three letters; &c. By taking advantage of these few obvious principles, a tolerably skilled decipherer will read almost any such piece of cryptographic writing in five minutes. The *Times* newspaper often gives, in its advertising columns, correspondence on delicate subjects, even assignations for elopements, written in this manner, the writers of which are of course little aware how open their secrets thus become to society.

Politicians and important personages conducting affairs of difficulty became long ago sensible of the necessity of using ciphers of greater abstruseness. The celebrated letter of Charles I. to the Earl of Glamorgan, in which he made some condemning concessions (elsewhere denied) to the Catholics of Ireland, was composed in an alphabet of 24 short strokes variously situated upon a line. Other letters by the same monarch are to appearance a mere series of numbers of two and three figures, divided by semicolons. In such cases, it was necessary that the two parties in the correspondence should have previously concerted what words each number was to represent. Bacon devised what he thought a not easily penetrable cipher, in which he employed only *a* and *b*, arranging each of these, in groups of five, in such collocations as to represent all the 24 letters.

Thus *aabab ababa babba* conveyed the word *Fly*. The great philosopher thought that preconcertment would here be necessary; but in reality any clever modern decipherer would have found no difficulty in reading any long letter composed in such a manner. The unfortunate Earl of Argyle, when preparing his expedition against the tyrannical government of James II., used a mode of secret writing which consisted in setting down the words at certain intervals, which he afterwards filled up with other words, making on the whole something intelligible, but indifferent. In our day, such a mode would not have been found proof against the ingenuity of those who have studied the means of decipherment. There are many other modes of secret writing, which it does not seem necessary to detail, as the art has become little more than a matter of curiosity. One of the ablest and amplest treatments of the subject is an article by Dr. William Blair in *Rees's Cyclopædia*. See also *Chambers's Journal*, No. 506 (Second Series), and Nos. 87 and 115.

CRY'STAL ISLANDS. See CORAL ISLANDS.

CRY'STAL PALACE. See SYDENHAM.

CRY'STALLINE ROCKS, a name given to all rocks having a crystalline structure. They are found belonging to every division of the crust of the earth, but are especially abundant in the most ancient azoic rocks; the greater proportion of intruded igneous rocks also possess this structure. When attempting in the laboratory to produce crystals, it is known that the building material must exist in a fluid condition, and this is obtained either by heating to fusion or by solution. It has been asserted that all C. R. have been produced under similar circumstances; and no one can doubt that lavas and more ancient rocks having a similar origin, have assumed this structure while solidifying from a condition of igneous fusion, while rock-salt is as certainly obtained from a saturated solution of salt. There are, however, many rocks, such as some fossiliferous limestones, in which this structure occurs, where it is not possible to conceive of their being in either condition. It is known that crystallization takes place in solid material, as in the axles of railway carriages, or in the crystals of pyrites in the chalk, where the iron has been gathered from the surrounding material while in a solid state. We know not what is the force that induces such a change in solid materials; it may be called metamorphic or molecular action, but these are names that mean nothing, and simply hide our ignorance. That such a force, inducing crystalline structure in amorphous masses, has been and is now at work on the solid strata of the earth, cannot be doubted.

CRYSTALLO'GRAPHY. A crystal is a piece of matter that, by the action of molecular forces, has assumed a definite geometrical form of some kind, with plane faces. There is a great variety of crystalline forms, each form being characteristic of one or more substances; and C. is the science which classifies the forms and shows the relations that subsist among them. The great majority of substances are capable of undergoing the process of crystallization, the exceptions being principally complex organic substances which tend to assume a globular or spherical form approaching that of organized structures. The most favorable condition for the crystallization of any substance is from its solution in water or other liquid. A liquid usually dissolves more of a salt when warm than when cold; and when a warm saturated solution is allowed to cool, a portion of the salt deposits itself in crystals. This process is that which is generally followed in the crystallization of saline substances. A second process resorted to in the case of the metals, such as bismuth, antimony, &c., and sulphur, is to fuse the material in a vessel, and when it is cooled down, so as partially to solidify the mass, the crust is broken through, and the liquid still remaining is poured off, when a net-work of crystals is obtained. A third method is to vaporize the substance, which on condensation resolves itself into crystals. Examples of this class are the formation of snow crystals from the water-vapor in the atmosphere, and the minute black crystals of iodine obtained by allowing its vapor to condense in a cold vessel or on a cold surface.

Many circumstances affect the crystallizing power of substances. Thus, water may be cooled down below its freezing or crystallizing point (32° F.), provided it be kept perfectly still, without becoming solid; but on subsequent agitation, it instantly crystallizes. Similarly, a hot saturated solution of sulphate of soda, or glauber salt, if cooled down in a still place, does not crystallize, but immediately does so when the liquid is agitated, or a fragment of any solid substance is introduced into it. The size of the crystals obtainable from any fluid depends much on the rate of cooling, and the state of commotion of the liquid. The more slowly the solution cools down, and the more quietly the process of crystallization is allowed to proceed, the larger are the crystals obtained; whilst when the liquid is rapidly cooled, and agitation is kept up, the crystals are comparatively small, and generally not completely formed. The reason of this will be at once apparent, for a large crystal is constructed of a multitude of smaller crystals, built up regularly so as to constitute a compound crystal of the same form as the more minute crystalline atoms; and when a liquid is cooled slowly in a state of rest, only a few minute crystals are produced at first, and these are gradually built round on all sides by successive layers, till large, well-defined crystals are the result; while, when the liquid is rapidly lowered in temperature, and especially when agitation is kept up, numerous minute crystals are formed at once, and do not adhere together. In either case, the liquid from which the crystals have separated is called the *mother-liquor*, and is a saturated solution of the salt.

The external forms of crystal amount to several thousands, but they may all be regarded as belonging to six different systems.

The *regular system* (otherwise called the *cubic*, *octohedral*, *tesseral*, *tessular*, *spheroidal*, or *equi-axed system*) is characterized by

having three axes or straight lines passing through the same point, of equal lengths, and placed at right angles to each other. The best illustration of this system is the cube or hexahedron (fig. 1), which has six square faces or planes, and the three equal axes (printed in bold lines) terminate in the center of each of the square faces. The planes or squares are symmetrically arranged, so that each is perpendicular to one axis, and parallel to the other two. The crystals have each six square faces, with twelve equal edges, and eight equal angles. Examples of substance which crystallize in the form of the cube or hexahedron, are—common iron pyrites (FeS_2), common salt, or the chloride of sodium (NaCl), fluor spar (CaF), galena, or the sulphuret of lead (PbS), and the

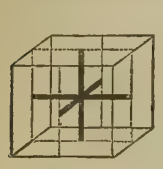


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig 7,

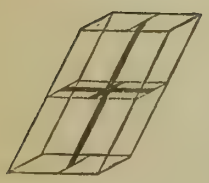


Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

metals gold, silver, platinum, and copper. Another important crystalline form belonging to the regular system is the octohedron (fig. 2), where the terminations of the axes are in the angles of the crystals, as represented in the figure by the bold lines. It has eight faces, all of which are equilateral triangles, and twelve edges, with six angles, each of which has four faces. The diamond (C), alum, zinc-blende (ZnS), sal ammonia C. (NH_4Cl), magnetic iron ore (Fe_3O_4), fluor spar (CaF), and chrome iron ore, are examples. There are various secondary forms belonging to this system, derivable from the cube and octohedron, such as the rhombic dodecahedron (fig. 3), which has twelve faces, and is the form in which the garnet crystallizes.

The *square prismatic system* (known as the *pyramidal, tetragonal*, or *quadratic system*) has three axes placed at right angles to each other, of which two are of equal length, but the third may be longer or shorter. To this belong the *right square prism* (fig. 4), in which the lateral axes terminate in the center of each side face, and the perpendicular axis, is longer than the two lateral axes; and the *right square-based octohedron* (fig. 5), which resembles two pyramids placed base to base, and having eight faces, which form isosceles triangles. Examples of substances which crystallize in this system are—yellow prussiate of potash, native binoxide of tin, zircon, apophylite, calomel, &c.

The *right prismatic system* (otherwise known as the *right rhomboidal*, or *rectangular prismatic system*), is characterized by having three axes, all of unequal or different lengths, but placed at right angles to each other. The *right rhombic prism* (fig. 6), and the right *rhombic-based octohedron* (fig. 7), are forms included in this class, and examples of materials which crystallize in this form are —sulphur, arsenical iron pyrites, nitrate of potash, sulphate of potash, sulphate of baryta (heavy spar), topaz, arragonite, &c.

The *oblique prismatic system* (*oblique rhomboidal*, or *rectangular prismatic*) has three axes, which may be all of unequal lengths, two of which are placed at right angles to each other, whilst the third axis is so inclined as to be perpendicular to one of the two axes, and oblique to the other. To this belong the *oblique rhombic prism* (fig. 8), and the *oblique rhombic-based octohedron* (fig. 9). Many salts crystallize in this form, such as green vitriol (sulphate of iron), borax, sulphate of soda, carbonate of soda, phosphate of soda, realgar (native bisulphuret of arsenic), &c.

The *doubly oblique prismatic system* has three axes of unequal length, which intersect obliquely with each other. The forms are very irregular, which render them very puzzling to make out satisfactorily. Nitrate of bismuth, sulphate of copper, sulphate of manganese, quadroxalate of potash, and pyrotartaric acid, are examples.

The *rhombohedral*, or the regular *hexagonal system*, is known by the presence of four axes, three of which are in the same plane, and incline to each other at an angle of 60°, whilst the remaining fourth axis is perpendicular to the three. To this belong the *regular six-sided prism* (fig. 10), and the *rhombohedron* (fig. 11). Examples of this system are—calcareous spar, ice, quartz or rock crystal, nitrate of soda, beryl, arsenic, antimony, and apatite.

CRYSTALLO'MANCY, a mode of divination by means of transparent bodies, at one time very popular. A precious stone, crystal globe, or other transparent object, was employed, but a beryl was deemed most effective. In using it, the operator first muttered over it certain formulas of prayer, and then gave it into the hands of a youth or virgin—none others were pure enough to discern its revelations—who beheld in it the information required. Sometimes the desiderated facts were conveyed by means of written characters on the crystal; sometimes the spirits invoked appeared in the crystal to answer the questions asked.

CSA'BA, a town of Hungary, 7 miles south-south-west of Bekes. It is well built; some of the houses are even very elegant. It has a trade in grain, wine, and cattle. The women are also noted for their skill in making sacks and mattresses. Pop. of township (1880) 32,616.

CSANA'D, the name of two towns in Hungary, both situated on the Marõs, the one with a pop. of 4000, and the other with a pop. of 5500, who are engaged in agricultural pursuits.

CSAT, or CSATH (MEZO), a market-town of Hungary, near the Theiss, in the district Borsod, and about 15 miles S.E. of Miskolcz. Pop. 5000.

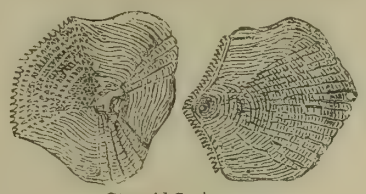
CSERVE'NKA, a town of Hungary, in the county of Upper Bacs, on the Franzens Canal, about 130 miles south of Pesth. Pop., which is German, 7000.

CSOMA DE KORÖS, ALEXANDER, a Hungarian scholar and traveler, whose name in his own language is written Köröse Csoma Sandor, was born about 1790 at Körös in Transylvania, and educated first at the college of Nagy-Enyed, and subsequently at Göttingen, where he devoted himself with great zeal to the study of the Oriental tongues. The dream and inspiration of his boyhood was the hope of one day discovering the original home of his Magyar ancestors, and as he grew up, it became the single thought and passion of his life. In 1820, he set out on his visionary pilgrimage. After a year's interval, his friends got a letter from him, dated Teheran, in which he expressed his conviction that the object of his search would speedily be obtained. Leaving Teheran, he wandered north-east through Little Bokhara, and at length reached Tibet, where he spent about four years (1827—1830) in the Buddhist monastery of Kanam, studying Tibetan. He soon discovered that there was little connection between that language and his native one, but still he hoped to make use of his researches, and set out for Calcutta. Here he learned, to his dismay, that the literature of Tibet was simply a translation from the Sanscrit—a language he might easily have acquired a knowledge of at home. His whole labor seemed to have been in vain. Fortunately for C., the library of the Asiatic Society of Bengal contained upwards of 1000 volumes in Tibetan which no one could catalogue. C. undertook and successfully executed the task. By the great Anglo-Indian scholars, Prinsep, Wilson, and others, he was very generously treated. He next prepared, at the expense of the government, a Tibetan grammar and dictionary (Calcutta, 1834), which was the first really accurate and valuable European work on the subject. It is still a standard treatise, and has been the guide of all good scholars since. C. wrote many articles on Tibetan literature in the *Asiatic Researches*. but still haunted, as of old, by the hope of discovering the early home of the Magyars, he once more set out on an expedition to the western confines of China, but died on the 11th April 1842, at Darjeeling in Sikkim.

CSONGRA'D, a town of Hungary, at the confluence of the Theiss and the Körös, 70 miles south-east of Pesth. The inhabi-

tants, (1880) 17,837 in number, are chiefly engaged in the rearing of cattle, and the cultivation of the vine.

CTE'NOID FISHES, an order of fishes, according to a classification proposed by Agassiz (see FISHES), characterized by *ctenoid* scales, i. e., imbricated scales, generally rounded or ovoid, with teeth or sharp projections on their hinder margin. The name is from the Greek *kteis* (gen. *ktenos*), a comb. The scales of



Ctenoid Scales.

C. F. are horny or bony and unenamelled. There are sometimes numerous rows of teeth or little spines, sometimes only one row, the rows successively wearing off as new ones are formed in the enlargement of the scale. Living C. F. are numerous, fossil ones comparatively few. Perches, flounders, and turbot may be mentioned as examples.

CTENOPHORA, an order of *Actionozoa*, of which the *Beroe* (q. v.) may be taken as the type. See also ACALEPHÆ; and the classification at ZOOLOGY.

CTESI'BIUS, a Greek who lived about 250 years B.C., was born at Alexandria, and was famous for his inventions in mechanics. We owe to him and his pupil Hero Alexandrinus, the pump, the bent siphon, and also the discovery of the elastic force of air, and its application as a motive power.

CTE'SIPHON, now Al-Madain, was a city of Assyria, on the eastern bank of the Tigris, the common winter residence of the Parthian kings, and finally the capital of the Parthian kingdom. Its ruins still attest its former magnificence.

CU'BA, the largest of the Antilles, and most important transmarine possession of Spain, stretches in N. lat. from 19° 50′ to 23° 9′, and in W. long. from 74° 8′ to 84° 58′. It has a length of rather more than 750 miles, and an average width of 50 miles, its area being about 45,700 square miles. It is larger than Ireland, and less than England. The surface is mountainous at the south-east coast, where the Sierra Maestra, rising in some places to an elevation of 8000 feet, runs from Cape de Cruez to Cape de Mayzi. In the central part of the islands there are rugged hilly districts between Santa Clara and Puerto Principe, and also north-west of Trinidad. What remains of the country, although undulating, consists chiefly of well-watered plains, which everywhere support a luxuriant vegetation.

Rocky reefs and muddy shallows beset about two-thirds of the coast. In some localities, however, the sea is deep to the very shore, offering many excellent havens, and those, too, situated on the busiest thoroughfares of the western hemisphere; the chief of these being Havana, the admirable situation of which makes it the emporium of Central America. A somewhat elevated watershed crosses the island in the direction of its length, and as the streams run at right angles to it, they are necessarily short. There is in C. no distinction of dry and rainy seasons, and there are showers every month. Hurricanes are less frequent than in the other West India Islands, but they sometimes do occur, and cause widespread desolation. One which swept over C. in the middle of October 1870, caused the loss of 2000 lives. Another occurred in the end of September 1873. Earthquakes are frequent. The cultivated portions of C. produce in abundance sugar, tobacco, maize, rice, yams, bananas, coffee, and all the products of the tropics; while in the districts left in a state of nature are reared countless herds of cattle. Sugar is, however, the chief product of the island; and all over the western districts the traveler sees vast level or undulating tracts covered with cane fields, and factories employed in crushing, boiling, and refining the sugar.

Since the close of the late American war, the Cuban sugar-trade has been immensely increased, and the quantity exported in good years has recently been valued at the prodigious sum of 15, or even 20 millions sterling. Fifteen per cent. of this sugar goes to England, and seventy-five per cent. to the United States. The exportation of tobacco forms still a large item of the exports from Cuba. The chief imports consist of flour, salted fish, manufactured goods, hardware, machinery.

The enormous development of Cuban commerce cannot be accounted for either by the enterprise of the inhabitants or to good government—and least of all to the latter, for the Spaniards have done nothing for C. but to make it supply Madrid with the largest possible revenue. It is due to the great demand for sugar in America, and the monopoly C. now enjoys of slave-labor.

The population of C. in 1877 was 1,394,516; in 1872 it was 1,370,211, of whom 730,750 were whites, about 34,000 Chinese and Hindu coolies, and 605,461 blacks. Of the blacks, 225,938 were free, and 379,523 were slaves. Of the whites, about 600,000 were creoles, or natives of the island; while 120,000 were 'peninsulares,' or natives of Spain. The slaves of pure blood alone have the strength necessary to do the hard work of the sugar estates, and the prosperity of the island is dependent on them. Although the creoles and the 'peninsulares' are of the same origin, the difference between them is most striking. They can be distinguished at a glance in the streets of Havana.

The creoles are feeble and indolent, even when they are children of parents born in Spain. The Cuban Spaniards, on the other hand, are a sturdy and energetic body of men. Recruited from the north-eastern parts of Spain, they go to C. as adventurers, chiefly to find employmennt as traders and mechanics, but obtain the greater share of the wealth of the island. There are upwards of 200,000 adult male creoles, and half that number of Spanish Cubans; but the latter—all men—through the large volunteer force, which they almost exclusively recruit, and the favor of the Spanish government, which distrusts the creoles, have absolute control over the government of the island, which is administered in a manner scandalously unjust. They treat the creoles with a scorn and contempt only exceeded by the hatred, mixed with fear, with which the latter regard the dominant population 'Cuba for the Cubans,' is the watchword of the creoles, whose most anxious desire it is to be rid of the adventurers, who have secured for themselves the best share of the wealth of the island. If they could secure this object, they believe that even with emancipation they would be in a better position than now, and accordingly they manifest sympathy for the negroes, and join with them in opposition to the 'peninsulares.'

C. is divided into three intendencias—the western, middle, and eastern. In the first, there were (1872) upwards of a million of inhabitants. It includes Havana with 200,000 inhabitants, Matanzas with 36,000, Cardenas with 13,000, and several other towns connected by railways. The middle division, which extends eastward to the north-east corner of the Great Bay and the Boca de Nuevitas, has only a population 75,000, 30,000 of whom live in the capital, Puerto Principe. The eastern division has 249,000 inhabitants; the capital is Santiago, with a population of 37,000. The chief towns of the western division are connected by railways, and it is well settled and prosperous, the great sugar factories and tobacco plantations, which constitute the wealth of the island lying there. The middle and eastern divisions are very partially cultivated, and, owing to civil war, are becoming much less productive than they were. Many of the landowners of the eastern part of the island have sold their slaves to those of the Havana district, and have migrated to Jamaica and the United States.

In 1492, C., which is often spoken of as the 'Pearl' or 'Queen of the Antilles,' was discovered by Columbus during his first voyage. In 1511, the island began to be permanently colonized, becoming, within ten years, the base of all the various operations against Mexico.

While, in the first quarter of the present century, every continental portion of Spanish America established its independence, C. remaining, like Puerto Rico, faithful to the mother-country, largely profited by the intestine broils of the revolted provinces, for, when the old Spaniards were expelled in mass from the mainland, many of them naturally took refuge in the still loyal islands, enriching them with their capital, and energy, and skill. C. has long been coveted by other nations. In 1762, Havana was captured by a British armament, but was restored in the following year. During the present age, the island has been an object of cupidity to the United States—a cupidity checked more powerfully by jealousy on the part of France and England than by Spain's own resources; and, in fact, it has been twice attacked—in 1850 and 1851—by individual Americans without success. They were commanded by a Spaniard of the name of Lopez, who, being taken prisoner, was executed as a traitor. The termination of the American war had an unexpected effect on the position of C. The island has been coveted because it was the only market from which slaves could be imported into the southern states, and this trade was at an end. This was not, however, the only effect of the war. It destroyed the production of sugar in the southern states, and C. supplied the want. Great interests were created in New York, which favored the perpetuation of slavery in C., and its existence as an independent state, or a dependency of a foreign power, became more desirable for the Americans than its annexation. The Spanish revolution of 1868, when Queen Isabella was driven from the throne, effected another change in Cuban politics. The Madrid ministry, in 1870, passed a measure known as the Moret law, from Senor Moret y Prendergast, the colonial minister at the time, which declared that every slave at the age of 60 should become free—and emancipated all the unborn offspring of slaves. This law never was enforced, its publication even having been prohibited by the 'peninsulares;' and the Madrid government have never been in a position to enforce it or any other measure which meets the disapproval of the 'loyal party' in Cuba. Instead of

doing so, it has accepted their alliance, and aided them by sending troops to crush the creole and negro insurrection, which broke out in 1868. The struggle was carried on with varying success, and often with unexampled ferocity, for eleven long years. It was not till the end of 1879 that the authorities, partly by military energy, partly by terms of compromise, succeeded in quelling the rebellion. Pardon was offered to rebels laying down their arms, and restoration of confiscated property. See *The Pearl of the Antilles*, by A. Gallenga (Lond. 1873). For a picturesque description of Cuban life and manners, see another work also called *The Pearl of the Antilles*, by W. Goodman (1873). See also *The Mambiland*, by James J. O'Kelly (1874).

CUBA'GUA, an island in the Caribbean Sea, off the north-east coast of Venezuela in South America, is situated in the department of Maturin, between Margarita and the mainland, about 30 miles north of the town of Cumana.

CUBE, a solid with six square faces, each of which is parallel to the one opposite to it. It is a form of frequent occurrence in nature, especially among crystals. See CRYSTALLOGRAPHY. In arithmetic, the C. of a number is the product of its multiplication three times by itself. This use of the term arises from the circumstance that the solid contents of a C. may be expressed by the third power of the number which expresses the length of one of its edges. Thus, if the edge of a C. be a line of 4 inches, its solid contents are equal to 64 cubic inches. Conversely, the C. root of a number is that number, which, multiplied three times by itself, produces the first number. See DOUBLING THE CUBE.

CU'BEBS, or CUBEB PEPPER, the dried berries of *Cubeba officinalis* and other species of *Cubeba*, a genus of climbing shrubs of the natural order *Piperaceæ*, very closely allied to the true peppers, but distinguished at once by the contraction and elongation of the berries at the base, so that they appear to be stalked, upon which account C. are sometimes called *Piper caudatum*, or tailed pepper. *Cubeba officinalis* is a native of Penang, Java, New Guinea, &c., and is said to be extensively cultivated in some parts of Java. Its spikes are solitary, opposite to the leaves, and usually produce about fifty berries, which are globular, and when dried, have much resemblance to black pepper, except in their lighter color, and the stalk with which they are furnished. *Cubeba canina*, a native of the Sunda and Molucca Islands, is supposed also to yield part of the C. of commerce, and the berries of *C. Wallichii* possess similar properties. C. are less pungent, and more pleasantly aromatic than black pepper; they are used in the East as a condiment, but in Europe chiefly for medicinal purposes; they act as a stimulant, and are sometimes found useful in cases of indigestion, also in chronic catarrhs, and in many affections of the mucous membrane, particularly those of the urino-genital system. C. contain a principle called *Cubebine*, analogous to that contained in pepper (*piperine*). C. appear to have been known in Europe from ancient times. In 1305, Edward I. granted to the corporation of London the power of levying a toll of one farthing on every pound of C. passing over London Bridge.

CUBIC EQUATIONS. A cubic equation containing but one unknown quantity, is one in which the highest exponent of the quantity in any term is 3. Every such equation can be reduced to the general form $x^3 + px + q = o$, in which the coefficient of x^3 is 1, and that of x^2 is zero. Every cubic equation of this form has three roots, all of which may be real, or one only may be real, and the other two imaginary. The roots will all be real, when p is essentially negative, and $\frac{p^3}{27} > \frac{q^2}{4}$ numerically. One root only will be real when p is essentially positive, or when it is negative, and $\frac{p^3}{27} < \frac{q^2}{4}$ numerically. If p is essentially negative, and $\frac{p^3}{27} = \frac{q^2}{4}$, two of the roots are equal. When one of the roots only is real, the equation may be solved by the following formula, known as Cardan's formula:

$$x = \sqrt{-\frac{q}{2} + \sqrt{\left(\frac{q^2}{4} + \frac{p^3}{27}\right)}} + \sqrt{-\frac{q}{2} - \sqrt{\left(\frac{q^2}{4} + \frac{p^3}{27}\right)}}.$$

When the roots are all real, this formula fails to give their values. Methods of solving C. E. are to be found in most books on trigonometry and algebra. They are all troublesome. The reader will find the theory of their solution admirably discussed in Young's *Theory of Equations*. See also EQUATIONS.

CU'BICAL NI'TRE is a commercial name applied to the nitrate of soda ($NaNO_6$). See SODA.

CU'BIT (Lat. *cubitus*), a measure employed by the ancients, equal to the length of the arm from the elbow to the tip of the middle-finger. The C. of the Romans was about 17⅝ inches, and that of the Hebrews 22 inches, but its length is now generally stated at 18 English inches.

CUCKING-STOOL. See DUCKING-STOOL.

CU'CKOO (*Cuculus*), a genus of birds of the order of Climbers (q.v.); the type of a family, *Cuculidæ*, which contains a large number of species, mostly confined to the warmer regions of the globe, although some of them are summer visitants of cold climates. The beak is compressed and slightly arched, and the tail long and rounded, the wings rather long, the tarsi short, two toes directed forwards, and two backwards, the outer hind-toe capable of being brought half round to the front. The feet are thus adapted for grasping and moving about upon branches, rather than for climbing, and the long tail is much used by many of the species for balancing the body, as they hop from branch to branch in the thick tropical woods which they frequent. The name C. is derived from the note of the male of the Common C. (*Cuculus canorus*), which, although monotonous, is always heard with pleasure, being associated with all that is delightful in returning spring.

A similar name is given to the bird in many languages. The C. is a very widely diffused bird; it is found in India and in Africa, and migrates northwards in summer, even to Lapland and Kamtchatka. It appears in Britain in April, and all except the young birds are believed to migrate southwards again before the middle

Common Cuckoo (*Cuculus canorus*).

of August. It frequents both cultivated districts and moors. There is no pairing or continued attachment of the male and female, and the female, after having laid an egg on the ground, deposits it, *with her beak*, in the nest of some other smaller bird, leaving the egg to be hatched and the young one to be fed by the proper owners of the nest.—The egg of the C. is very small for so large a bird, being not larger than the skylark's, and the number she will lay is uncertain; but the young one soon acquires size and strength enough to eject from the nest any eggs which may remain in it, or unfortunate young birds, the true offspring of its foster-parents, and it seems restless and uneasy till this is accomplished. It works itself under them, and then jerks them out by a motion of its rump. Its back at this early age exhibits a peculiar depression between the shoulders, so that an egg or a young bird can easily be got to lie upon it; but this depression soon disappears, and along with it the singular instinct with which it is supposed to be connected. The hedge-sparrow, the yellow-hammer, the pied wagtail, and the meadow pipit, are among the birds most frequently selected by the C. as its substitutes in incubation and the care of its young. A pair of meadow pipits usually accompany the cuckoo wherever it goes. The reason of this curious fellowship has not been ascertained.—Among the *Cuculidæ* of North America, one of the most interesting is the Yellow-billed American C., sometimes called from its note the *Cow-cow* or *Cow-bird* (*Coccyzus Americanus*). It is among the rarest of British birds. It does not lay its eggs in the nests of other birds, but builds and hatches for itself—exhibiting, however, a remarkable peculiarity in laying its eggs at such long intervals, that a very evident difference of age appears among the young in the same nest.

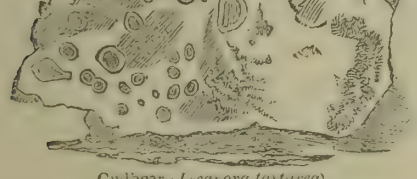
CU'CUMBER (*Cucumis*) a genus of plants of the natural order *Cucurbitaceæ*. The COMMON C. (*C. sativus*), distinguished by heart-shaped, acuminately pentangular leaves, which are rough with hairs approaching to bristles, and oblong fruit is a native of the middle and south of Asia, and has been cultivated from the earliest times. Its fruit forms an important article of food in its native regions, south of Europe, &c., and an esteemed delicacy in colder countries, where it is produced by the aid of artificial heat. Many varieties are in cultivation, with fruit from four inches to two feet long, rough, smooth, &c. Young cucumbers are much used for pickling, and are called *gherkins*. The C. is cultivated in fields even in the south of England, for the supply of the London market; but in the northern parts of Britain, the aid of a hot-bed is required even to produce fruit fit for pickling. The C. requires a sunny situation, and a free, rich soil.—To this genus belong other species valued for their edible fruit. *C. Anguria* is a West Indian species, with fruit about as large as a pullet's egg, much esteemed as an ingredient in soups. The SNAKE C. (*C. flexuosus*) grows to a great length, and is similar in quality to the common cucumber. *C. serotinus* is cultivated in Turkey, *C. macrocarpus* in

Brazil; the CONOMON (*C. conomon*) is much cultivated in Japan. The Melon (*C. melo*), Water Melon (*C. citrullus*), Chate (*C. chate*), and Kaukoor (*C. utilissimus*), are noticed in the article MELON; the species yielding colocynth, in the article COLOCYNTH.—The DUDAIM (*C. dudaim*) is very generally cultivated in Gardens in the East for the fragrance of its fruit, which, however, is almost tasteless. It is supposed that this plant is sometimes meant in the Old Testament, where the English version has *mandrake*.—The SPIRTING C., SQUIRTING C., or WILD C., which yields the drug called Elaterium (q. v.) belongs to an allied genus.

CUCURBITA'CEÆ, a natural order of exogenous plants, consisting chiefly of herbacecous plants, natives of the warmer regions of the globe, having succulent stems which climb by means of lateral tendrils. There are some shrubby species. The fruit (*pepo*) is peculiar; it is more or less succulent, has a thick fleshy rind, and the seed bearing parietal placentæ either surrounding a central cavity, or sending prolongations inwards. The seeds are flat and ovate, embedded in a sort of pulp, which is either dry or juicy.—This order contains about 300 species, very many of which yield fruits much used for food in warm climates, and some of them are cultivated in colder regions as articles of luxury. The fruit of some attains a very large size. To this order belong the Cucumber, Melon, Gourd (of many kinds), Pumpkin, Squash, Vegetable Marrow, Gourd, &c. The young shoots and leaves of many species are also used as potherbs; and the roots of some abound in a bland fecula, and are edible, as those of *Momordica dioica* and *Bryonia umbellata*, East Indian plants.

Yet acridity is a prevailing characteristic, of which the Spirting Cucumber (see ELATERIUM) of the south of Europe, and the Common BRYONY (q. v.) are examples. These are not without their use in medicine, but still more important is the COLOCYNTH (q. v.).—Among the more interesting species of this order is *Hodgsonia heteroclita*, a gigantic species, which is found in the Himalaya Mountains, ascending to an elevation of 5000 feet. The seeds of some C. are used as almonds, and yield oil by expression, as those of *Telfairia pedata*, an African plant. *Bryonia dioica* is the only British species, and does not extend to Scotland or Ireland.

CU'DBEAR, a dyestuff similar to Archil (q. v.) and Litmus (q. v.), and obtained in the same manner from lichens by the action of ammoniacal liquids. It is chiefly employed as a purple-dye for woollen yarn, but the color is rather fugitive. The name C., or C. LICHEN, is often appropriated to one particular species of lichen, *Lecanora tartarea*, which is abundant on rocks in the Highlands of Scotland and in the Alpine and northern districts of



Cudbear (*Lecanora tartarea*).

Europe, and from which the dyestuff C. is usually obtained by maceration for ten or twelve days in urine with water and chalk. The name is a corruption of *Cuthbert*, and is derived from that of Dr. Cuthbert Gordon, under whose management the manufacture of this dyestuff was begun in Leith about the year 1777, by Mr. Macintosh of Glasgow. The species of the genus *Lecanora* are crustaceous lichens, with a flat uniform *thallus*, and unstalked *shields*. *L. tartarea* forms a thick, granulated, and tartareous grayish-white crust, with scattered yellowish-brown shields. It is sometimes called *White Swedish Moss*, being largely imported from Sweden.

CUDDALO'RE, the chief town in the southern division of Arcot (q. v.), is one of the few seaports on the Coromandel, or east coast of Hindustan. It is situated on the estuary of the Southern Pennaur, a considerable tributary of the Bay of Bengal, being in lat. 11° 43′ N., and long. 79° 50′ E. It is 15 miles to the south of Pondicherry, and 100 to the south of Madras. Though the river itself is beset by a bar, which admits only vessels of moderate size, yet there is good anchorage off-shore at the distance of a mile and a half. The site is not more than 5 feet above high-water mark; but notwithstanding this apparently insalubrious position, the climate is said to be peculiarly healthy. C. was at one time a place of great strength; and in that respect it was frequently an object of contention in the wars which, during the latter half of the 18th c., so long desolated this neighborhood. In 1758, it was taken by the French from the English, who had held it for 77 years; and, after various intermediate vicissitudes, it was finally ceded to its original possessors in 1783. Pop. (1871) 40,290.

CU'DDAPAH, a native town with a military cantonment in the presidency of Madras, from which it lies about 140 miles to the north-west. It stands, at the height of 507 feet above the sea, near the right or south bank of the Northern Pennaur, which flows into the Bay of Bengal. Lat. 14° 32′ N., and long. 78° 52′ E. The native town itself claims notice merely as the capital of the district of its own name; and the military cantonment, pleasantly overhanging the Bogawanka, an auxiliary of the Pennaur, contains barracks for Europeans, and spacious lines for sepoys. Pop. (1871) 16,275.

CUDDAPAH, the district mentioned in the preceding article, extends in lat. from 13° 12′ to 16° 19′ N., and in long. from 77° 52′ to 79° 48′ E., containing 8367 sq. m., and (1871) 1,351,194 inhabitants. Sloping towards the Bay of Bengal, the country ranges in its general elevation above the sea, between 1182 and 450 feet. C. is traversed in its length from north to south by numerous parallel ridges, which constitute a part of the Eastern Ghauts—some of the peaks rising 3500 feet above the sea level. The maximum, mean, and minimum temperatures are said to be respectively 98°, 81°, and 65° F. In the hot season, the climate is understood to be peculiarly prejudicial to European constitutions. The most striking feature in the physical character of the district is the remains of diamond mines, now abandoned, and probably exhausted, situated about seven miles from the capital. C. was ceded to Britain in 1800; and in 1846 it was the scene of serious disturbances, occasioned by an unwise interference on the part of government with the prescriptive titles to landed property.

CU'DDY was a name first applied in East India trading ships to a cabin under the poop, where the men messed and slept. The same name was afterwards given to the only cabin in very small vessels, and sometimes to the cooking-room.

CU'DWEED, the popular name of many species of plants of the genera *Gnaphalium*, *Filago*, and *Antennaria*, belonging to the natural order *Compositæ*, sub-order *Corymbiferæ*, the stems and leaves of which are more or less covered with a whitish cottony down; and the heads of flowers consist, in great part, of dry involucral scales, and may be kept for a long time without undergoing much apparent change, so that they may be reckoned among *Everlasting Flowers* (q. v.). The cudweeds are small plants of very unpretending appearance, some of them common in Britain. *Antennaria dioica* is very frequent in dry mountain pastures. It is sometimes called Cat's-foot. Its heads of flowers, from the appearance of which it derives this name, were formerly officinal, and were employed as an astringent in pectoral diseases.

CU'DWORTH, RALPH, D.D., an illustrious English divine, was born in 1617 at Aller, in Somersetshire, and admitted pensioner of Emmanuel College, Cambridge, in 1630, where he took his degree of M.A., and became an eminent tutor. About 1641 he was presented to the rectory of North Cadbury, in Somersetshire; and in 1644, upon taking his degree of B.D., maintained two theses, in which can be discerned the germs of his *Intellectual System*. In the same year he was appointed master of Clare Hall, Cambridge, and in 1645, regius professor of Hebrew; after which he began to apply himself assiduously to the study of Jewish antiquities. In 1651, he took his degree of D.D.; in 1654, he was chosen master of Christ's College; in 1662, appointed to the vicarage of Ashwell; and in 1678, installed prebendary of Gloucester. He died at Christ's College, July 26, 1688.

C.'s *magnum opus*, entitled *The True Intellectual System of the Universe*, was published in 1678. It is a work of great learning, acuteness, and loftiness of thought; but some, at the time, fancied that C. exhibited too much impartiality in stating the atheistic arguments. Dryden said 'that he raised such strong objections against the being of a God and Providence, that many thought he had not answered them.' Lord Shaftesbury and Bayle were of this opinion also. The accusation of impartiality—a rare offence in those contentious days—is not likely to lessen our admiration of Cudworth. The philosophy to which he was attached was that of Plato, and, in consequence, he estimated highly the writings of the Alexandrian school, to which his own bear some resemblance. The obloquy to which his adventurous studies exposed him, does not seem to have greatly affected him. Besides *The Intellectual System*, C. left in MS. *A Treatise concerning Eternal and Immutable Morality*, which was published by Dr. Chandler, Bishop of Durham, in 1731; and forms, or was intended to form, the second part of *The Intellectual System;* also a discourse *On Liberty and Necessity*, *On Moral Good and Evil*, a discourse *On the Creation of the World and the Immortality of the Soul*, &c. These MSS. are now in the British Museum.

CUE'NCA, a city of Spain, at the confluence of the Jucar and Huecar, about Midway between Valencia and Madrid. It is romantically situated on a rocky eminence, 3400 feet above the level of the sea, and is surrounded by hills. It appears to have derived its name (Lat. *concha*, a shell) from its position and appearance. Ford says it is 'indeed a hill-girt *shell*.' The town is of Moorish origin. The streets are narrow and crooked. The chief buildings are the cathedral, the bishop's palace, and a fine bridge over the Jucar (erected in 1523), connecting the city with the convent of San Pablo. C. was once celebrated for arts, literature, and industry, but its glory has now quite departed. It suffered much during the Peninsular campaign. Pop. 8200.—C. gives name to a mountainous, well-watered province, yielding excellent timber, honey, wine, and grain, with good pasture, and various minerals, including iron, coal, copper, and silver. Area about 12,000 miles. Pop. (1877) 237,497.

CUENCA, a city of Ecuador, in South America, stands on a wide plain or table-land, 8640 feet above the level of the sea. It is 85 miles south-south-west of Quito, the capital of the republic; in lat. 1½° S., its proximity to the equator, however, being largely neutralized, with regard to climate, by its altitude. Pop. estimated at 30,000. It possesses a cathedral and a university.

CUE'VA DE VE'RA, a town of Spain, in the province of Granada, 42 miles north-east of Almeria. It is situated on a plain on the right bank of the Almanzor, near its entrance into the Mediterranean. It is generally well built and its streets regular. The principal edifices are an old Moorish castle, and the parish church in the Doric style. C. has manufactures of hardware, earthenware, and of wine and oil; and a large number of persons are employed in mines in the vicinity. Pop. 20,644.

CUICHUNCHU'LLI (*Ionidium parviflorum*), a Peruvian plant of the natural order *Violaceæ*, half shrubby, with minute leaves, possessing very active emetic and purgative properties, and said to be a certain remedy for *Elephantiasis tuberculata*, a reputation which, if even partially well founded, ought to recommend it to the particular attention of the benevolent and humane. Other species of *Ionidium* share the same name, properties and reputation. One of them was formerly supposed to yield ipecacuanha, and its root is still known as White Ipecacuanha. See IPECACUANHA.

CUIRA'SS, as its name (Fr. *cuir*, leather) implies, was originally a jerkin, or garment of leather for soldiers, so thick and strong as to be pistol-proof, and even musket-proof. The name was afterwards applied to a portion of armor made of metal, consisting of a back-plate and breast-plate hooked or buckled together; with a piece jointed to the back called a *culet* or *garde de reines*.

CUIRASSIE'RS, in the time of Queen Mary, were heavy horsemen wearing body-armor over buff-coats. They carried swords and pistols, and the reins were strengthened with iron chains. In modern armies, the name is often given to the heaviest cavalry. Napoleon's twelve regiments of C. attracted much attention during his wars. The first rank of Russian C. are armed with lances. The only C. in the British army (wearing the cuirass) are the Life Guards (red) and Horse Guards (blue); and in these the cuirass is now regarded rather as a matter of show than of use.

CUISSARTS, among ancient armor, were worn by troopers. They consisted of small strips of iron-plate laid horizontally over each other round the thigh (Fr. *cuisse*), and riveted together.

CUJA'CIUS, properly, JAQUES DE CUJAS, or CUJEUS, one of the most distinguished jurists of the 16th c., born in 1522, was the son of a tanner of Toulouse. After studying law, he was appointed teacher of the same at Cahors (1554), and in the following year, by the recommendation of the Chancellor L'Hopital, gained the chair of law in the university of Bourges. In 1557, he became a professor at Valence. After several changes, he returned to Bourges in 1577, where he resided till his death, October 4, 1590.

His great reputation as a jurist was founded on his study of original MSS. of the Roman laws, and on his classical treatment of these authorities. He had in his library 500 MSS. on Roman law, and by his emendations contributed greatly to remove the obscurities of jurisprudence. A complete collection of his works was edited by Fabrot (10 vols., Par. 1658), and has since been republished frequently. Uhl has edited separately C.'s *Animadversiones et Observationes*. C.'s daughter made herself notorious by her immoralities. See Spangenberg's *C. und seine Zeitgenossen* (Leip. 1822).

CU'LDEES, or KELDEES (Celt, *Ceile De;* Lat. *Colidei, Culdei, Calledei, Keldei, Keledei*), the name given in the British islands to an ancient order of ecclesiastics. The word seems to be of Celtic origin, and in the Irish language signifies an 'attendant of God.' Giraldus Cambrensis, writing towards the end of the 12th c., when the order still flourished, interprets the name in one place by the Latin word *cælicola*, i. e., 'worshiper of heaven;' and in another by *cælebs*, i. e., 'single,' or 'unmarried.' Boece and Buchanan, in the 16th c., translate it *cultores Dei*, i. e., 'worshipers of God.'

There is some uncertainty as to the first appearance of the order. There is no trace of it in the works of Adamnan, of Bede, of Alcuin, or of any other ecclesiastical historian of the 8th or 9th century. An abbot and bishop of the north of Ireland, who compiled a metrical calendar of Irish saints about the year 800, was known in his own time as 'Ængus the Ceile-De.' But it has been questioned whether the title was not used rather to denote his great personal piety, than to describe his ecclesiastical character. The Four Masters, again, in their *Annals of Ireland*, compiled about the year 1636, record certain great wonders wrought by a Ceile-De in the year 806. But no such event is recorded in the ancient chronicles from which the Four Masters compiled their work, and Irish antiquaries think that the passage must therefore be rejected as apocryphal. But in Irish annals of undoubted authority, it is chronicled that, in the year 919, 'a Ceile-De came across the sea westward to establish laws in Ireland;' in other words, as Irish archæologists conjecture, to bring the Irish into conformity with the rule for canons which had been enacted in 816, at the council of Aix-la-Chapelle. The Annals of Ulster record that, in 920, Armagh was plundered by Godfrey, son of Ivor, the Dane, but that he spared the oratories with the C. and the sick. The C. of Armagh, who thus appear in the beginning of the 10th c., survived till the beginning of the 17th century. Archbishop Usher, who died in 1655, writes that they continued until within his own memory. They were secular priests or canons, about twelve in number, living in community, under the rule of a prior, who—after the beginning of the 13th c., when the metropolitan cathedral of St. Patrick was remodelled after the English fashion—officiated as precentor, his C. being the clerks or choir. The antiphonary or service-book, with the musical notation, from which they sang, is still preserved in the library of Trinity College, Dublin; and its calendar records the deaths of several of their number, one of them so lately as the year 1574.

The prior seems generally to have been a pluralist, its having been formally ruled in 1448, after an appeal to Rome, 'that the priory of the college of secular priests, commonly called Culdees, being a simple office, and without cure of souls, is not incompatible with a benefice.' The C. of Armagh, dissolved at the Reformation in 1541, were resuscitated for a brief space in 1627. Their old possessions—among which were seven town-lands containing 1423 acres, seven rectories, and four vicarages—were in 1634 bestowed upon the vicars choral of the cathedral, who still enjoy them.

There were at least seven other houses of C. in Ireland, viz., at Clonmacnois, Clondalkin, Devenish, Clones, Popull, Monaincha, and Sligo.

If tradition could be trusted, the first appearance of C. in Scotland should be placed about the middle of the 9th century. A leaf of the Register of St. Andrews, written about 1130, relates that Brude, the son of Dergard, the last king of the Picts (who ceased to reign about 843), gave the island, since called St. Serf's Inch, in Lochleven, to God, St. Servan, and the Culdee hermits serving God there. They were governed by an abbot; and about the year 1093, during the rule of Abbot Ronan, they gave up their island to the Bishop of St. Andrews, on condition that he should find them in food and raiment. They had grants of lands or immunities from all the kings of the Scots who reigned between 1039 and 1153, the roll of these royal benefactors being headed by the renowned Macbeth (1039—1056) and his wife Gruoch, the daughter of Bodhe. They had a grant of a church from each of the three bishops who ruled the see of St. Andrews between 1040 and 1093; and about 1120, they had a grant of lands from one of the sons of King Malcolm Canmore and St. Margaret—Ethelred, Earl of Fife, and hereditary lay abbot of the Culdee monastery of Dunkeld. A few years afterwards, the Bishop of St. Andrews gives their island, and all their possessions, including their church vestments and their books, to the newly founded Canons Regular of St. Andrews, in order that a priory of that rule might supplant the old abbey of C. in the St. Serf's Inch. About 1140, the bishop's grant was enforced by a charter from King David, in which it was ordered that such of the C. as chose to live canonically and peacefully under the new canons should remain in the island. 'If any one of them refuse so to do,' says the king, 'my will is, and I command, that he be expelled from the island.' We hear no more of the Culdee hermits of Lochleven. The Canons Regular who came in their place continued till the Reformation, and we are indebted to one of their priors, Andrew Wintoun, who died about 1429, for a valuable metrical Chronicle of Scotland.

A catalogue of the books of the Culdee abbey, when it was bestowed upon the Canons Regular of St. Andrews, about 1140, has been preserved. The number of volumes was not quite twenty. They were—a Pastoral, a Gradual, a Missal, some of the works of Origen, the Sentences of St. Bernard (who was still living), a Treatise on the Sacraments, in three parts, a part of the Bible, a

Lectionary, the Acts of the Apostles, the Gospels, the works of Prosper, the books of Proverbs, Ecclesiastes, and Canticles, a Gloss on the Canticles, a work called *Interpretationes Dictionum*, a Collection of Sentences, a Commentary on Genesis, and a Treatise on the Exceptions from Ecclesiastical Rules.

The C. of St. Andrews were of more importance, and not perhaps of less antiquity, than those of Lochleven. The death of an abbot of St. Andrews is chronicled by the Irish annals in 747. It is not said that he was a Culdee; but in 944, when Constantine, the king of Scots, exchanged his crown for a monk's cowl, it is recorded that he became 'abbot of the Culdees of St. Andrews.' No more is heard of them till about the middle of the 12th century. A priory of Canons Regular had now been planted beside them, and from its records we learn that in the church of St. Andrew, such as it then was, there were thirteen C., holding their office by hereditary tenure, and 'living rather according to their own pleasure and the traditions of men, than after the rules of the holy fathers;' that some few things of little importance they possessed in common; that the rest, including what was of most value, they held as their private property, each enjoying what he got from relatives and kinsmen, or from the benevolence granted on the tenure of pure friendship, or otherwise; that after they became C., they were forbidden to have their wives in their houses, or any other women of whom evil suspicion could arise; that the altar of St. Andrew was left without a minister, nor was mass celebrated there except on the rare occasion of a visit from the king or the bishop, for the C. said their own office after their own way in a corner of the church. The attempt to supplant the C. by Canons Regular, which had succeeded at Lochleven, was repeated at St. Andrews, but failed. The C. kept their own church—St. Mary's, or the Kirk of the Heugh—and had a voice along with the Canons Regular in the election of the bishop. Their abbot disappears about the middle of the 11th c.; and soon afterwards their 'prior' exchanges that title for the name of 'provost.' Their distinctive character was gradually passing away; before the end of the 14th c. they lose their share in the election of the bishop; their name of Culdee is heard no more; their church, about the same time, takes the name of the King's Chapel-royal; and henceforth there remains nothing to distinguish them from the secular priests of other collegiate churches.

The C. of the church of St. Mary at Monymusk, in Aberdeenshire, appear to have been founded by the Bishop of St. Andrews towards the end of the 11th century. In the beginning of the 13th c. they are found making claim to be regarded as Canons Regular. The claim was resisted by the Bishop of St. Andrews, and in 1211, after an appeal to Rome, the dispute was settled by a compromise, which provided that there should be thirteen C. at Monymusk, of whom one—to be chosen by the bishop from a list of three presented by the other C.—should be the master or prior; that they should have a refectory, a common dormitory, and an oratory, but no cemetery; that they should not adopt the monastic or canonical life or rule without leave of the bishop; and that when he came to Monymusk, he should be received by the C. in solemn procession. Before this agreement is 50 years old, the name of C. disappears from Monymusk, and their house is recognized as a priory of Canons Regular.

C. are found at Abernethy, in Strathearn, about 1120. In the end of that century, their possessions appear to have been divided between their hereditary lay-abbot (the founder of the noble family of Abernethy) and the prior and C. by whom the burdens of the ecclesiastical offices was borne. In 1273, they were transformed into Canons Regular. The same partition of the Culdee revenues which appears at Abernethy, is found also at Brechin. A layman, who is abbot only in name, inherits a large share of the Culdee patrimony, and transmits it to his descendants, who soon lose even the name of abbot. The prior and his C., meanwhile, are absorbed into the chapter of the new bishopric, founded at Brechin by King David I., about 1145; in less than a hundred years, the name of C. disappears, and the chapter is one wholly of secular canons. The same silent change of C. into secular canons, which took place at Brechin during the 13th c., took place also at Dunblane, at Dunkeld, at Lismore, at Rossmarky, and at Dornoch. C. are found in the bishop's chapter at each of these places in the 12th c.; they disappear before the end of the 13th c., leaving the chapter one of secular canons. At Dunkeld, as at Brechin and at Abernethy, great part of the Culdee revenues was held by a lay-abbot, whose office was of such mark as to be hereditary in the royal family. The father of 'the gracious Duncan,' and the son of St. Margaret, were Culdee abbots. If a tradition of the 16th c. can be received as authority for what passed in the 12th c., the C. of Dunkeld were married, like the priests of the Greek Church, but lived apart from their wives during their period of service at the altar.

C. are found holding land at Monifieth, near Dundee, about 1200; and there was a lay-abbot of Monifieth; but there is nothing to show whether he was or was not a Culdee. The C. of Muthill, in Strathearn, appear with their prior in charters of the beginning of the 13th century. Nothing more is known of them. Jocelin of Furnes, in his life of St. Kentigern, or Mungo, written about the year 1180, relates that the disciples of that saint at Glasgow, in the 6th c., had all things in common, but lived each in his own hut, whence they were called 'solitary clerks,' and more commonly 'Culdees.' C. appear as one of the ecclesiastical fraternities of Iona in the year 1164; and the faint vestiges of a circular building (about 15 feet in diameter) called 'Cothan Cuildich,' or the Culdee's cell, are still shown in the island.

Only one or two traces of C. have been observed in England. The canons of St. Peter's, at York, were called C. in the reign of Æthelstan (924—931); and a charter of Æthelred, in the year 1005, speaks of the canons of the English cathedrals generally as *cultores clerici*. The term is of doubtful import, and the character itself is not beyond suspicion.

Of the C. in Wales, we have only one notice. Giraldus Cambrensis, writing about 1190, describes the island of Bardsey, on the coast of Caernarvon, as inhabited 'by most devout monks, called celibates or Culdees.'

Such is a concise recapitulation of all that is certainly known of the Culdees. Before their history was ascertained, opinions were held regarding them which now find few if any supporters among archæologists. It was believed that they were our first teachers of Christianity; that they came from the East before corruption had yet overspread the church; that they took the Scripture for their sole rule of faith; that they lived under a form of church government approaching to Presbyterian parity; that they rejected prelacy, transubstantiation, the invocation of saints, the veneration of relics, image-worship, and the celibacy of the clergy; and that they kept their simple worship and pure doctrines undefiled to the last, and were suppressed only by force and fraud, when the Roman Catholic Church triumphed over their older and better creed. For all this, it is now clearly seen that there is no foundation. There is no reason to suppose that the C. differed in any material point of faith, discipline, or ritual from the other clergy of the British islands and Western Christendom. Their name was their only peculiarity.

The best account of the Irish C. is given in a dissertation by the Rev. Dr. Reeves, in the *Proceedings of the Royal Irish Academy* for 1860. The best account of the Scottish C. is given in Mr. Grub's *Ecclesiastical History of Scotland*, vol. i. pp. 226—243 (Aberd. 1861.)

The opinions formerly held regarding the Scottish C. will be found in Selden's preface to the *Decem Historiæ Anglicanæ Scriptores*, reprinted in his *Opera*, vol. ii. pp. 1129—1146; Sir J. Dalrymple's *Collections concerning the Scottish History* (Edin. 1705); and the late Rev. Dr. Jamieson's *Historical Account of the Ancient Culdees* (Edin. 1811). The opinions of these writers are controverted in Bishop Lloyd's *Historical Account of Church Government*, chap. vii.; Goodall's *Preliminary Dissertation*, and Bishop Russell's *Supplement*, prefixed to Keith's *Catalogue of Scottish Bishops* (Edin. 1824); Pinkerton's *Inquiry into the Early History of Scotland*, vol. ii. pp. 270—273 (edit. 1814); and Chalmers's *Caledonia*, vol. i. pp. 434—439 (Lond. 1807). On the subject of the C. generally, reference may be made to Lanigan's *Ecclesiastical History of Ireland*, vol. iv.; to the dissertation by J. van Hecke in the *Acta Sanctorum Octobris*, vol. viii.; and to Skene's *Celtic Scotland*, vol. ii.

CU'LENBORG, CU'LEMBORG, or KUI'LENBURG, a town of the Netherlands, situated on the left bank of the river Leck, 12 miles north-west of Tiel. C. has three divisions, of which the inner town is the oldest and most important. It has a Reformed, a Lutheran, a Roman Catholic church, a synagogue, and a fine orphan-house. It has steam-boat communication, and is a station of the railway from Utrecht to 's Hertogenbosch. C. has several factories. In olden times, the 'Dominion of Culenborg' formed a county; and its independence, both of the Roman empire and the States of Holland, secured it the singular privilege of offering an asylum to fugitives from Holland for debt. Pop. (1880) 6725.

CULIACA'N, a town of the Mexican confederation, stands on a river of its own name, which, flowing towards the south-west, enters the Gulf of California near its mouth. It occupies a fertile tract in the department of Sinaloa, being about 90 miles to the south-east of the city so called. It is estimated to contain 7000 inhabitants.

CULILAWAN BARK, also called CLOVE BARK, a valuable aromatic bark, the product of the *Cinnamomum Culilawan*, a tree of the same genus with the Cinnamon (q. v.) tree, growing in the Molucca Islands. It comes to market in pieces of various length, almost flat, thick, fibrous, covered with a white epidermis, reddish-yellow inside, and has an odor resembling that of nutmeg and cloves, and a pungent taste. It is useful in cases of indigestion, diarrhœa, &c.—Another variety of C. B. is believed to be the produce of *Cinnamomum xanthoneurum*; and a very similar bark, called SINTOC BARK, is obtained from *C. Sintoc*.

CU'LLEN, a royal, parliamentary, and municipal burgh and seaport in the north of Banffshire, 12 miles west-north-west of Banff. It is built on the west slope of an eminence overlooking the sea, and at the mouth of the Cullen Burn. Pop. (1881) 2033. A third of the inhabitants of the town are engaged in the cod, ling, haddock, skate, herring, and salmon fisheries. C. contributes with Elgin, Banff, Peterhead, Inverury, and Kintore in returning one member to parliament. The chief exports are cured fish, oats, potatoes. Some linen is made. The Marquis of Montrose burned C. in 1645.

CULLEN, WILLIAM, a well-known physician of the last century, and one of the most celebrated professors of medicine in the universities of Edinburgh and Glasgow, was born at Hamilton, in Lanarkshire, on the 15th day of April 1710. His father was factor to the Duke of Hamilton, and was possessed of a little landed property in the parish of Bothwell; he appears to have brought up two of his sons to the learned professions, and to have himself received a legal education. William C. received the first part of his education at the grammar-school of Hamilton, and afterwards began his medical studies in Glasgow by an apprenticeship, and by attending literary classes in the university. At this time (about 1727), it does not appear that there was any systematic medical teaching in Glasgow University, though the medical school of Edinburgh was just rising to the height of its fame, under the auspices of the first Monro. C.'s master in the art, however, Mr. John Paisley, was a liberal and enlightened man, having a valuable library, of which the pupil may be presumed to have made good use. In 1729, having completed for the time his medical education, he was appointed surgeon to a merchant-ship, trading to the West Indies; and from this time till 1734, he was actively engaged in learning his profession practically in various situations, but without accepting any permanent responsibility. He next spent two additional winter sessions in Edinburgh in the regular study of medicine, and was one of the founders of that important Students' Association—since called the Royal Medical Society—the object of which was, and is, the advancement of the medical knowledge of the members by periodical discussions on subjects of interest connected with medical study. In 1736, he commenced practice at Hamilton, and very soon was largely employed, having secured from the first the influence and friendship of the Duke of Hamilton and of other persons of distinction. Soon after he became acquainted with William Hunter, afterwards the celebrated anatomist and obstetric professor, and brother of the still more celebrated John Hunter. See HUNTER, JOHN and WILLIAM. The three years passed by Hunter under Cullen's roof formed the beginning of a life-long friendship, although after Hunter went to London, it is probable that they never again met. In 1740 C. took the degree of Doctor of Medicine in the university of Glasgow; in 1741 he entered into partnership with a surgeon, with the view of confining himself to a physician's practice; in 1744, he responded to the invitation of a number of families in Glasgow, and took a house in that city, an object which it is probable he had in view some years before, but which he was prevented from carrying out by the friendship and liberal patronage of the Duke of Hamilton, who died in 1743. Various circumstances indicate that during the seven years passed in practice in Hamilton, C. was diligently preparing, not only for the practice, but also for the teaching, of his profession; and accordingly, he had no sooner settled in Glasgow, than we find him engaged in giving a course of lectures, in regard to which his correspondence with William Hunter sufficiently shows that it was successful, and deserved success. Up to this period, though professorships of medicine, and of anatomy with botany, existed in the university, no lectures were delivered in either medicine or botany; and it seems certain that to C. that university owes the real commencement of its medical school; for in one or two years succeeding 1746, he made arrangements with the several professors to lecture on the theory and practice of physic; on botany and the materia medica, and finally on chemistry, being assisted in these last departments by Mr. John Carrick, who also acted as assistant to the professor of anatomy. In botany, C. seems to have lectured in Latin, but in the other departments he adopted the English language as the vehicle of expression, an innovation of great importance, which permitted him to adopt a more familiar style of lecturing than had hitherto been in use. One of his original hearers records that 'in the physic class, Dr. Cullen never read lectures, but only used notes; in the chemistry, he sometimes read, but very seldom.' *

He was supported by the university by votes amounting to £136 for the chemical laboratory, and £20 annually for keeping it in repair. As a chemist, he does not appear to have made any notable discovery; but he imbued the minds of his pupils with large and liberal views of a science then very imperfectly studied, and was beyond all doubt the means of raising up the great reputation of Dr. Black, by turning his thoughts to the subject of Latent Heat, which he prosecuted so successfully by a series of conclusive and most original experiments. In 1751, after somewhat prolonged negotiations, C. was placed, through the influence of the Duke of Argyle, for the first time in his rightful position as a professor in the university of Glasgow, in room of Dr. Johnstone, the Professor of Medicine.

But by this time it had begun to be apparent that an opening both for teaching and practice existed in Edinburgh, and Lord Kames, whose knowledge both of general science and of Edinburgh society placed him in a favorable position for judging of the chances of success, made several attempts to attract the rising and ambitious Glasgow professor to the metropolis; in which design, however, he was not successful till four years afterwards, when C. was elected by the town-council joint Professor of Chemistry with Dr. Plummer, who had fallen into bad health, and who died about a year afterwards. In 1757, his ever-active mind found a new direction in adding to his duties as Professor of Chemistry the teaching of Clinical Medicine in the Royal Infirmary, a duty up to this period performed by Dr. Rutherford only, the Professor of Medicine and Botany. The clear-sightedness and practical sagacity which he brought to this work at once fixed his position as a teacher and as a physician. Probably, also, the fact of his having to give bedside instruction at this period opposed itself to the natural tendency of his mind to give everything a systematic form, and weeded his method of practice of an immense quantity of the scholastic rubbish which appears prominently in all the medical learning of that age. He became a decided favorite with the students, and not less so with his patients; and in 1760 was applied to by the former to undertake the lectures on materia medica, in consequence of the death of Dr. Alston during the session. This duty he performed so well that his lectures were surreptitiously printed from the notes of a pupil, and had a considerable circulation. On the resignation of Dr. Rutherford, it was reasonably expected that C. would have been transferred from the chemical chair to that of the Practice of Physic, for which he had shown so decided an aptitude; but personal views interfered, and Dr. John Gregory was appointed to the practical chair. In 1766, C. was, however, placed in the chair of Institutes of Medicine, vacant by the death of Dr. Whytt; and Black, now the greatest chemical discoverer of the age, was brought to Edinburgh from Glasgow to fill C.'s place as Professor of Chemistry. In 1773, C. was at last transferred to the chair of the Practice of Physic, the duties of which he had for some years performed alternately with Dr. Gregory, the latter taking part in return alternately with C. in the lectures on the Theory or Institutes of Medicine.

The rest of Dr. C.'s biography is simply a record of continued success as a teacher and a practitioner. His popularity with his students, and even his scientific reputation at one time threatened to be seriously diminished by the brief but noisy episode of the Brunonian system (see BROWN, JOHN, M.D.).

In 1778, C. became the proprietor of Ormiston Hill, a small but prettily situated property about eight miles west of Edinburgh, where he passed as much time as his professional duties would allow in improving his little estate, and renewing his long dormant knowledge of, and love for, rural affairs. 'I have got upon my hobby,' he writes to a friend; 'my amusement is a little farm, and a little pleasure-ground. . . . I have done a great deal, but it is all levelling work; other people cannot know what earth has been moved, but I have had some amusement in the turning of every shovelful.' It was a becoming end to a life of usefulness. He had here the leisure and enjoyment of life which were required to wean him from the too exclusive pursuit of his profession; and while his love of science never chilled, and was even made subservient to the adornment of the retreat of his old age, he was somewhat withdrawn from the heat and the strife of the world into the purer air of domestic retirement. C. died on the 5th February 1790, having nearly completed his 79th year, and having been actively engaged in teaching and consulting practice till within a few months of his death. His most important works are—the *First Lines of the Practice of Physic* (Edin. 1777); *Synopsis Nosologiæ Methodicæ*, 1785; *Institutions of Medicine*, 1777; *A Treatise of the Materia Medica*, 1789. Their characteristics are great clearness of expression, with remarkable soundness of judgment and common sense, rather than striking originality, or a rapid advance into new regions of thought. But he was eminently the man for his time, which was distracted and confused by a host of baseless theories, and by many of those 'false facts' which C. himself said were more numerous than even false theories. Amid this farrago, he sought his way towards the truth with remarkable impartiality, and infinite candor as regards the opinions of others. His fame as one of the greatest of teachers has survived the memory of his professional success, and even the credit of his far-famed systematic Nosology. His writings have been collected, in 2 vols. 8vo, by Dr. John Thomson (Edin. 1827), by whom also a Life was commenced, the first volume of which was published in 1832. This biography was continued by his son, and finally completed in a second volume by Dr. Craigie, in 1859.

* Thomson's *Life of Cullen*, vol. i. p. 25.

CULLE'RA, a fortified town of Spain, and port on the Mediterranean, 23 miles south-south-east of the town of Valencia. It stands near a very fertile district, and the inhabitants are mostly engaged in agriculture, cattle-rearing, fishing, and the production of oil and wine. Pop. (1877) 11,050.

CULLO'DEN, or DRUMMO'SSIE MOOR, a desolate level tableland, now partly cultivated, in the north-east of Inverness-shire, six miles east-north-east of Inverness, near the Moray Firth. It is memorable as the scene of the total defeat, on 16th April 1746, of the Highland army under Prince Charles Stuart by the royal troops under the Duke of Cumberland, and the extinction of the hopes of the House of Stuart to regain the English crown. Green mounds, and a cairn, with stones and inscriptions, mark the spots where the battle was fiercest, and where many of the slain lie buried.

CULM, in Botany, the peculiar cylindrical hollow and jointed stem of Grasses (q. v.).

CULM, a popular name of Anthracite (q. v.), in very general use in some parts of England, and occurring in many scientific works. In some districts of South Wales, the C., obtained from the pits in a broken and crumbling condition, is used as fuel, being made up into balls, with one-third of its bulk of wet viscid clay. It burns without flame, producing a strong and steady heat, well adapted for cooking.

CULMINA'TION, an astronomical term, signifying the passage of a star across the meridian. The star is then at the highest point (*culmen*) of its course: hence the name. The sun culminates at midday, or twelve o'clock, apparent solar time—which seldom agrees exactly with mean time, as shown by a watch or clock. The full moon culminates at midnight. The time of C. of a fixed star is always exactly midway between the times of its rising and setting; in the case of the sun, moon, and planets, it is only nearly so.

CU'LNA, a town of Bengal, 47 miles north of Calcutta, on the right bank of the Hooghly. The town contains a vast number of temples, is a station of the Free Church (Scotland) Mission, and has a flourishing English school. It is a place of considerable trade, rice, grain, silk and cotton being the chief articles of commerce. C., in 1871, had 27,336 inhabitants.

CU'LPA (Lat. fault, crime, blame). By the Roman jurists, C. was recognized as existing in three degrees: *C. lata*, gross carelessness or omission, which was regarded as equivalent to dole; *C. levis*, that degree of negligence into which a person attentive to his own affairs may be supposed occasionally to fall; and *C. levissima*, that still more slight degree of negligence which is in some degree incident to human nature, and may be fallen into by even the most prudent and sharp-sighted. Where a contract contemplates the mutual benefit of both parties, the middle degree of diligence is all that either is bound to exercise, and the neglect of this is *C. levis*, or C. simply. Where one party only is benefited, he is bound to exercise the utmost diligence, the neglect of which is *C. levissima*, whilst the other party has done enough if he avoids *C. lata*, or gross and excessive negligence. These distinctions of the Roman law have been adopted by the law of Scotland.

CULPABLE HO'MICIDE. See HOMICIDE and MURDER.

CU'LPRIT, in English law, is a prisoner accused, but not tried. After trial, if not acquitted, he becomes a convict.

CULRO'SS, a parliamentary and municipal burgh and seaport in a detached part of Perthshire, on the north shore of the Firth of Forth, 6 miles west of Dunfermline, and 22 north-north-west of Edinburgh. It is a place of great antiquity. As early as the 6th c., it was the seat of the monastery of St. Serf, who afterwards became the patron saint of the town, where his yearly festival was kept till about the close of the 18th century. Ængus the Keldee, an Irish martyrologist, who wrote about 800 A.D., describes it as lying in Strathearn, between the Ochils and the Sea of Gindan, i. e., the Firth of Forth. It stands on the face of a hill rising from the shore. The parish church preserves some remains of the conventual church of a Cistercian abbey, founded in 1217, on a commanding site in the higher part of the town. Close beside it is the fine old residence of C. Abbey, founded by the Bruces of Carnock and Kinloss about the end of the 16th c., remodelled about the middle of the 17th c., and towards the end of the 18th occupied by the father of the late Lord Dundonald, who here made experiments in extracting tar from coal for preserving ships' bottoms, and gas for illuminating purposes. At the east end of the town are the ruins of a chapel, built about the beginning of the 16th c., in honor of St. Kentigern or Mungo, who is said to have been born here about the year 500, and to have been here educated by St. Serf. C. has various charitable institutions, and carries on some damask weaving. In the 16th c. it was famous for the manufacture of salt and the export of coal. Its once extensive shipping-traffic is now gone. Pop. (1881) 373. It returns one member to parliament with Stirling, Dunfermline, Inverkeithing, and South Queensferry. From James VI.'s time, up till the beginning of this century, coal-mines were worked here far under the Firth of Forth.

CU'LTIVATED PLANTS—those plants which, either for their usefulness or their beauty, have been to some considerable extent, and not merely as objects of curiosity, cultivated by man—belong to natural orders widely different from each other, and scattered throughout almost all parts of the vegetable kingdom. The prevalence of particular qualities in particular natural orders, indeed, causes us to find groups of C. P. in some of them, as the *Cerealia* or corn-plants among grasses; but with these are botanically associated other species—usually far more numerous—to which no great value has ever been attached, or which are objects of interest to the botanist alone.

It may be that, in some instances, the original preference of certain species was accidental, and that their present superiority over certain others is merely owing to the improvements effected by cultivation; but we are no more entitled to assume that this has been ordinarily the case, than that man has in his selection exhausted, or nearly exhausted, the resources of nature. Some plants are known to have been cultivated from the most remote historic ages; some have but recently become the objects of human care, which yet are deservedly esteemed; and, in some instances—e. g., sea-kale—these have not been introduced from regions newly explored, but are natives of the very countries which have been the seats of ancient civilization. Probably, in the earliest ages, plants useful for food alone were cultivated, and of these only a few kinds, as is still the case among savage tribes; it may perhaps be doubted whether plants yielding fibre for clothing and cordage, or plants from which alcoholic beverages or narcotics could be procured, were most likely next to engage attention.—Of C. P., plants affording articles of human food are certainly the most important, as well as the most numerous class. See FOOD. Next to these may be ranked plants yielding FIBRE (q. v.). Other important classes of C. P. are those yielding alcoholic beverages, all of which, however, are also to be ranked among the plants yielding food (see FERMENTED LIQUORS); those yielding tea, coffee, cocoa, and other similar beverages, containing *Caffeine* (q. v.), or some other analagous principle; those yielding Narcotics (q. v.), as tobacco and opium, some of which are and some are not cultivated also for other purposes; those yielding Dye-stuffs (q. v.); those yielding medicines (see OFFICINAL PLANTS); those yielding fixed oils (see OILS), some of which are to be reckoned among plants valuable for food, on account of the use of their oils as articles of food, whilst they are also valuable on other accounts; those yielding Fodder (q. v.) for cattle; those yielding timber (see TIMBER TREES); those employed for Hedges (q. v.), &c. There are also many miscellaneous useful products of plants, and useful purposes to which they are applicable. Among the former are resins, turpentines, essential oils, gum, caoutchouc, gutta-percha, bark for tanning, &c.; among the latter, the thatching of roofs, basket-making, and the supply of food necessary for useful insects, which leads to the cultivation of the white mulberry as the food of the silkworm, and of the cochineal cactus or nopal as the food of the cochineal insect. Many plants highly valued for their usefulness are still scarcely or not at all cultivated; this is the case particularly with many that yield medicines, for which the whole demand is not too great to be easily supplied by the plants growing wild, and timber trees, the plantation of which only takes place in countries of very advanced civilization. The number of plants cultivated for their usefulnes is continually increasing, as well as of those cultivated for their beauty.

The cultivation of flowers and ornamental shrubs and trees, although unquestionably less ancient than that of some of the plants most necessary for the supply of urgent wants, nevertheless dates from a remote antiquity, and has always existed in every country entitled in any measure to the credit of civilization. Some C. P. have from a very early period been very widely diffused, as has particularly been the case with some of the corn-plants; but others have been confined to particular regions through no necessity of climatic adaptation, but rather from want of intercourse among nations. Thus, some of the finest ornaments of our green-houses and gardens, recently introduced into Europe, have been diligently cultivated from time immemorial in China and Japan, in which countries also many useful plants are cultivated still almost unknown in other parts of the world. The cultivation of useful aquatic plants is practised in China to a degree unapproached in any other country.

The changes produced by cultivation present an interesting and difficult subject to the student of vegetable physiology. Increase of luxuriance and size is a result which might have been expected from abundant nutriment and favorable circumstances of growth; but the determination of the strength of the plant in its vegetation to particular parts, and their greater proportionate increase, is a more remarkable phenomenon, although of common occurrence, as is also the considerable modification of juices and qualities. To these effects of cultivation, perpetuated in the progeny

of the plants, and increased from one generation to another, we owe many of the most useful varieties of cultivated plants. Our cabbages, turnips, carrots, &c., differ very much from the wild plants of the same species; there is little, for example, that is eatable or nutritious in the root of a wild turnip, and the acridity occasionally to be observed even in cultivation exists in it to a much greater degree. Wild celery is poisonous, or almost so. How far the effects of cultivation can be extended, is a question not yet decided in general, nor with reference to particular species.

CULTIVA'TION. The term includes all operations for preparing the soil for those crops which man specially selects for his use. The spade, the hoe, and the plough, have been the primary implements of C. among all nations as far back as their civilization can be traced. All these effect much the same end. By their means the soil is stirred and inverted, which keeps under the vegetation that is supplanted, and loosens the soil to admit of the roots of the sown plants to run through it. The harrow or rake, on the other hand, is employed to smooth the surface and cover the seed. To allow of the C. of the crops when they are growing, in many cases the seeds are planted or sown in rows.

Cereals, for instance, are, with this view, often sown with a *drill* in rows from six to nine inches apart; and the narrow rows are either cultivated by the *hand* or *horse hoe*. Again, turnips, potatoes, and other green crops are sown at wider intervals, from 24 to 30 inches, and are cultivated during their growth by horse-hoes of various descriptions. The implements used in C. will be best treated under their special names, and under the different crops the peculiarities of their cultivation will be considered. A few general principles, however, which ought to be kept in view in the C. of all crops, may be here stated.

The soil, in the first place, should be as completely inverted as possible, since it is an important object to smother or bury the surface-plants, and permit them to decay within the soil and yield food for the plants to be sown. In the second place, it should be rendered as loose and comminuted as possible; for earth in this state both allows an excess of water to pass through it more easily, and it also retains a larger supply within it for the wants of vegetation when the weather is dry. Land that is tilled in autumn may be left open, rough, and cloddy, as the frost of winter will loosen and pulverize it by spring. In a dry and warm climate, the desired state of the soil is secured by abundant ploughing, rolling, and other operations. In a wet and moist climate, these must be more sparingly resorted to, as a moderately rough mould facilitates the draining away of excessive rains, and prevents the soil from becoming consolidated by such excess.

CULTIVA'TOR, a farm implement. See GRUBBER.

CULTRIRO'STRÉS (Lat. knife-billed or ploughshare-billed), a tribe of birds of the order *Grallatores;* distinguished by a long, thick, stout, and generally pointed and trenchant bill, and containing Cranes, Herons, Bitterns, Storks, Adjutants, &c.

CU'LVERIN, among the earlier forms of cannon, was a very long gun. It was generally an 18-pounder, weighing 50 cwt.; the *demi*-C. was a 9-pounder, weighing 30 cwt. A C. of especially large dimensions is still in existence at Dover Castle, where it is known by the name of Queen Elizabeth's Pocket Pistol.

CU'LVERT is the name given to an arched channel of masonry for the conveyance of water underground.

CU'MÆ, an ancient city on the coast of Campania, founded conjointly by colonists from Chalcis in Eubœa, and from Cymæ in Asia Minor. According to Strabo, it was the earliest of all the Greek settlements either in Italy or Sicily, but the precise date of its foundation is a matter of dispute. It soon attained to wealth and power, built several harbors or port-towns of its own, kept a tolerably large fleet, extended its influence over the native tribes of the neighboring territories, planted a colony at Neapolis (Naples), and for 200 years (700—500 B.C.) was indisputably the most important and civilized city in Southern Italy. Subsequently, it was repeatedly but unsuccessfully attacked by the Etruscans and Umbrians.

In 474 B.C., its ally, Hieron, king of Syracuse, defeated the combined fleets of the Etruscans and Carthaginians, who had attacked it by sea. Yet there can be no doubt that these conflicts both lessened its resources and weakened its influence, for in 420 B.C., the Samnites conquered the city, murdered or enslaved most of the citizens, and forcibly married their wives and daughters. A Samnite colony was now established in C., which rapidly degenerated into a second-rate Campanian town. In 338 B.C., it was admitted to the Roman franchise, and from this period steadily adhered to the fortunes of Rome. In the second Punic war, Hannibal tried to capture it, but was repulsed by Sempronius Gracchus. Towards the close of the republic, it became the municipal capital of the district in which the Roman nobles had their villas and sea-coast residences. It continued to exist as a 'quiet' place down to the close of the Roman empire, but re-assumed a momentary importance during the wars of Belisarius and Narses. Its strong fortress, garrisoned by the Goths, was the last place in Italy that held out against the Byzantine army. Few remains of the ancient city exist.—C. is famous as the residence of the Sibyl (q. v.), whose cave—a vast subterranean grotto hewn out of the eastern side of the rock on which stood the citadel—is described by Justin Martyr, who visited it. It was destroyed by Narses in a vain attempt to undermine the fortress.

CUMANA', the oldest European city in the new world, having been built by Diego Castellon in 1521, and originally named New Toledo. It is in the province of the same name, in Venezuela, South America, and stands at the mouth of the Manzanares, on the Gulf of Cariaco, a long and narrow arm of the Caribbean Sea. Lat. 10° 30′ N., and long. 64° 15′ W. Though it was almost entirely destroyed by an earthquake in 1853, yet in 1873 it numbered, including several suburbs, 9427 inhabitants. It has a good roadstead, which is commanded by a fort on an adjacent height. It has but few edifices of any note, for the houses, in order to guard against the evil already mentioned, are generally low built. It carries on a tolerably large export trade in cattle, smoked meat, salt-fish, cocoa, and other provisions.

CUMANA, the department of which the above-mentioned city is the capital, forms the most easterly section of the northern coast of the republic, touching the Orinoco on the south, and meeting Caracas on the west. Besides the capital, it comprises the city of Barcelona, and the towns of Cariaco, Carapano, Aragua, and El Pao. Pop. (1873) 55,476.

CU'MBERLAND, the north-westmost county of England, bounded N. by Scotland and the Solway Firth, W. by the Irish Sea, S. by Lancashire, E. by Westmoreland, Durham, and Northumberland. It is 11th in size of the English counties; greatest length 74 miles; greatest average breadth, 22; 75 miles of coast; area, 1523 square miles; ⅔ being cultivated, and ⅓ in mountain and lake. The surface is mountainous in the south-west and east; the middle consists of hills, valleys, and elevated ridges; and the north and north-west districts, including the vale of Carlisle, are low, flat, or gently undulated. The mountains in the south-west are high, rugged, and sterile, with deep and narrow valleys, lakes, rivers, waterfalls, and woodlands. The chief mountains are Sca Fell Pike, 3210 feet; Sca Fell, 3162; Helvellyn, 3118; Skiddaw, 3054. From the latter are seen the German Ocean and the Irish Sea. The Pennine chain, the great backbone of the north of England, skirts the north-east border of C., and rises in Cross Fell, 2929 feet. C. has 15 lakes, the largest one, Ulleswater, being 9 miles by 1. Six of the chief waterfalls are 60 to 156 feet high. The chief rivers are the Eden, running 35 miles north-west into the Solway Firth; the Esk, running south into the same; and the Derwent, which collects the water of six lakes and several tarns, and runs 33 miles north-west and north into the Irish sea. The great west or Carlisle and Lancaster railway route from Edinburgh to London, crosses the north-east part of Cumberland.

The Lake district, or nearly the south-west half of C., consists of Silurian slates, with protrusions of granite and trap-rocks, and with new red sandstone along the coast south of St. Bees Head. In the north is a semicircular strip of carboniferous limestone; then follow strips of coal strata and Permian rocks; then the new red sandstone plain of Carlisle, with carboniferous limestone on the north-east, including a trap-dike 30 miles long, parallel to and on the east side of the Eden, and crossing to the west near Ainstable. C. abounds in mineral wealth—silver, copper, lead, iron, plumbago, gypsum, limestone, coal, slates, marbles, marl, and several of the more rare minerals.

In the mountainous parts, the climate is cold, wet, and variable, especially from July to October; on the coast, it is mild. There is a fall of 50 inches of rain annually at Whitehaven, and of 68 at Keswick; while at some places among the mountains the fall sometimes reaches 100 inches. Half of the cultivated soil consists of dry loam. Much of the subsoil is wet clay. The chief crops are wheat, barley, oats, turnips, and potatoes. There are many small dairies. Many sheep and cattle are reared in the mountains. The estates are generally small, and farmed by the owners, or held under the lords of the manors by customary tenure. Many of the small or peasant proprietors have had their lands in their families for centuries, and have a high spirit of independence.

There are manufactures of woollens—much being domestic—cottons, linen, earthenware, and glass. C. is divided into five wards or hundreds, 104 parishes, and nine poor-law unions. The chief towns are Carlisle, Cockermouth, Whitehaven, Workington, Maryport, Wigton, Penrith, Keswick, Egremont. Population at the census of 1871, 220,253; at that of 1881, 250,630. In 1880, the number of electors was 24,560. C. returns eight members to parliament—four for the county, two for Carlisle, one for Cockermouth, and one for Whitehaven. C. formed part of Cumbria (q. v.). Many Roman relics have been found, such as altars, inscriptions, coins, instruments, utensils. During Saxon times, it was under Danish law. Henry III. united it to England. For

three centuries before the union of England and Scotland, C. was the constant scene of war and devastation, from incursions of the English and Scotch into this, a debatable tract between the two kingdoms. It was again devastated in the civil wars of the 17th c., and in 1715 and 1745. C. had formerly several monasteries and hospitals; and on the borders, many towers or peel houses; and it has still some old Norman and Gothic churches.

CUMBERLAND, a river, rises in Kentucky, United States, and after a course of 600 miles, of which the lower half is navigable for vessels of 400 tons, enters the Ohio at Smithland from the left, a few miles above the point where the Tennessee also joins the Ohio from the same side.

CU'MBERLAND, a township of Rhode Island, U.S., on Blackstone River, 10 miles north of Providence, containing extensive manufactories of iron, machinery, cotton, boots and shoes, &c. Pop. (1880) 6445.

CUMBERLAND, a city of Maryland, U.S., on the left bank of the Potomac River, at the foot of the Alleghanies, 179 miles west-by-north from Baltimore. It contains county buildings, 8 churches, 3 newspapers, flour-mills, &c. The C. semi-bituminious coal is got in this district. Pop. (1870) 8056; (1880) 10,693.

CUMBERLAND, Dr. Richard, was born in London, July 13, 1632. Educated at St. Paul's School and at Cambridge, he was appointed to the rectory of Brampton, Northamptonshire, in 1658; in 1667, to the living of All Hallows, Stamford; and in 1691, to the bishopric of Peterborough. C. was a man of great acquirements and piety. He was the author of several works, but he is now chiefly remembered on account of his *Inquiry into the Laws of Nature*, issued in reply to Hobbes; and his *Essay on Jewish Weights and Measures*. As an instance of his insatiable thirst for knowledge, it is mentioned that he learned Coptic after the age of 83. He died October 9, 1718.

CUMBERLAND, Richard, a dramatic writer and essayist, was born on the 19th February 1732, in the lodge of Trinity College, Cambridge. He was the great-grandson of the Bishop of Peterborough, and grandson, by the mother's side, of Dr. Richard Bentley. He was placed at the public schools of Bury St. Edmunds and Westminster, and at the age of 14, was entered at Trinity College, Cambridge, where he took his degree in his 18th year, and two years after was elected a fellow. Having been appointed private secretary to the Earl of Halifax, he gave up his intention of entering the church, and passing through several subordinate offices, was appointed secretary to the Board of Trade, holding that office till 1782, when the Board was suppressed. Having obtained a compensation allowance, C. retired to Tunbridge Wells. Here he devoted himself to literature, and wrote farces, tragedies, comedies, pamphlets, essays, and novels. Many of his comedies were successful at the time of their appearance, although they have not kept possession of the stage. C. is best known as an essayist, and as a translator from the Greek poets. His memoirs were published in 1806, and he died in 1811.

CUMBERLAND, William Augustus, Duke of, second son of George II., was born 1721. He adopted a military career, was wounded at Dettingen in 1743, and defeated at Fontenoy by Marshal Saxe in 1745. In 1746 he defeated the Young Pretender at Culloden. In 1747, he was again defeated by Saxe (at Lafeldt), and in 1757 had to surrender and disarm his army at Klöster-Zeven. On his return to England, he felt compelled to resign his commissions, and died in 1765. See *Life* (1776) and *General Orders of* 1745—1747 (1876). The latter seems to show that his severity after Culloden has been exaggerated.

CUMBERLAND ISLAND, a large island with Davis Strait on the E., Hudson's Bay on the W., Hudson's Strait on the S., and on the W. a small strait separating it from Cockburn Island.

CUMBERLAND PRESBYTE'RIANS, a religious denomination which sprang up in 1810 in the state of Kentucky, in North America, in consequence of a dispute between the presbytery of Cumberland in that state, and the Kentucky Synod of the Presbyterian Church in America, concerning the ordination of persons who had not passed through the usual educational curriculum, but whose services the presbytery regarded as demanded for the ministry by the exigencies of the times. In 1880, this church had 26 synods, about 1320 ministers, and 107,000 members. Its doctrines agree with those of the other branches of the Presbyterian Church, except that the doctrine of universal redemption is held, and the predestination of sin denied.

CU'MBRAYS, or GREAT and LITTLE CUMBRAY, two small isles in the Firth of Clyde, between Bute Isle and Ayrshire, and included in the county of Bute. They consist of old red sandstone, with trap-dikes intersecting it. Great Cumbray lies three miles east of Bute, is 3½ miles long by two broad, has a pop. of (1881) 1856, contains Millport and Newton villages, and is a great summer resort of the inhabitants of Glasgow. Little Cumbray lies nearly a mile to the south of Great Cumbray, is one mile long by half a mile broad, and rises 780 feet; it contains many caves, excavated by the sea in the stratified rocks. Pop. (1881) 23.

CU'MBRÉ, La, the Spanish for top or height, is one of the principal passes across the Andes, on the high-road between Santiago in Chili and Mendoza in the Argentine Republic. The altitude of its crest is 12,454 feet, fully one half higher than the pass of the Great St. Bernard in the Alps.

CU'MBRIA, an ancient British principality, comprising Cumberland in England, and that part of Scotland which is now divided into the shires of Dumbarton, Renfrew, Ayr, Lanark, Peebles, Selkirk, Roxburg, and Dumfries. It was governed by its own kings—who had their seat at Dumbarton, Glasgow, and elsewhere—until about the middle of the 10th c., when it became a tributary principality held of the king of the English, by the heir of the king of the Scots. See the article Bretts and Scots.

CU'MBRIAN MOUNTAINS, a great knot of mountains, nearly 50 miles in length and breadth, in the north-west of England, occupying part of Cumberland, Westmoreland, and Lancashire. This tract, the English Lake district, has much of the physical character of Wales, and being unsurpassed in the British Isles for picturesqueness and beauty, it is much frequented by tourists. The central and southern parts consist of Silurian, granite, and trap rocks, rising in lofty rugged mountains, which enclose deep valleys and large lakes. There are 25 mountain-tops upwards of 1500 feet high, including Sca Fell Pike, 3166 feet; Sca Fell, 3100; Helvellyn, 3055; and Skiddaw, 3022. Four passes cross these mountains at the height of from 1100 to 1250 feet. The deep valleys between the mountains contain 14 lakes, 1 to 10 miles long. The largest of the lakes are Windermere, Ulleswater, Conistone Water, Bassenthwaite Water, and Derwentwater. A semi-circular strip of carboniferous limestone skirts the north of the Silurian tract. On the higher C. M., snow lies six or eight months in the year, but on the neighboring coasts rarely above a few days. Many eminent persons have resided among the lakes, the beauty of which has inspired some of the finest writings of Wordsworth, Coleridge, Southey, Professor Wilson, De Quincey, Arnold, and Harriet Martineau.

CUMIA'NA, a town of North Italy, in the province of Turin, 7 miles north of Piñerolo, near the right bank of the Cisola. Pop. 5700.

CU'MMIN, or CU'MIN (*Cuminum*), a genus of plants of the natural order *Umbelliferæ*, containing only one known species (*C. cyminum*), a native of Egypt and the neighboring countries; an annual, with branched stem, much divided thread-like leaves, general and partial involucres resembling the leaves, umbels of small white or pink flowers, and fruit about two lines long. The fruit (seeds) has an odor resembling that of caraway, but stronger and less pleasant. It is employed as a carminative in many parts of the world; in Germany, it is often put into bread; in Holland, sometimes into cheese. It is also used in medicine, particularly with resin for discutient plasters, but its use is now chiefly confined to veterinary practice. It contains a peculiar volatile oil (*Oil of Cummin*). C. is cultivated in the south and middle of Europe, India, &c. C. seed is brought to Britain mostly from Sicily and Malta—The fruit of *Lagoecia cuminoides*, another umbelliferous plant, a native of the Levant, is similar in its qualities and uses to that of cummin. The Black C. of the ancients is believed to be a species of *Nigella* (q. v.). Both are perhaps included in the name C. in Scripture.

Cuminum Cyminum: *a*, fruit; *b*, section of fruit.

CU'MMING, Rev. Dr. John, a popular preacher and author, was born in Aberdeenshire, 10th November 1810, educated at King's College, Aberdeen, where he took his degree of M.A. in 1827, and, in 1833, was ordained to the Scotch Church, Crown Court, Covent Garden, London, where he officiated till a year or two before his death. His popularity as a preacher was very great, especially among 'fashionable' circles. In 1837, C. made his first prominent appearance in public in connection with the Voluntary controversy between Drs. Wardlaw and Chalmers. His views were strongly in favor of establishments. Afterwards he figured prominently on the platform, particularly as the 'cham-

pion' of the anti-popery class of Protestants. But the chief source of his popularity was his gift of apocalyptic interpretation. His exposition of the Book of Revelation was not very convincing to men who are moderately impressed with the grandeur, complexity, and mystery of the Divine Providence; but it was greatly relished, and greedily swallowed by that large portion of the community who love to see all things, even the 'oracles of God,' presented under melodramatic aspects. After some years of ill-health, C. died 5th June 1881.

C.'s works are very voluminous: the chief are *Voices of the Night*, *Voices of the Day*, *Voices of the Dead*, *Apocalyptic Sketches*, *Expository Readings in the Old and New Testament*, and *The Seventh Vial*.

CU'MNOCK, OLD, a town in the south-east of Ayreshire, on the left bank of Lugar Water, and on the Glasgow and Dumfries Railway, 16 miles east of Ayr, in the middle of the district of Kyle. The population, in 1881, was 3345. It was once famous for the manufacture of wooden snuff-boxes, with 'invisible wooden hinges,' 2500 to 3500 being made yearly, but this business has for many years been almost wholly in the hands of the Mauchline manufacturers. Around Old C. there is an abundant supply of good coal, and of rich iron ore. It has also manufactures of reaping and thrashing-machines, and other agricultural implements. New Cumnock is a village 5 miles south of Old C., amid the high lands in the upper part of Kyle district. Pop. (1881) 1265. Near New Cumnock are found ironstone, antimony, smiths' and cannel coal, and plumbago.

CU'MYN, CUMMING, or COMYN, a family which rose to great power and eminence in England and Scotland. It took its name from the town of Comines, near Lille, on the frontier between France and Belgium. While one branch remained there, and in 1445, gave birth, in its old château, to the historian Philippe de Comines (q. v.), another followed the banners of William of Normandy to the conquest of England. In 1069, the Conqueror sent Robert of Comines, or Comyn, with 700 horse to reduce the yet unsubdued provinces of the north. He seized Durham, but had not held it for 48 hours when the people suddenly rose against him, and he perished in the flames of the bishop's palace. His nephew, William, became Chancellor of Scotland about 1133, and nine years later, all but possessed himself of the see of Durham. The chancellor's nephew, Richard, inherited the English possessions of his family, and acquired lands in Scotland. By his marriage with Hexilda, Countess of Athol, the granddaughter of Donald Bane, king of the Scots, he had a son William, who, about 1210, became Earl of Buchan by marrying the Celtic heiress of that great northern earldom. By this marriage, he was father of Alexander, Earl of Buchan, who, by marrying a daughter of Roger de Quenci, Earl of Winchester, acquired the high office of Constable of Scotland, with great estates in Galloway, Fife, and the Lothians. By a previous marriage with a wife whose name has not been ascertained, William C. was father of Richard—whose son John became Lord of Badenoch—and of Walter, who by marriage became Earl of Monteith. By other marriages, the family obtained, for a time, the earldom of Angus, and the earldom of Athol, so that, by the middle of the 13th c., there were in Scotland 4 earls, 1 lord, and 32 belted knights of the name of Cumyn. Within 70 years, this great house was so utterly overthrown that, in the words of a contemporary chronicle, 'there was no memorial left of it in the land, save the orisons of the monks of Deer' (a monastery founded by William C., Earl of Buchan, in 1219). The Cumyns perished in the memorable revolution which placed Bruce on the throne of Scotland.

Their chief, the Lord of Badenoch, had, in 1291, been an unsuccessful competitor for the crown, as a descendant through king Donald Bane, of the old Celtic dynasty. His son, Red John C., was one of the three wardens of Scotland, and distinguished himself by his gallant resistance to the English. He fell under Bruce's dagger, before the altar of the Franciscan friars at Dumfries, in 1306; and his kindred went down, one after another, in the struggle to avenge him. John C., Earl of Buchan, was defeated by Bruce in a pitched battle near Inverury, in 1308, when his earldom was wasted with such relentless severity, that—we are told by the poet who sang the victories of Bruce—for sixty years afterwards, men mourned the desolation of Buchan. Such of the Cumyns as escaped the sword, found refuge with their wives and children, in England, where, although they were so poor as to be dependents on the bounty of the English court, they married into the best families, so that, in the words of Mr. Riddel, 'their blood at this day circulates through all that is noble in the sister kingdom.'

CUNARD, SIR SAMUEL, founder of the well-known line of Transatlantic steamers, was born in 1787 at Halifax, Nova Scotia, where his father, a French Canadian, had settled. Becoming early a successful merchant and shipowner, C. cherished the idea of steam communication between England and America; and having obtained a contract from the English government for the mail service, built four paddle-steamers for the Atlantic voyage. The first passage was that of the *Britannia* in 1840. From its small but successful beginning, C.'s undertaking soon developed into one of the vastest of private commercial concerns. Made a baronet in 1859, C. died at London, 28th April 1865.

CUNA'XA, a place in Babylonia, east of the Euphrates, about 60 miles north of Babylon, noted for the battle (401 B.C.) between Cyrus the younger and his brother Artaxerxes Mnemon, in which the former was killed.

CUNDINAMA'RCA, the central state of Colombia (formerly New Granada), has an area of 79,000 square miles, and a population (excluding Indians) of about 410,000. The western part is mountainous, with luxuriant valleys; in the east are vast plains. C. is well wooded, and rich in minerals. The capital of C. is Bogota, also capital of the republic. C. was one of the most highly civilized regions of the continent before the Spanish conquest; and ancient ruins are numerous.

CUNE'IFORM, Cuneatic, Wedge-shaped, Arrow-headed (Fr. Tête-à-clou, Ger. Keilförmig), are terms for a certain form of writing, of which the component parts may be said to resemble either a wedge, the barb of an arrow, or a nail. It was used for monumental records, and was either hewn or carved in rocks and sculptures, or impressed on tiles and bricks.

The first date that can be assigned to it is about 2000 B. C., and it seems to have died out shortly before or after the reign of Alexander the Great. It appears to have been employed first in Assyria and Media, and to have thence spread over the whole of that vast portion of Asia which formed the Persian monarchy under the Achæmenidæ. For nearly 2000 years after its extinction its very existence was forgotten. Although the immense ruins found all over that ancient kingdom, and principally those of splendid palaces and tombs, which, at a distance of about 12 miles from Shiraz, designate the site of ancient Persepolis, had at all times attracted the attention of Eastern travelers, still no one seems to have dreamed that those strange wedges which completely covered some of them could have any meaning. It was Garcia de Sylva Figuëroa, ambassador of Philip III. of Spain, who, on a visit to Persepolis in 1618, first became possessed with the firm conviction that these signs must be inscriptions in some lost writing and, perhaps, language, and had a line of them copied. Amongst subsequent travelers whose attention was attracted to the subject, Chardin, after his return to Europe in 1674, published three complete groups of cuneiforms, copied by himself at Persepolis, together with a comparatively long and minute account of the mysterious character. He likewise declared it to be 'writing and no hieroglyphs; the rest, however, will always be unknown.' Michaux, a French botanist, sent, in 1782, an entire altar, found at Bagdad, to Paris, covered with inscriptions, and bearing a large wedge—evidently an object of worship—on its top. Ever since, the materials for the investigation of a subject, the high importance of which by that time was fully recognized, have been rapidly accumulating. Sir H. Jones, Ker Porter, Robert Stewart, Sir W. Ouseley, Bellino, Dr. Schultz—up to Rich and Botta, Flandin, Rouet, Layard, Oppert, and, above all, Rawlinson, each in his turn brought back more or less valuable materials from his eastern travels; and, naturally enough, those explorers are among the foremost to engage in the study of the records they had brought to light.

Shrouded in comparative mystery though certain portions of these characters and the language they represent still be, it is highly interesting and instructive to notice the opinions first entertained of them by the wise and learned in Europe. In the Transactions of the Royal Society of June 1693, they first appeared from a copy made by Flowers, and they are held to be 'the ancient writing of the Gaures or Gebres, or a kind of *telesmes*'—an expression no less unintelligible than the subject it tries to explain. Thomas Hyde, the eminent Orientalist, declared them, in his learned work on the religion of the ancient Persians, which appeared in 1700, to be nothing more nor less than idle fancies of the architect, who endeavored to show how many different characters a certain peculiar stroke in different combinations could furnish, and reproved the authors of all those 'so-called Persepolitan inscriptions' very strongly for having misled so many wise men, and taken up so much of his own precious time.

Witte, in Rostock, saw in them the destructive work of generations upon generations of *worms*. Generally, they were pronounced to be talismanic signs, mysterious formulæ of priests, astrological symbols, charms, which, if properly read and used, would open immense vaults full of gold and pearls—an opinion widely diffused among the native *savans*. The next step was to see in them a species of revealed digital language, such as the Almighty had first used to Adam. Lichtenstein read in some of them certain passages from the Koran, written in Cufic, the ancient Arabic character; in others, a record of Tamerlane; and was only surprised that others should not have found this, the easiest and clearest reading, long before him. Kæmpfer was not quite sure whether they were

Chinese or Hebrew characters. That they were Runes, Oghams, Samaritan, Greek characters, were some of the soberest explanations.

It was Karsten Niebuhr who first showed the way, to the more sensible portion of the learned, out of this labyrinth of absurdities. Without attempting to read the character itself, he first of all established three distinct cuneiform alphabets instead of one, the letters of which seemed to outnumber those of all other languages together. The threefold inscriptions found at Persepolis he thus took to be transcripts of the same text in three alphabets, in a hitherto unknown language. Tychsen of Rostock (1798) and Münster of Copenhagen (1800), affirmed and further developed this conjecture. The latter went so far as to divide the characters and inscriptions into alphabetical, syllabic, and monogrammatical, and to assume two different languages—Zend for inscriptions of a religious, Pehlvi for those of a political character. The real and final discovery, however, is due to Grotefend of Hanover, and dates from 1802. On the 7th of September of that year, he laid the first cuneiform alphabet, with its equivalents, before the Academy of Göttingen—strangely enough, in the very same sitting in which Heyne gave an account of the first reading of hieroglyphs. The process by which Grotefend arrived at that wonderful result is so supremely interesting, that we cannot omit to sketch it briefly. He fixed upon a Persepolitan inscription of what was called the first class, and counted in it thirty promiscuously recurring groups or combinations of cuneiforms. These groups he concluded to be letters, and not words, as a syllabarium of thirty words could not be thought of in any language. Then, again, a certain oblique wedge, evidently a sign of division, which stood after three, four, five, up to eight or nine such groups or letters, must show the beginning or end, not of a phrase, but of a word. Tychsen and Münster had already pointed out a certain combination of seven characters as signifying the royal title. Grotefend adopted this opinion.

The word occurred here and there in the text, and after the first words of most of the inscriptions, twice; the second time with an appendage, which he concluded to be the termination of the genitive plural, and he translated these two words, without regard to their phonetic value, 'King of Kings.' He then, in comparing the words preceding the royal titles in two tablets, found them repeated in what he assumed to be a filial relation; thus: There were three distinct groups, words, or names, which we will call X, D, and H, and this is how they occurred: 1, X, King of Kings, son of D, King of Kings; 2, D, King of Kings, son of H; but the 3, H, was *not* followed by the word King. H, therefore, must have been the founder of the dynasty. Now the names themselves had to be found. Grotefend, unlike his predecessors, had no recourse to philology, but to archæology and history. The inscriptions in question were by that time proved to belong to the Achæmenian dynasty, founded by Hystaspes = group H. He was followed by Darius, 'King of Kings, son of Hystaspes,' or Darius Hystaspis = group D; he, again, by Xerxes, King of Kings, son of Darius, King of Kings = group X—and the problem was solved. It could not have been Cyrus and Cambyses, as the groups did not begin with the same sign (C); nor Cyrus and Artaxerxes, the first being too short for the group, the second too long—it could only be Darius, Xerxes, Hystaspes—of course, in the orthography of their, not of our time; and wherever in these names the same letters recurred, they were expressed by the same combinations of signs. A further proof of the correctness of the reading was furnished by a vase in Venice, bearing a cuneiform and a hieroglyphical inscription, which were both read at the same time independently 'Xerxes.' Innumerable difficulties, however, remained, and remain up to this moment. Grotefend had, after all, only read—and not altogether correctly—three names, which did not contain more than twelve letters—the rest being mere conjecture—and there were many more in this alphabet. The two other alphabets, with an infinite variety of letters, had hardly been properly approached yet. Moreover, the discovery of Grotefend was in itself so startling, so extraordinary and bold, that no one ventured to follow it up for the next 20 years, when H. Martin found the grammatical flexions of the plural and genitive case. We cannot now specify his further discoveries, or those of Rask, Burnouf, Lassen, Westergard, Beer, Jacquet, and others who followed; we will only say, that they mostly secured for themselves fame and name by rectifying or fixing one or two letters. The last and greatest of investigators of this first alphabet is Rawlinson, who not only first copied, but also read, the gigantic Behistun inscription—containing more than 1000 lines—of which more anon.

We now proceed to give what may be called the results of the investigations of the cuneiform character in general, up to this present moment; but we must warn the reader beforehand, that though much has been done, more remains to be done, and that a few years may change the whole aspect of cuneiform studies.

Cuneiform writing, as we said before, was used for monumental records only, a cursive writing—from right to left—being used for records of minor importance. The inscriptions are mostly found in three parallel columns or tablets, and are then translations of each other in different alphabets and languages, called respectively Persian, Median, and Assyrian; the Achæmenian Kings being obliged to make their decrees intelligible to the three principal nations under their sway, as in our days the Shah of Persia would use the Persian, Turkish, and Arabic languages, in order that he might be understood in Bagdad and Teheran.

The first of the three, the Persian—first, in so far as it always holds the place of honor—consists of 39 to 44 letters, and is the most recent of the three, the most ancient being the Assyrian. It is distinguished by the oblique stroke which divides its words. Its letters are composed of not more than five strokes or wedges placed side by side horizontally or perpendicularly, or both, never—with one exception—crossing each other. The language is pronounced by all investigators (save Gobineau), to be as near Sanscrit as possible, although not so refined, and to be the mother-language of modern Persian. It is only twice found by itself; all the other inscriptions are trilingual. The time of its use is confined to the years 570—370 B.C. The oldest instance of its employment is an inscription of Cyrus the Great at Pasargadæ; the most recent, that of Artaxerxes Ochus at Persepolis. The most important is that of Darius Hystaspis, in the great inscription of Behistun, which contains, besides genealogical records, a description of the extent of his power, the leading incidents of his reign, prayers to Ormuzd and the angels, and reference to the building of the palaces—the last two subjects generally forming the only contents of the other Persian inscriptions. The inscription of Artaxerxes Ochus is important, in so far as it traces his origin to the Achæmenidæ, through Arsames, grandfather of Darius. Most of these inscriptions occur at Persepolis, Behistun, Naksh-i-Rustam, and Hamadan.

The second kind is called the Median, because it takes the second place in the trilingual inscriptions, under the conquering Persians, but over the conquered Assyrians, and as the Medes stood somewhat in that relation to these two nations, that name was selected. Another name, 'Scythic,' has been proposed, or, by way of compromise, 'Medo-Scythic,' and the language—supposed to have been spoken by those innumerable Tartaro-Finnic tribes which occupied the center of Asia—has been pronounced to be a Turanian dialect. But the process of constructing out of such slender elements as Samojed and Ostiak words, a so-called 'Scythic,' is somewhat similar to the attempt of reconstructing Sanscrit from some detached and very doubtful French and English words. These inscriptions never occur by themselves (one instance again excepted), and being translations of the Persian records, about ninety names have been ascertained, and an alphabet of about 100 characters—combinations of a syllabic nature—has been established. The principal investigators of this character are Westergaard, De Saulcy, Hincks, Norris, and Oppert. Gobineau holds the language to be Huzvaresh, a mixture of Iranian and Semitic.

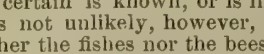
The third and most important is the Assyrian portion of the cuneiforms. The trilingual records gave the first clue to the deciphering of this character; but many original, more than a thousand years older, documents have since been found in Babylon, Nineveh, and other places near the Euphrates and Tigris, and even in Egypt. About 400 different signs have been distinguished on slabs, cylinders, barrels, prisms, of a phonetic, syllabic, and ideographic nature. Proper names are preceded by monograms, which give the same help to their readings as cartouches in hieroglyphics. Of those 400 signs, however, hardly one-tenth are known for certain. Proper names were found varied to about five times, and the characters themselves are both homophonous (same sound expressed by various signs) and polyphonous (same sign with various sounds). Five and more dialects have been distinguished in the language, which is decidedly Semitic (Gobineau takes it to be simply Arabic); and these dialects are supposed to have belonged either to different tribes or subsequent periods. It is this alphabet about which the greatest uncertainty and confusion prevail, for endless subdivisions, and even certain assumed grammatical forms, do not constitute a certainty. There is, however, a hope of its eventually being fully deciphered. A few years ago, the Asiatic Society submitted a cylinder of Tiglath-Pileser to four prominent investigators of the subject, and they independently read it nearly alike, with exception of the proper names, where they widely differed. As a proof of the enormous importance of this character for history, grammar, law, mythology, archæology, and antiquities generally, we will name some of the records of which Rawlinson, a few years ago, proposed the publication (now in progress): Chaldæan Legends (2000—1500 B.C.); Bricks from Kilehsergat, of the early Kings of Assur (1273—1100), in a character approaching the cursive; Annals of Tiglath-Pileser I. (1120 B.C.); Annals of Sardanapalus, of Shamas, father to the biblical Pul, of the biblical Pul and Semiramis, his wife, of Sargon, Sennacherib, Assur bani-Pal, son of Esarhaddon; Cylinder of Nebuchadnezzar; Cylinders containing the notice of Bel-

shazzar, &c.; besides syllabaries, vocabularies, mathematical and astronomical tablets, calendars and registers, and more than 1000 mythological tablets. Nay, if the Birs-Nimrud really stands on the foundations of the old tower of Babel, we might in the bricks excavated at these very foundations read the language spoken at the time 'when the whole earth was of one speech.'

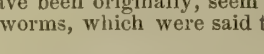
As to the origin of the character, we will briefly state, in conclusion, that nothing certain is known, or is likely to be known for some time. It is not unlikely, however, that it was hieroglyphic, although neither the fishes nor the bees, which these letters are supposed to have been originally, seem to have more in their favor than the worms, which were said to be their unconscious authors.

The following is the opinion of Rawlinson on this point: 'That the employment of the cuneiform character originated in Assyria, while the system of writing to which it was adapted was borrowed from Egypt, will hardly admit of question. Whether the cuneiform letters, in their primitive shapes were intended like the hieroglyphs to represent actual objects, and were afterwards de-

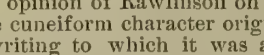
Persian.



Scythic.



Assyrian.



graded to their present forms; or whether the point of departure was from the Hieratic, or perhaps the Demotic character, the first change from a picture to a sign having thus taken place before Assyria formed her alphabet, I will not undertake to decide; but the whole structure of the Assyrian graphic system evidently betrays an Egyptian origin. The alphabet is partly ideographic and partly phonetic, and the phonetic signs are in some cases syllabic, and in others literal. Where a sign represents a syllable, I conjecture that the syllable in question may have been the specific name of the object which the sign was supposed to depict.' For the opinion that the cuneiform characters were invented by the primitive Accadian inhabitants of Chaldæa (who spoke an agglutinative language), see the article ASSYRIA.

In order to give the reader some idea of the appearance of the cuneiform character, we subjoin the name of Darius (Dariyavas, Tariyavaus), written in the Persian, Scythic, and Assyrian alphabets:

For fuller information on this subject, see Rawlinson, *The Persian Cuneiform Inscription at Behistun deciphered and translated*, &c. (Journal As. Soc., 1846, &c.); Grotefend, *Erläuterungen der Keilinschriften aus Behistun* (Göttingen, 1854); Lassen u. Westergaard, *Ueber die Keilinschriften der ersten und zweiten Gattung* (Bonn, 1845); Hincks, *On the First and Second Kinds of Persepolitan Writing* (Transact. Roy. Ir. Soc., 1846); Norris, *Memoir on the Scythic Version of the Behistun Inscription* (Journ. As. Soc., 1853); Rawlinson, *A Commentary on the Cuneiform Inscriptions of Babylon and Assyria* (1850); Oppert, *Etudes Assyriennes* (Journal Asiatique, Paris, 1857); Rénan, *Critique*, &c. (Journ. d. Sav., Paris, 1859).

CU'NNINGHAM, ALLAN, poet and *littérateur*, was born in 1785, at Blackwood, in Dumfriesshire. The circumstances of his parents were humble. At the age of 11, C. was taken from school, and apprenticed to a stone-mason. He worked faithfully at his calling; but his spare time, and his evenings, were given to song and the collection of traditions. He first appeared in print as a contributor to Cromek's *Remains of Nithsdale and Galloway Song*. These contributions, purporting to be ancient ballads, were entirely the composition of the ingenious and ambitious stone-cutter. The publication gained him the acquaintance of Hogg and Sir Walter Scott. With the latter, 'Honest Allan' was always a prodigious favorite. On his removal to London, he became one of the best known writers for the *London Magazine*. He subsequently obtained a situation in Chantrey's studio as foreman, or confidential manager, and this office he held till his death. During his career, he wielded an indefatigable pen. He wrote novels, poems, and a drama. His principal prose works, apart from his fictitious narratives are *Lives of the Painters, a Life of Burns*, and a *Life of Sir David Wilkie*. He died in London on 21st Oct. 1842. As a Scotch poet, he ranks, perhaps, after James Hogg. His songs, although disfigured by false taste, mannerism, and a superabundance of ornament, have true lyrical impulse and movement.

CUNNINGHAM, PETER, son of Allan Cunningham, the poet (q. v.) (born 1816, died 1869), is known in literature as the author of *Handbook of London, Life of Drummond of Hawthornden, Life of Inigo Jones, Modern London*, &c.; as the editor of various English classics; and as a frequent contributor to periodicals.

CUNNINGHAM, WILLIAM, D.D., a distinguished Scotch theologian, was born in 1805, and ordained as a minister of the Church of Scotland in 1830. He took a prominent part in the discussions previous to the Disruption in 1843, and was one of those who left the Establishment to form the Free Church. In 1847, he became principal of the New (Free Church) College, Edinburgh. He died in 1861. He is the author of *Historic Theology in the Christian Church* (1862), *Reformers and Theology of the Reformation* (1862), and *Discourses on Church Principles* (1863).—See *Life of C.*, by Rainy and Mackenzie (1871).

CUNNINGHA'MIA, a genus of trees of the natural order *Coniferæ*, nearly allied in botanical characters to the true pines and firs, but in foliage having considerable resemblance to the Araucarias. *C. Sinenois* is an evergreen tree, with narrow ovato-lanceolate, stiff, and sharp-pointed leaves, common in China, but too tender for the climate of Britain.

CUP, DIVINATION BY, a mode of foretelling events, practised by the ancient Egyptians, and still prevailing in some of the rural districts of England and Scotland. One of the eastern methods consisted in throwing in small pieces of gold or silver leaf into a C. of water, in which also were placed precious stones, with certain characters engraved upon them. The infernal powers were then invoked, and returned answer, either in an intelligible voice, or by signs on the surface of the water, or by a representation in the C. of the person inquired about. By the modern method, a person's fortune is foretold by the disposition of the sediment in his tea-cup after pouring out the last of the liquid. Few people now, however, even among the most ignorant, have implicit faith in the oracle.

CU'PAR-A'NGUS, a town on the borders of Perthshire and Forfarshire, and partly in both, is situated on the left bank of the Isla, a tributary of the Tay, 12½ m. E. by N. from Perth, and 16 m. W.N.W. from Dundee. It lies between the Grampian and Sidlaw Hills, in the center of the valley of Strathmore, and from its position in this valley it is popularly called 'the capital of the How.' Pop. (1881) 2154. It has extensive linen manufactures, with a considerable traffic in timber. Near the town are the remains of two Roman camps, on one of which stand the ruins of a monastery, built in 1164 by Malcolm IV., and destroyed at the Reformation. Recent excavations have exhumed numerous richly-carved tombstones in the grave-yard contiguous to the parish church, evidently those that had marked the graves of the ancient dignitaries of the monastery. The abbey revenue in 1562 was £1234 14*s.* 9*d.* in money, and 182 chalders of victual. The classic hill of Dunsinane is situated about five miles to the south-west of C., and the dilapidated castle of the 'bold Piteur,' who fell in the battle of Killiecrankie, in 1689, is within a distance of two miles.

CUPAR-FIFE, a royal, parliamentary, and municipal burgh, and the county town of Fifeshire, near the middle of the peninsula of Fife, on the Eden, 9 miles from its mouth, 32½ miles north of Edinburgh, and 14½ south of Dundee. It lies in a beautiful vale, stretching east and west, with a range of hills on the south, and a fertile country, with wooded eminences, on the north. It consists chiefly of two streets at right angles with each other. Pop. (1881) 5010. The chief manufactures are linens, bricks, and earthenware. It contributes with St. Andrews, East and West Anstruther, Crail, Kilrenny, and Pittenweem, to return one member to parliament. A fortress of the Macduffs, thanes of Fife, once stood on a mound called the Castle Hill, at the east end of the town. In former times, religious shows, mysteries, or moralities, were acted on a green esplanade in front of the castle, still called the Play-field. There also was acted the *Three Estates*, a celebrated satire on the priesthood, which hastened the religious revolution, and was written by Sir David Lindsay, whose estate of the Mount was near the town.

CU'PEL. See CUPELLATION.

CUPELLA'TION is the process of the separation of one metal from another (as lead from silver) by the use of a CUPEL highly heated in a muffle furnace. See ASSAY.

CU'PID, one of the gods of the classic mythology, whose name in Latin signifies *Desire*. The genealogy of this meddlesome divinity is rather confused. Sometimes he is represented as the son of Vulcan and Venus, or of Mars and Venus, while at other times the mythologists seem at a loss to name his father, and make him spring from the sea-foam, like Venus herself. As among the Greeks, the myth of Eros gave birth to numerous *Erotes* or Loves, so at Rome, also, that of C. originated a legion of Cupids, who all possessed the same attributes as their prototype. Every one knows what these were: the bow, arrows, quiver, and wings. Often a bandage covered the eyes. The appearance was that of a chubby child, or youth with a malicious smile. His darts could pierce the

fish at the bottom of the sea, the birds in the air, and the gods in Olympus. The immensity of space was his home, but like his mother, he specially loved the flowery thickets of Cyprus.

CU'POLA (Ital., from the root of *cup*), a spherical vault, or concave ceiling, on the top of a building. Cupolas are hemispherical, or of any other curve, and often consist of glass, so as to form a window in the roof. See DOME.

CUPPING is the application of cups, from which the air has been exhausted, to the skin, with the object of causing congestion or excessive fulness of the cutaneous blood-vessels; and if it should be thought desirable to withdraw some blood, the skin may be cut or scarified, and the exhausted cups applied over the incisions, to favor its flow.

C. has been a part of surgical practice from the earliest times, and instruments for performing it have been found in use among the least civilized nations. Of old, the cups were either small horns, open at both ends, from which the air was withdrawn by suction at the narrow extremity, or glasses of various shapes, with a small hole in the bottom of each. This hole was plugged with wax, the air exhausted by heat, and when the operator wished to remove them, he withdrew the plug, and allowed the air to enter. The modern cups are of glass, with round or oval mouths, and closed bottoms. Some have small sockets for holding cotton wick in their interior.

The principal improvements have been in the methods of incising the skin. This used to be effected with a common lancet or narrow knife, with a short blade and convex edge, set in a long elastic handle, which the operator struck rapidly with his finger, so as to drive the blade 26 or 30 times into the skin.

This was so tedious an operation, that a number of similar blades were used at once. These are contained in a box, which has slits pierced in it corresponding to the number of blades; the latter can be caused to emerge at these slits by turning a handle, or more rapidly by setting free a spring, which causes them to revolve suddenly, and in doing so protrude at the slits more or less, according to the will of the operator. The operation is thus performed: The scarificator, glasses, torch, spirits of wine, and a lighted candle are placed ready at hand; the part is sponged with hot water, so as to cause an increased flow of blood into it, then dried with a warm towel; the torch, previously saturated with the spirits of wine and lighted, is held for an instant in one of the glasses, which is now clapped on to the skin. The number of glasses depends on the quantity of blood it is thought desirable to abstract; each one will probably withdraw from three to five ounces. When the skin under the glass has become red and swollen, the cupper removes it, applies the scarificator, and as rapidly as possible again exhausts the air from the glass, and claps it on again. The blood will now flow into it; and when enough has been taken, the glass is removed, and some lint applied to the wounds. This apparently simple proceeding requires considerable skill, so that C. is practised as a separate profession in large towns, and the medical boards of the public services require that candidates for their appointments should produce a certificate of having received special instruction in the art. The difficulties consist in regulating the depth of the cuts, for should they be either too deep or too shallow, the blood will not flow. If the glasses be completely exhausted of air, their rims hurt the patient, and the blood will not flow, and it has happened that arteries or large veins have been wounded by ignorant operators.

There are many modifications of the ordinary C. apparatus, but all on the same principle.

Dry C. is simply applying the cups as described, but not wounding the skin. The ancients had a high opinion of this method, as they believed the 'noxious humors' were drawn forth of the body into the cups; and it need scarcely be added that extempore cups may be found in tumblers, finger-glasses, or any air-tight vessel with a smooth rim.

CU'PULE (*Cupula*), in Botany, a sort of cup formed by a number of cohering bracts, and surrounding the fruit or the base of the fruit in certain plants; as the oak, in which it is the cup of the acorn, and the hazel, in which it is the husk of the nut.

CUPULI'FERÆ (i. e., cupule-bearing), or CORYLACEÆ, a natural order of exogenous plants, consisting of trees and shrubs, natives of temperate climates. The leaves are alternate and furnished with stipules. The male flowers, and sometimes also the female flowers, are disposed in catkins (and this order is regarded by many botanists as a sub-order of AMENTACEÆ, q. v.); the stamens are 5—20, inserted into the base of scales or of a membranous perianth; the ovary is crowned by the rudiments of a persistent perianth, and surrounded by a Cupule (q. v.) of various figure; there are several cells and ovules, but the greater part of the ovules are abortive; the fruit is a 1-celled nut, more or less enclosed in the cupule; the seed is usually solitary; the embryo large, with fleshy cotyledons and minute superior radicle.—This order contains many of the most important trees of Europe and America, including all the different kinds of Oak, Beech, Chestnut, and Hazel, the Hornbeam, &c. Many species are also natives of tropical countries, but they are only found at considerable elevations.

CUR (Welsh *cor*, a dwarf, anything small; *coravon*, a small river; *corgi*, a small dog), a name sometimes applied indiscriminately to small dogs of any kind not highly valued, and in this way often particularly appropriated to dogs of mongrel breed, but also used by naturalists as the common designation of many races, of which the Terriers (q. v.) may be considered as the type; all of them small size, and exhibiting in a high degree the capacity for domestication along with activity and sagacity. These races are distributed over all parts of the world, and differ very considerably from each other, and are found domesticated even among very rude and savage tribes. The Pariah dog of India is reckoned among them, and exists in that country both in a wild and in a domesticated state; its body is more lank than that of the cur races of Europe, a character which is also in some measure exhibited by the dogs that haunt the streets of towns in Turkey, Persia, &c. The curs may, not improbably, have been the first domesticated dogs.

CURAÇA'O is the most important of the Dutch West India Islands which lie near the northern coast of Venezuela, in the Carribean Sea. Pop. (1880) Curaçao, 24,146; Bonaire, 4906; Aruba, 6204; Netherlands part of St. Martin, 3142; St. Eustatius, 2097; and Saba, 1955. Entire pop. 42,530, all free. The capital of C. is Willemstad, a very handsome town situated on the bay of St. Anna, and having 13,000 inhabitants. The soil of C. and its dependent islands is less productive than that of other tropical lands. The exports are maize, beans, cattle, salt, phosphate of lime, red dyewood, charcoal, bricks, and fruits. Goat, kid, and deer skins are exported in large numbers. Provisions have to be imported, to some extent, so poor is the soil; though tamarinds, bananas, cacao, oranges, sugar, tobacco, and maize are grown. The trade is mainly with the United States. C. (which is also spelled *Curaçoa* and *Curassou*) was discovered by Spain in 1527, taken by the Dutch in 1634, conquered by the English in 1807, and restored to Holland in 1815.

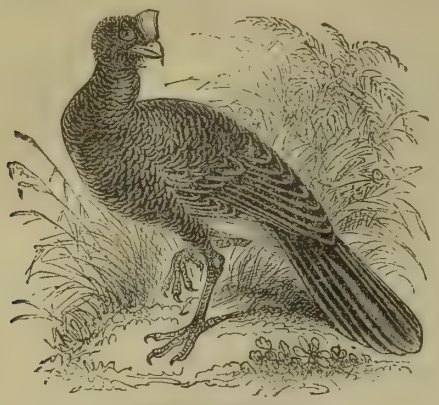
CURAÇO'A is a well-known and esteemed liqueur, made either from the small oranges called C. oranges, or from orange-peel, by digesting in sweetened spirits, along with a little cinnamon, and often a little mace or cloves. The spirits used are generally reduced to about 56 under proof, and contain about 3½ pounds of sugar per gallon. C. is often colored by digesting in it for a week or ten days a little powdered Brazil wood, and mellowing the color by means of burned sugar.

CURAÇOA ORANGES, small oranges which have fallen from the trees long before maturity. They have properties similar to those of orange-peel, but are more bitter and acrid, and are used for the same purposes.

CURARI, OURARI, WOORALI, or WOORARA, a celebrated poison used by some tribes of South American Indians for poisoning their arrows. It is by means of this poison that the small arrows shot from the Blowpipe (q. v.) become so deadly. The nature and source of this poison remained long unknown, the Indians being very unwilling to reveal the secret, which seems, however, to have been at last obtained from them by Sir Robert Schomburgk, and it is now regarded as pretty certain that the principal ingredient is the juice of the *Strychnos toxifera*, a tree or shrub of the same genus with that which yields nux vomica. See STRYCHNOS. It has a climbing stem, thickly covered with long spreading reddish hairs; rough, ovate, pointed leaves, and large, round fruit. The poison, when introduced into the blood, acts on the nervous system, and produces paralysis, with convulsive movements, and death ensues. It is supposed to be the most powerful sedative in nature. Artificial respiration is the most efficacious means of preventing its effects. It has been proposed to employ it in the cure of lockjaw and hydrophobia, and it has recently been asserted, as the result of experiment, that it can be very beneficially employed in the former disease. Like snake-poison it is comparatively inert when taken into the stomach. See WOORALI.

CURA'SSOW, or HO'CCO (*Crax*), a genus of large gallinaceous birds of the family *Cracidæ*, having a strong bill surrounded at the base with a skin—sometimes brightly colored—in which the nostrils are pierced, and the head adorned with a crest of feathers curled forward, which can be raised and depressed at pleasure. The species, which are not numerous, are natives of the forests of the warm parts of America. They congregate in flocks, and although they live much among the branches of trees, their habits greatly resemble those of domestic poultry. They are very unsuspicious of danger, until taught by severe experience; and are easily domesticated. The best known species (*C. Alector*) is about the size of a turkey, its plumage is almost entirely black. It is

abundant in the forests of Guiana. Its flesh is very good eating. It is kept in poultry-yards in South America, and was introduced into Holland at the close of last century, where it seemed com-



Galeated Curassow.

pletely acclimated, but the stock was lost midst the troubles which ensued on the French Revolution.

CU'RATE, literally, one who has the cure (Lat. *cura*, care) of souls, in which sense it is used in the Church of England Prayer-book, 'all bishops and curates.' It is, however, generally used to denote the humblest degree in the Church of England. A. C., in this sense, is a minister employed by the incumbent of a church (rector or vicar), either as assistant to him in the same church, or else in a chapel of ease within the parish belonging to the mother church. He must be licensed and admitted by the bishop of the diocese, or by an ordinary having episcopal jurisdiction, who also usually appoints his salary. Any C. that has no fixed estate in his curacy, not being instituted and inducted, may be removed at pleasure by the bishop or incumbent. But there are *perpetual* curates as well as temporary, who are appointed where tithes are impropriate and no vicarage was ever endowed: these are not removable, and the impropriators are obliged to maintain them. In general, the salaries of curates, certainly the hardest-worked, and not the least devoted of the English clergy, are shamefully small, and reform in this matter is urgently required.

CURA'TOR TO A MINOR. See GUARDIAN.

CURB (in horses) consists of strain of the straight ligament which runs down the back of the hock; is most common in animals with straight small hocks and that conformation known as *sickle hams;* whilst like other strains it occurs from sudden and violent exertion, often proceeding in the lighter breeds from leaping or galloping in heavy ground, and in the heavier, from the effort of keeping back a load whilst going down a steep incline. Swelling appears on the inner and back part of the joint, generally causing lameness, which is most apparent in trotting, and, in slight cases, usually wears off after the animal has been out for ten minutes. Fomentations must first be used to allay the irritation and inflammation; when heat and tenderness disappear, cold applications will be advisable; when, after ten days, the enlargement still continues, a blister may be necessary; whilst, from the first, all work must be forbidden.

CURCAS. See PHYSIC NUT.

CURCU'LIO. See WEEVIL.

CURCU'MA (Arab. *kurkum*), a genus of plants of the natural order *Scitamineæ*, having the tube of the corolla gradually enlarged upwards, and the limb two-lipped, each lip three-parted. The species are stemless plants, with palmate tuberous roots, natives of the East Indies. The dried roots of some are the Zedoary (q. v.) of the shops; the roots of others yield Turmeric (q. v.); and some yield a kind of Arrow-root (q. v.). The same species often yields both arrow-root and turmeric, the former being obtained from the young roots, the latter from the old.—*C. Amada* is called MANGO GINGER. Its root when fresh has the smell of a mango, and in its qualities resembles ginger. It is a native of Bengal.

CU'RFEW (Fr. *couvre-feu*, cover fire). To William the Conqueror is ascribed the introduction of the C. bell into England, the object of which was to warn the people to cover up their fires, and retire to rest. The time for ringing these bells was sunset in summer, and about 8 o'clock in winter; and certain penalties were imposed upon those who did not attend to the signal. The practice of ringing the C. bell, however, appears to have prevailed throughout Europe long before the era of the Norman Conquest, its object being the laudable one of preventing fires, which, owing to houses being chiefly composed of wood, were then both frequent and destructive. The custom of ringing the C. bell at eight or nine o'clock, is still continued in many parts of England, though its original significance is of course lost.

CU'RIA MU'RIA ISLANDS. See KOORIA MOORIA ISLANDS.

CU'RISCHES HAFF. See KURISCHES HAFF.

CU'RLEW (*Numenius*), a genus of birds of the order *Grallatores*, and of the same family (*Scolopacidæ*) with the snipe, woodcock, avocet, stilt, godwit, &c. The bill is long, slender, curved, and compressed; the face and head are feathered; the legs are slender, and part of the *tibia* is naked as well as the shank; the tail is short, and the folded wings extend about as far as the tail. The Common C. (*N. arquata*), the *Whaup* of the Scotch, is a bird of wide geographic distribution, being found in tropical, temperate, and arctic regions of the Old World and in Australia. It is common in Britain, frequenting the sea-shores in winter, and elevated moors in summer. Its peculiar cry or whistle is among the well-known characteristics of many upland scenes. It feeds on worms, molluscs, and insects. Its long bill enables it to seek its food in marshy or boggy ground. It builds a slight nest of leaves or other dry materials, in some tuft of rushes or among long grass or heath, in which four eggs are laid. The C. is good eating.—The WHIMBREL (*phæopus*) is a smaller species of C., much re-

Commun Curlew (*Numenius arquata*).

sembling the Common Curlew. It is also very widely distributed in the Old World; it frequently occurs on the shores of Britain, but seems to breed only in the most northerly moors. North America has several species of C., some of which extend their summer migrations to very northerly regions. The ESQUIMAUX C. (*N. borealis*) is sometimes seen migrating in dense flocks.

CURLING, a sport on the ice common in Scotland, where it is played by all classes of people in winter. Frozen-over lakes and rivers answer for the purpose, but under the auspices of C. clubs, artificial shallow ponds are maintained for the sake of this popular national sport, and these *bonspiels*, or set matches, are contested with immense spirit. The sport is regulated by a body of rules issued by a central association called the Caledonian Curling Club, which has grand matches in which hundreds are engaged at least once, if possible, every winter.

The remarkable and pleasing peculiarity of C. is, that it produces for the time a thorough mingling of ranks—peers, peasants, clergymen, farmers, country gentlemen and tradesmen, all mingling hilariously and familiar for the occasion. The sport belongs more particularly to the south-western division of Scotland. Latterly, it has migrated to England, Canada, and other countries where Scotsmen can find ice of sufficient strength and keenness. C. is played with flattish round stones, about nine inches in diameter, prepared by stone-hewers, each stone weighing from 30 to 45 lbs. Each of the players has a pair. The stones are provided with handles, to enable the player to hurl them on the ice with a proper degree of force. As at bowls, the stones are hurled to an assigned point or mark. The game is as follows: Sides are made up, usually consisting of four against four, with a director styled *skip* for each; after which a certain length of ice, of from 30 to 40 yards in length, and 8 or 9 feet across, is chosen. This is called the *rink*. Certain marks are then made at each end of the rink, consisting of several concentric rings, called *broughs*, and a center, called the *tee*. A certain number is game, usually 31, and the keenness displayed by rival sides in competing for victory, is perhaps without a parallel in any other pastime whatever. One on each side plays alternately. The chief object of the player is to hurl his stone along the ice, towards the tee with proper strength and precision; and on the skill displayed by the players in placing their own stones in favorable positions, or in driving rival stones out of favorable positions, depends nearly all the interest of the game. At a certain distance from each of the tees, a score—the *hog-score*—is drawn across the ice; and any stone not driven beyond this mark, counts nothing, and is laid aside. In country places, a dinner composed of 'beef and greens,' the

well-known curler's fare, generally concludes the day's diversion, which, taking place when out-door labor is suspended, is felt to be no encroachment on rural occupations. For laws and regulations of C., and general remarks on the game, see *Chambers's Information for the People*, article 'Out-of-Door Recreations.'

CU'RRACH, COURACH, or CO'RACLE (Celt. *corwg*, *curach*; Lat. *curuca*, *carrocium*, *carabus*), the name given in the British islands to a canoe or boat, made of a slender frame of wood, covered with skins. Skiffs of this sort, as well as canoes hollowed out of the trunks of oaks, were in use among the Britons in the earliest times of which we have record. Julius Cæsar, who built some of them after the British model, tells us that the keel and gunwales were of light wood, and the sides of wicker, covered with hides. Similar descriptions of the C. are given by Piny, Lucan, Solinus, Festus Avienus, Sidonius Apollinaris, and others. The first occurrence of the name seems to be in Gildas, who wrote in the 6th c.; he speaks of the C. as in use among the Scots and the Picts. A long voyage in the North Sea, made in a C., during the same century, by one of the companions of St. Columba, is commemorated by Adamnan, who died in 704. In 878, three Irish missionaries sailed in a C. from Ireland to Cornwall; the voyage occupied seven days; and the size of the C. is indicated by the remark that it was one of two skins and a half. An old life of St. Patrick speaks of a C. 'of one skin, with neither helm nor oar.' The C. of a larger size had a mast and sail. The C. still continues to be used on the Severn, and on many parts of the Irish coast, especially on the shores of Clare and Donegal. The last C. known to have been used in Scotland is in the museum at Elgin. It was employed on the Spey, towards the end of last century. Shaw, whose *History of Moray* was published in 1775, when the C. had become rare, thus describes it: 'It is in shape oval, near three feet broad, and four long; a small keel runs from the head to the stern; a few ribs are placed across the keel, and a ring of pliable wood around the lip of the machine. The whole is covered with the rough hide of an ox or a horse; the seat is in the middle; it carries but one person, or, if a second goes into it to be wafted over a river, he stands behind the rower, leaning on his shoulders. In floating timber, a rope is fixed to the float, and the rower holds it in one hand, and with the other manages the paddle. He keeps the float in deep water, and brings it to shore when he will. In returning home, he carries the machine on his shoulders, or on a horse.' One who figures in the *Dunciad*—Aaron Hill the poet—by showing the Strathspey Highlanders how to make their timber into a navigable raft, hastened the disappearance of the C. from Scotland. A description of the C., as still used in Ireland, will be found in the *Ulster Journal of Archæology*, vol. i. p. 32. A boat of bison skin, essentially the same with the British coracle, is in use among some of the Indians of North America.

Modern Coracle.

CU'RRAN, JOHN PHILPOT, a celebrated legal and parliamentary orator, born at Newmarket in the county of Cork, Ireland, July 24, 1750; was educated at Trinity College, Dublin; and in 1773, having resolved to adopt the law as a profession, went to London and entered himself at the Middle Temple. Two years after, he was called to the Irish bar, where his humorous, flowery, and sarcastic speech secured him immediate success, which his attractive social qualities did much to extend. In 1782, he obtained a seat in the Irish parliament as member for Kilbeggan, his general policy being in unison with that of Mr. Grattan and the few other liberal members who were then in the House. In debate, C. was usually charged with the reply to opponents, for which important duty his ready speech and cutting retort admirably qualified him. But his sarcasm led him into several duels, in which fortunately little harm was done on either side. In 1788, he was in favor of the formation of Irish volunteers; and in subsequent years, he was constant and eloquent in his appeals to government to adopt a different policy towards Ireland, as that which it was pursuing was likely to drive the people to rebellion. Government gave no heed, and the rebellion of 1798 was the consequence. C. had retired from parliament before the Union, of which he was a warm opponent. He was appointed Master of the Rolls in Ireland in 1806, an office he held until 1813, when he resigned. He died in London, October 14, 1817. C. is best remembered for his wit and gaiety, of which many excellent examples are preserved in the various Memoirs, Recollections, &c., of him which have been published.

CURRANT, a name originally belonging to a small kind of grape (see CURRANTS), and transferred, in consequence of the similar size of the fruit, to many species of the genus *Ribes*, the most important and almost the only genus of the natural order *Grossulariaceæ*. The species known as *currants* are destitute of spines, and have the flowers in racemes: the spiny species are known by the name GOOSEBERRY (q. v.). Among the fruit shrubs most generally cultivated in our gardens is the RED C. (*R. rubrum*), *Grosseille* of the French, a native of woods and thickets in the south of Europe, found also in some parts of Asia and of North America, perhaps rather a naturalized than a truly native plant in Britain. It has long been cultivated, although it does not appear that it had a place in the gardens of the ancient Greeks or Romans. The berries, besides being used for dessert, and to a much greater extent for pies, and for making jelly, are used also for making an agreeable and refreshing beverage, called in France *Eau de Grosseilles* (made of the juice of the fruit, water and sugar, strained, and iced), and a well-known fermented liquor called *Currant Wine* (q. v.).—The WHITE C. is a mere variety of the Red, the result of cultivation, with fruit less acid, and more fit for dessert, generally also rather larger.

There are many sub-varieties, and many intermediate shades of color. Both the Red and the White Currants are either trained as standard bushes, or against walls, the latter treatment producing larger and finer fruit, and both are sometimes trained on a north wall, to retard their ripening, till after the ordinary season. They grow readily, like the shrubs of this genus in general, from cuttings.—The BLACK C. (*R. nigrum*), *Cassis* of the French, grows in moist woods, and on the banks of streams in Europe and the North of Asia. The fruit is much larger than the Red C., and cultivation has lately produced varieties remarkable for size. There is a variety found in Russia with yellow berries. The Black C. is not so much cultivated in Germany and Holland as the Red, and is comparatively neglected even in England, but is to be found in almost every garden in Scotland. The jelly and preserve made from it are very useful for sore throats, as is also *Black C. Vinegar*, made in the same manner as Raspberry Vinegar. In Russia, the berries are gathered in large quantities in the woods, and dried in ovens, to be used in pies. They are tonic, and also slightly diuretic and sudorific. A liqueur, called *Liqueur de Cassis*, is prepared in France from the Black C., the manufacture of which has recently acquired a great importance in the Côte d'Or and neighboring departments. The town of Dijon contains more than thirty manufactories, and produced recently, in one year, not less than 220,000 gallons, the wholesale price of which—of the best quality—was equal to 2*s*. 9*d*. per quart. Large tracts of land are planted with the Black C. to supply the liqueur manufactories. It has very reasonably been suggested that the experiment of the introduction of this manufacture should be made in Scotland, and even in the Hebrides and Shetland Islands, where the Black C. perhaps grows as luxuriantly, and bears fruit as abundantly as in any part of the world.—Many other species of C., producing berries somewhat similar to those of the species so extensively cultivated, and some of them probably deserving of attention and cultivation, are found in temperate and cold climates in almost all parts of the world. One with beautiful red berries, larger than the largest English Red C., occurs on the Himalaya at an elevation of 13,000 feet.—The RED-FLOWERED C. (*R. sanguineum*), now so common as an ornamental bush in shrubberies, and trained on walls, producing in April a profusion of deep-red flowers in large drooping racemes, is a native of the north-west of America, and was introduced into Britain in 1826. Its bluish-black, mucilaginous, insipid berries are not, as is popularly believed, poisonous.—The GOLDEN C. (*R. aureum*), also a very ornamental shrub, from the same regions, has a tubular calyx and long golden yellow flowers. Its fruit, which is either yellow or black, and of fine flavor, is not freely produced in Britain.—The name NATIVE C., or AUSTRALIAN C., is given in Australia to the berries of different shrubs, particularly the white berries of *Leucopogon Richei*, of the natural order *Epacridaceæ* (q. v.).

The French naturalist Riche, who was attached to D'Entrecasteaux's expedition, mainly supported himself on these berries for three days, when he had been lost by his companions. Other fruits bearing the same name are produced by species of *Coprosma* (nat. ord. *Cinchonaceæ*), but they are very inferior.

CURRANT WINE is made of the juice of red or white currants, to which is added about one pint of water for every four pints of berries employed. About a pound and a half of sugar is afterwards added to each pint of the liquor, a little spirits being generally also added, before it is set aside to ferment. A larger quantity of sugar is sometimes employed, and no water, and a stronger and sweeter C. W. is thus produced. Fermentation requires several weeks, and the wine is not fit for use for at least some months afterwards. Black C. W. is made in the same way from black currants, but the fruit is put on the fire in as small a quantity of water as possible, and heated to the boiling-point before it is bruised. C. W., well made, may fairly challenge comparison with many products of the grape.

CURRANTS, a small kind of raisin (*Passulæ minores*), are the dried red or blue berries of a small-fruited seedless variety of the

common vine, which is cultivated in the East, and especially in Greece. The name is derived from the city of Corinth, in the neighborhood of which they were first cultivated. They are very small, round, with a thin skin, without seeds, and very sweet. Those brought from the island of Zante are most esteemed. They are much used by bakers and cooks, entering into the composition of many kinds of cakes, puddings, &c. They are a principal article of export from Greece, and the failure of the crop is severely felt in that country; whilst an increase of the price of C. is regarded as a disagreeable occurrence by the housewives of Britain. C. are simply dried in the sun, on the ground, and then packed into barrels. In a few districts of Greece, a very sweet oily wine, called currant wine, is made from currants.

CU'RRENCY means originally the capacity of being current, or, as Johnson defines it, 'the power of passing from hand to hand.' It is applied in practice to the thing that is so current, and generally to whatever, by being current among any nation or class of persons, serves as the money with which they buy commodities or pay their debts. It is necessary to be content with a practical explanation, without venturing on a scientific definition of the term, because, among the many disputed points in political economy, there is none productive of more exciting controversy than the proper regulation of the C.; and as the advocate of each theory is apt to define the term in the manner best suited to serve his own ultimate conclusions, his adversaries generally deny that his definition is sound. Whether correctly or not, it is applied in practice to everything that is received for payment. It differs from the word money, in its general acceptation, in as far as it expresses only that which passes as money at some time or place referred to.

The leading question among political economists regarding C. is, how far it should be restrained. The most effectual method of restraining it is by confining it to the precious metals. If it were law that none but a gold C. should be used in any country, and if, at the same time, there were no efforts to tamper with this gold C., and give it an artificial value, the C. of that country would keep its value all the world over, because it has been paid for in commodities, and will be sold again whenever it is in excess of the needs of those who use it. But for this very reason, it is a very expensive C., and therefore, ever since man's ingenuity was turned to trade, methods have been devised for superseding gold or the other precious metals by something cheaper. Unless, however, law or custom intervenes to give it efficiency, this cheaper material will only be worth its own intrinsic value. A five-pound Bank of England note is worth so little in its intrinsic value as a picture upon thin paper, that such a value can hardly be expressed. It derives its power as C. from the obligation it fixes on a great rich corporation to make good its professed amount to the holder. We thus pass from a purely bullion C. to the next step of restraint, which is generally called a mixed currency. Here some maintain that no note should be issued unless the banker or other person issuing it has in his possession as much bullion as will pay it. Others say it is sufficient that he is bound to pay its amount in bullion on demand without his actually possessing the bullion throughout the whole period of the C. of the note. A third party, again, are for a C. entirely free of a metallic basis; they hold that naturally paper-money, passing from hand to hand, will represent transactions, and will therefore come in the end to be made good in some shape or other; and they further hold, that if some losses should thus occur, these will be more than compensated by the rapid increase of trade and enterprise, caused by a free trade in C., as it is termed —that is to say, by every man issuing his own notes or promises to pay to whoever will take them. This last and extreme class of 'currency doctors,' as they have been termed, have lately been losing influence, and disappearing from the contest. Through a succession of practical measures, reached with considerable caution, the English have come to a mixed C., resting on a compromise between the two classes of mixed C. above referred to. In the theory of the measures brought to completion under Sir Robert Peel in 1844, it is admitted that, to a certain extent, a C. can be based on transactions and the property of those concerned in them, but that a limit must be drawn, to prevent the power of creating such a C. from running to excess, by the issue of notes which cannot be immediately made good by those who issue them.

Accordingly, the several banks in existence were allowed to continue their note circulation, but they were permitted to increase it only on the condition of having bullion in their coffers to pay the additional notes issued by them. A C. which is not bullion, and is not worth its nominal value in bullion, is called a 'depreciated currency.' Before the resumption of cash payments, the notes of the Bank of England had sunk to be worth but 16*s.* in the pound, as compared with gold. A depreciated C. may be created by a government calling notes or any other form of money a legal standard, and issuing a greater quantity of them than the real transactions of the country and the property passing from hand to hand require; or it may be created by private persons acting under laws by which the right of issuing a C. is not duly limited. This faculty which a C. has of being depreciated without being repudiated, is the real source of danger in all proposals for an unfettered C., or a free trade in the issue of money. If the bank-notes for which bullion cannot be immediately obtained were repudiated, there might be a natural check on over-issues; but it is their nature, on account of the difficulty of getting bullion for them, or the chance that it may never be got, that they pass at a discount or reduction of their value. Hence such a C. would be ever shifting; there would be no permanent standard, and the person incurring a debt before a depreciation which he pays afterwards would, in reality, be paying his creditor a dividend only. A depreciated C., however, is useful for small transactions. In the silver C. of this country, a pound is worth a little more than four-fifths of a sovereign. If a person due £100 could pay it in silver, he would get off with a dividend of from 16*s.* to 18*s.* in the pound; but by law, silver is not a legal tender for more than 40*s.* The copper C. is so far below its real value, that it has not been thought worth while to give it a permanent weight—the pence and halfpence now issued are little more than half the weight of those of former mintages; but they are only used as a medium for small sums, and the royal stamp is sufficient to establish a reliance on them.

CU'RRENTS. See GULF STREAM, TIDES.

CU'RRIE, DR. JAMES, best known for his valuable edition of Burns's works, long the basis of all subsequent editions, was born in Dumfriesshire, May 31, 1756. He was at first educated for a mercantile life, but afterwards studied medicine at Edinburgh University; and settling in Liverpool in 1781, soon obtained a good practice. He contributed some excellent papers to medical journals, but his chief work in connection with his profession was, *Medical Reports on the Effects of Water, Cold and Warm, as a Remedy in Febrile Disease*, the recommendations in which work have been followed with much success. The edition of Burns (introduced by a criticism on his writings), which he undertook solely for the benefit of the widow and children of the poet, was published in 1800, and realized £1400. C. died August 31, 1805.

CU'RRY-COMB. A kind of scraper used for dressing horses. It consists of a number of iron plates notched on one edge to form rough teeth. These plates are fastened in parallel lines to an iron back, to which a handle is attached, and the horse is 'curried' by scrubbing with the teeth.

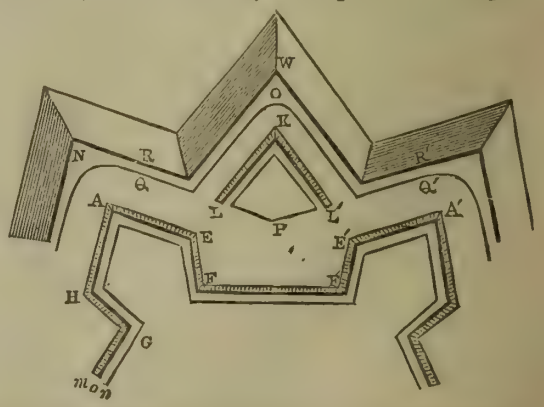
CURRYING. See LEATHER.

CURRY POWDER, or CURRY PASTE, is a compound of turmeric and various spices; it is used to a large extent in India and elsewhere as a seasoning for a variety of dishes. One of the best receipts for the compounding of C. P. is, turmeric powder, 6 oz.; coriander seed powder, 8 oz.; black pepper, 4 oz.; fenugreek, 2 oz.; ginger, 2 oz.; cayenne pepper, ½ oz.; cummin seed, ½ oz. Another process is to mix turmeric powder, 5 oz; coriander seed powder, 3 oz,; black pepper 1 oz.; ginger 1 oz.; cayenne pepper 1 oz.; scorched mustard, 2 oz.; mace, 2 drachms. And a third variety is obtained from turmeric powder, 8 oz.; coriander seed powder, 4 oz.; black pepper, 1 oz.; cayenne pepper, 1 oz.; scorched mustard, ½ oz.; mace, 1 drachm; cinnamon, 1 drachm; cardamoms, 2 drachms.

CURSE OF SCOTLAND, a term applied to the *nine of diamonds* in a pack of playing-cards. Much uncertainty prevails respecting the origin of this phrase. The most probable explanation is, that it refers to the detestation entertained in Scotland towards John Dalrymple, first Earl of Stair, on account of his concern in the Massacre of Glencoe, and for which he had to resign office, 1695. The heraldic bearing of this personage was 'or, on a saltire azure, nine lozenges of the field.' These nine lozenges resemble the nine of diamonds, and hence the popular phrase, the curse of Scotland.

CURSING. See INCANTATION, SWEARING.

CU'RTAIN, in Fortification, is the portion of rampart or wall



between two bastions or two gates. In a regular siege, to batter

down the C. is one of the main operations depended on; and many of the external works constructed by the defenders are intended to frustrate, or at least embarrass, this operation. In the annexed cut, which shows a ground-plan of some of the elements of a regular fortification, FF′ is the *curtain;* HAEF, a *bastion.* The component parts of the bastion are thus designated; AH and AE, two *faces;* EF and GH, two *flanks;* A, the *salient;* FG, the *gorge;* and H and E, the *shoulders. mn* is the *rampart; mo,* the *parapet* on the rampart; QPQ′, the *ditch;* NO, the *covert-way;* RWR′, the *glacis;* KLL′, a *ravelin.*

CURTIUS, Ernest, a distinguished German philologist and antiquary, born September 2, 1814, at Lübeck. After a good preliminary education at the High School of that place, he attended several German universities (Bonn, Göttingen, and Berlin) as a student of philology. In further pursuance of the path he had chosen—viz., the investigation of Greek antiquity—he went (1837), in company with Professor Brandis, to Athens, where he stayed several years. When his teacher, O. Müller (q. v.), came to Athens, C. accompanied him in his travels through Greece. On the death of Müller at Athens, in 1840, C. returned to Germany, visiting many places in Italy by the way. He graduated in Halle, and after he had taught for some time at two Berlin gymnasiums, he received an extraordinary professorship at the university of that place. His *Anecdota Delphica Inscriptiones Atticæ Duodecim,* and *The Acropolis of Athens,* were published about this time. In 1844, he became tutor to the present Crown-prince of Prussia. Six years later he returned to his academical office; in 1856 he was called to Göttingen; and in 1863 he was made Ordinary Professor at Berlin, and permanent Secretary of the Academy of Sciences. In 1874, he was sent by the German government to negotiate a treaty with the Greeks, to permit its undertaking those important excavations at Olympia, begun in 1875. His principal works are *Peloponnesos* (1852), a description of the country of Greece, with reference to its traditions, history, and monuments; *Attic Studies* (1864); and a *History of Greece,* which has been translated into English by A. W. Ward (1868—1876).

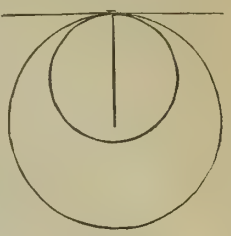
CURTIUS, Georg, a distinguished classical scholar, the brother of the former, who has acquired a high reputation for the light he has thrown on the Greek and Latin languages, by applying to them the comparative method. Born April 16, 1820, at Lübeck, he studied at Berlin and Bonn. After a short activity at Berlin, and a longer stay at Prague and Kiel Universities, he accepted (1862) the Professorship of Classical Philology at Leipzig. Of his published works are to be noted, *De Nominum Græcorum Formatione* (Berl. 1842); *Die Sprachvergleichung in ihrem Verhältniss zur Classischen Philologie* (Dresd. 1845); *Sprachvergleichende Beiträge zur Gr. und Lat. Gram.* (Berl. 1846); *De Nomine Homeri* (Kiel, 1855). His *Griech. Schulgrammatik* (11th ed., 1875) is in high repute, and his *Grundzüge der Griech. Etymologie* (Leipzig, 1862) is a most valuable contribution to that department of philology (Eng. trans., 1878).

CU′RTIUS, Mettus or Metius, a noble Roman youth who (according to tradition) heroically sacrificed his life for the welfare of his country, 362 B.C. A chasm, it is said, had opened in the forum, and the soothsayers predicted that some great calamity would happen if there were not thrown into it the best wealth of the state. While it was proposed to consult the oracles, and determine what this best wealth could be, C. appeared on horseback and in full armor, and exclaimed: 'Rome has no greater riches than courage and arms.' He then rode into the chasm, which immediately closed over him.

CURTIUS, Rufus Quintus, a Roman historian, author of the work *De Rebus Gestis Alexandri Magni,* in ten books, of which the first two have been lost, and the text of the remainder has come down to us in a damaged condition. Great differences of opinion have existed with regard to the time in which C. wrote, for his name is first mentioned by writers after the 12th century. Some critics have supposed that C. lived in the reign of Augustus; others, that he wrote in the 2d c., or under Constantine or Theodosius; while some regard the work ascribed to C. as a composition of the 13th century. The most probable opinion is that he flourished in the time of Vespasian. The value of the work is as dubious as its authorship. C. had a very inaccurate knowledge of geography, chronology, military tactics, astronomy, and historic criticism; hence his work is far from being reliable as a whole. The style, though declamatory, is on the whole pure and elegant. The first edition of C.'s history was published at Venice about 1471. Among modern editions may be mentioned Mutzell's (Berlin, 1841) and Zumpt's (Brunswick, 1849).

CU′RUKU OIL, or BRAHMADU′NDU OIL, a pale yellow, limpid oil, obtained in large quantities in India from the seeds of the *Argemone* (q. v.) *Mexicana,* or Prickly Poppy, a plant accidentally introduced, but which now flourishes luxuriantly in all parts of India. It is used for lamps, and for other purposes, but possesses properties which render it unfit for food.

CU′RVATURE. The C. of a plane curve at a point is its tendency to depart from a tangent to the curve at that point. In the circle, this tendency is the same throughout, for the curve is perfectly symmetrical round its center; in other words, the C. of a circle is constant. In different circles, the C. is inversely as the radius—i. e., it diminishes as the radius increases. The reciprocal of the radius is accordingly assumed as the measure of C. of a circle. A straight line, which has no C., may be considered part of a circle whose radius equals infinity as the reciprocal of infinity, measures the C., and is = 0. The annexed fig. shows how the circle of smaller radius bends more rapidly away from the tangent than that of larger radius.

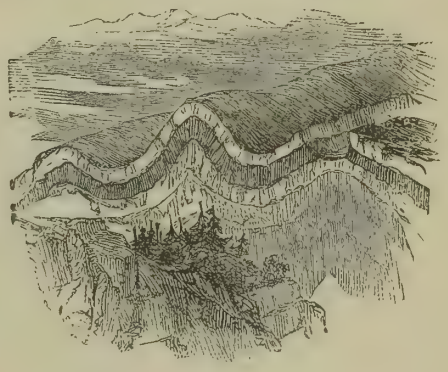


The constancy of C. in the circle suggests an absolute measure of C. at any point in the other curve; for whatever be the C. at that point, we can always find a circle of the same curvature. The radius of the circle which has the same C. at any point in a curve as the curve itself at that point, is called the radius of C. of the curve for that point; and the circle itself is called the *osculating* circle. If we know the radius of C. of a curve at different points, we can compare its C. at those points. We have thus the means also of comparing degrees of C. in different curves.

The problem of measuring the C. of a curve at any point is the same, then, with that of finding its radius of curvature. In some simple cases, as in the conic sections, this may be done geometrically; it is usually necessary, however, to employ the calculus. If the curve be referred to rectangular co-ordinates, and x, y be a point in it, then it can be shown that radius of C. $= \frac{\left(1+\frac{dy^2}{dx^2}\right)^{\frac{3}{2}}}{\frac{d^2y}{dx^2}}$.

If the curved line, instead of being plane, twists in space, it is called a curve of double curvature. See Contact and Osculation.

CURVES, Anticlinal and Synclinal, are terms applied to the elevations or depressions in undulating strata. The ridge-wave is called the anticlinal curve, and the top of the ridge is



known as the anticlinal axis; whilst the trough is the synclinal curve, and the bottom of the trough the synclinal axis. In the annexed section of the Jura Mountains, three anticlinal and two synclinal axes are seen.

CURVE means, in common language, a crooked line that departs gradually from the straight direction; in mathematics, however, it is usually restricted to lines that follow some law in their change of direction. Thus, the law of the circle is, that all points of it are equally distant from a fixed point, called the center. The law of a plane curve is generally expressed by an equation between the co-ordinates of any point in it referred to a fixed point. See Co-ordinates. When the equation of a curve contains only powers of x and y, the curve is algebraic; when the equation contains other functions, logarithms, for instance, of x and y, the curve is called transcendental. The cycloid, e. g., is a transcendental curve.

There are also curves, like the spiral, that do not continue in one plane; these are called curves of double curvature. To express the law of such a curve requires three co-ordinates and two equations.—Curves are said to be of the first, second, third, &c., order, according as their equations involve the first, second, third powers of x or y. The circle, ellipse, parabola, and hyperbola are of the second order of curves. There is only one line of the first order, namely, the straight line, which is also reckoned among the curves.—The higher geometry investigates the amount of curvature of curves, their length, the surface they enclose, &c.

The number of curves that might be drawn is of course infinite. A large number have received names, and are objects of great interest to the mathematician—in some cases for their beauty, in others, for their remarkable properties. Among the most interesting are the following: 1, circle; 2, ellipse; 3, hyperbola; 4, parabola; 5, cissoid of Diocles; 6, conchoid of Nicomedes; 7, lemniscata; 8, cycloid; 9, harmonic curve; 10, trochoid; 11, the witch; 12, cardiode; 13, curves of circular functions—e. g., curve of sines; 14, the logarithmic curve; 15, the spiral of Archimedes; 16, the catenary; 17, the tractory; 18, the tractrix; 19, the ovals of Cassini; 20, the reciprocal spiral.

CU'RZOLA (ancient, *Corcyra Nigra*, so called from the sombre color of its pine forests), an island of the Adriatic, forming a part of the Austrian crown-land of Dalmatia, lat. 42° 57′ N., long. 17° E. It has a length of about 25 miles, with an average breadth of 4 miles. It is well covered with wood, which on the south coast grows down to the water-edge. The woods furnish ship-timber, a considerable quantity of wine is raised, and the fisheries of the coast are productive. The population numbers altogether 11,000, about 2000 of whom are located in the town of C., at the north-east extremity of the island.

CUSCUS. See LEMON GRASS.

CUSCUTACEÆ. See DODDER.

CUSHAT. See PIGEON.

CUSP (Lat. *cuspis*, the point) is a point in a curve at which its two branches have a common tangent. If we conceive a curve to be generated by a moving point, then a C. is where the point suddenly stops and *returns* for a time in the same general direction as that in which it was moving when it reached the C. point.

Cusps are of two kinds: 1, when the two branches, AB, AC, have their convexities turned in the same direction with respect to

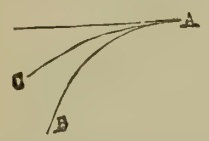


Fig. 1.

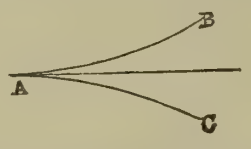


Fig. 2.

the common tangent at the C. point, as in fig. 1; 2, when they have their convexities turned in opposite directions to the common tangent at the C. point, as in fig. 2.

CUSP, in Architecture, is the point formed by the meeting of two small arches, or foils, in foil arches (q. v.), or tracery. Cusps often terminate in rich bosses of flowers and leaves.

Cusp.

CUSSO, KOSSO, or CABOTZ (*Brayera anthelmintica*, or *Hagenia Abyssinica*), a small Abyssinian tree of the natural order *Rosaceæ*, sub-order *Spiraceæ*, the dried flowers of which have been long used in Abyssinia as an anthelmintic, and have been found so efficacious in the removal of tape-worm, that they are now a much valued medicine in Europe. The flowers are simply dried, in order to be ready for the market; they have an

Cusso:—A, a branch, with leaves and flowers; B, a flower seen laterally; C, a female flower; *a*, *b*, *c*, *d*, *e*, the five outer segments of the calyx.

aromatic, but not very agreeable smell, and are administered in the form of an infusion.

CU'STARD, a composition of milk or cream, eggs, &c., sweetened with sugar, and flavored according to taste. Custards are of various kinds, such as plain, baked, lemon, orange, almond, coffee custards, &c. For a plain C., the following is a recipe as given by M. Soyer: Mix a pint of boiling milk with two ounces of sugar and the thin yellow peel of half a lemon; then take four eggs, beat well in basin, and add gradually the milk, &c. (not too hot); pass the mixture through a colander, and, having filled the custard cups with it, place them over the fire in a stew-pan containing about one inch of hot water, and leave them here until sufficiently set (about twelve minutes is the time required).

With this as a basis, a variety of custards are produced by the simple addition of flavoring ingredients, as almonds, orange-peel, &c.

CUSTARD APPLE, the name commonly given in the West Indies and other tropical countries to the fruits of certain species of *Anona*, a genus of trees of the natural order *Anonaceæ* (q. v.). Some of the fruits of this genus are among the most delicious produced in tropical countries, as the Cherimoyer (q. v.), and even the common C. A. (*A. reticulata*), which is regarded as a native of America, but is now very common throughout the East Indies, the variety cultivated in the Eastern Archipelago being very superior even to the West Indian. The C. A. is a large, dark-brown, roundish fruit, sometimes from its size and appearance called Bullock's Heart in the West Indies; the tree is of considerable size. Some other American species of *Anona* are sometimes called custard apples, and two or three which are natives of Western Africa. To this genus also belong the Sweet-sop, the Sour-sop, the Pinana or Pinha, all of them tropical American fruits, and the ALLIGATOR APPLE of the West Indies (*A. palustris*), a fruit of pleasant taste, but regarded as dangerously narcotic.

Custard Apple (*Anona triloba.*)

CU'STODY. See IMPRISONMENT.

CU'STOM, in English Law. This is either general or particular. The principal doctrines relating to general customs have been stated under COMMON LAW. Of particular customs, it may be remarked that, in order to establish them as law, they must be proved by verdict of a jury, except the C. of the city of London, which is proved by certificate by the lord mayor, aldermen, and recorder. A particular C. must, like a general C., be established as in force for a time whereof the memory of man runneth not to the contrary. See COMMON LAW. A C. must have been uninterrupted as regards right, though the exercise of it may have been disused; it must have been held without objection, and be unopposed to other customs; it must be not unreasonable nor uncertain in operation.

CU'STOMARY FREE'HOLD, in English Law, a species of estate which, in all practical respects, is identical with Copyhold (q. v.), but in which the tenure is expressed to be according to the custom of the manor, without adding the words 'at the will of the lord.'

CUSTOM HOUSE, the office at a seaport where the custom duties (see next article) are paid, vessels entered and cleared, &c. The several custom houses in the United Kingdom have each a separate establishment of officers, according to the extent of the trade in the port to which it belongs, and the consequent exigencies of the service. The whole are, however, under the control of the Commissioners of Customs. In England, the custom-house officer has the right of personal search only when he has good cause to suspect that contraband goods are concealed about the person.

CUSTOMS DUTIES, the portion of the revenue of the United Kingdom derived from a tax on imports. The origin of the term is connected with the long conflict between the crown and parliament as to the right of taxation. To meet the claims made by the House of Commons of the exclusive right to vote all supplies, it used to be maintained that there were certain duties on exportation and on importation to which the crown had acquired a right by *custom*, and after the power of parliament over this branch of taxation had been fully established, it retained its old name. This tax, after the excise came in force, was always applicable distinctively to goods changing place. There were customs not only upon things leaving and things coming to the British dominions, but also upon commodities transferred from one part to another. In Scot-

land, the duty on commodities imported into any town from a foreign country was called the great custom; and the duty charged by a burghal corporation on commodities coming from the country districts within its walls was called the small or petty customs. At present, the term C. D. applies solely to the tax levied on commodities imported from abroad.

The tax on imports was of old a simple percentage, familiarly known to the readers of English history as 'tonnage and poundage,' from the method in which it was adjusted to heavy and light goods. Subsequently, however, the notion prevailed that the C. D. might not only be a source of revenue, but an instrument for furthering the various theories about protecting this trade and discouraging that, which prevailed from time to time. When it was held as an established principle, with regard to any trade, that the customs should be adjusted in such a manner as either to aid or impede it, the regulations regarding that trade alone would have complexity enough for a whole code of customs laws, the object of which was mere revenue.

The more complex the arrangements, the more open were they to the machinations of the smuggler or defrauder, and consequently regulation had to be added to regulation, till the whole became a chaos. In some instances, the duties were such as to act as a prohibition to importation; in others, merely as a heavy increase on the price. In either case, there would be relaxations in favor of the produce of our own colonies, and perhaps of some favored country with which we had a treaty of reciprocity. Then, to encourage our own trade and manufactures, it was considered politic to allow goods to be imported for exportation abroad, or to be imported for the purpose of being worked up into a manufacture, and there would be a difference between the extent of encouragement granted to that manufacture, if it were for home consumption or for exportation. The method in which such relaxation was accomplished was at first by charging the duty on the importation, and afterwards repaying it by what was called a 'drawback;' and this was subsequently accomplished in an easier method for the importer, by allowing him to 'bond' the goods in the government warehouses until the duty was paid, or the conditions which dispensed with it fulfilled. See WAREHOUSING SYSTEM.

In the year 1825, the laws of the British customs were consolidated into eleven acts of parliament—the fruit of the exertions of the late Mr. Deacon Hume. It will give a conception of the confused and cumbersome condition into which the system had merged, to note that the number of acts repealed on the occasion of the consolidation was 443 and it was afterwards discovered that several had been omitted. There was still a long list of C. D. many of them intended for purposes beyond the mere collection of revenue; but the free-trade legislation of 1846 cleared away a great mass of this burden on the commerce of the country, and almost every year has contributed to the abbreviation of the list of duties or Tariff (q. v.). One by one, articles of solid food have been exempted; and nearly the whole customs revenue is now derived from tea, coffee, dried fruits, spirits, wine, and tobacco. Thus simplified and reduced, the C. D. supply an enormous amount of revenue. The British revenue for the year ending 31st March 1880 was £81,265,055, and to this amount the customs contributed £19,326,000.

The defects which, according to the doctrines now prevalent in this country, are to be avoided in a code of customs, are—1. The prohibition or discouragement of the importation of useful commodities; 2. Encouragement to the smuggler; and 3. Loss of revenue by raising the duty to the height which discourages importation. Under the first head, see ANTI-CORN-LAW LEAGUE, CORN LAWS, and FREE-TRADE. The second is connected with the view that on stimulants the duty cannot be too high, even though it should greatly impede their importation—the duty on tobacco is in some instances, as high as 900 per cent. on the value of the article. But then, if the smuggling trade be encouraged, the stimulant is not only obtained without any contribution to the revenue, but the people become demoralized, and trained to crime.

Under the third head, a memorable example is furnished by the sugar-duties of France, which were so high that the native agriculturists could make sugar from beet-root a little cheaper than the duty-paid foreign sugar. Hence the article was dear, for had it not been for the height of the duty, it would not have been worth while to make it at home, and at the same time there arose little or no revenue from it.

The collection and general management of the C. D. is under one great central department of the government in London. The office of receiver-general was, in 1871, united with that of the comptroller-general, and there is a fourfold division into the paymaster's, examiner's, accountant's, and auditor's branches.

CU'STOS ROTULO'RUM (Lat. keeper of the *rotuli* or rolls), one of the justices of the peace of a county appointed by the crown to keep the county records.

CUSTRI'N. See KUSTRIN.

CUTCH, a protected principality under the presidency of Bombay, stretches along the gulf of its own name and the Indian Ocean between Guzerat and Sinde. It extends in N. lat. from 22° 45′ to 24° 40′, and in E. long. from 68° 26′ to 71° 45′, containing, in something of a triangular form with the maritime line as a base, an area of 15,100 square miles, and a population of rather more than half a million. It is divided naturally into C. Proper and the Runn of Cutch.—1. C. Proper, consisting of 6500 square miles, and numbering nearly all the inhabitants, is the belt on the sea-shore, touching Sinde, of which it may be regarded as a physical continuation, on the north-west, and being separated by a detached portion of the Runn from Guzerat on the south-east. While the southern edge of this belt is merely a sandy desert, the northern section, traversed lengthwise by two parallel ranges of hills, presents, amid much sterility, many fertile tracts, which yield cotton, rice, &c., and feed a large stock of horses, kine, buffaloes, and camels. The grand defect of the country is the scarcity of water. Hence the crops occasionally fail from the scantiness of irrigation; and in the month of March 1861, this region was said to be suffering more severely than almost any other in India from a nearly general famine. Timber is scarce, for the growth in the mountains is chiefly brushwood. Here and there, however, decayed trunks of great size, more particularly on the southern ridge, indicate the former existence of noble forests. The mineral productions are coal, iron, and alum. The traces of volcanic action are numerous. Earthquakes also have recently occurred; one of which, in July 1819, besides shaking every fortification to its foundations, and destroying several hundreds of people, threw up an enormous mound of earth and sand many miles in extent, and simultaneously submerged an adjacent district of corresponding size.

The population of the state was estimated, in 1871, to be 409,522, being about 63 individuals to a square mile. The ruler is styled the Rao; and the feudatory chieftains under him are about 200. —2. Runn of C.—subdivided into two parts, the smaller, of 1600 square miles, on the east, and the larger, of 7000 square miles, on the north—is merely an amphibious desert, being, in a great measure, hard ground during the dry season, and then, in turn, a sort of shallow lake formed by the heavy rains and pent-up tides of the south-west monsoon. It is supposed to have been originally a permanent inlet of the ocean, and to have had its level raised by some such convulsion of nature as that which marked the year 1819. The periodical disappearance of the waters leaves behind it one continuous crust of salt. This dreary waste, however, is not without its elevated spots, the islets, doubtless, of a remoter era. Herds of wild asses and clouds of flies are its only inhabitants, and to cross it by day, except in the rainy season, is almost certain death.

CU'THBERT, ST., OF DURHAM, one of the three great saints of England in the middle ages, the other two being St. Edmund of Edmundsbury, and St. Thomas-à-Becket of Canterbury. St. C. was born about 635. Neither his birthplace nor his parentage has been ascertained; but a legend, which was long generally believed, told that he was born in Ireland, and drew his lineage from one of the petty kings of that country. When the light of record first falls upon him, he is a shepherd boy in the kingdom of Northumbria, which then stretched northwards to the Forth. In 651, while watching his flock by night on the heights of Lauderdale, he believes that he sees the heavens open, and a company of angels descend upon the earth, and again ascend to heaven, carrying with them the soul of St. Aidan, the pious bishop of Lindisfarne, or Holy Island. The vision determines him to become a monk, and in the same year he enters the monastery of Melrose, of which St. Boisil was provost or prior, and St. Eata, abbot. When the latter removed to the newly-founded monastery of Ripon, St. C. accompanied him, and was appointed to the office of superintendent of the guests. In 661, St. Boisil died of the plague, which then ravaged Britain, and St. C. was chosen to succeed him as provost or prior of Melrose. While in this office, he distinguished himself by his assiduity in visiting the neighboring villages, and especially the remoter mountain hamlets, sometimes on horseback, but oftener on foot, and laboring by his teaching and example to reclaim the people from the superstitious or pagan rites into which they had fallen. After a few years spent in this way, he left Melrose for the island monastery of Lindisfarne, of which he became provost or prior, his old master, St. Eata, being abbot.

Longing for an austerer life even than the monastic, he quitted Lindisfarne in 676, to become an anchorite, or solitary recluse, in a hut which he built with his own hands on Farne Island. Here, in 684, he was visted by Ecgfrid, king of Northumbria, Trumuine, ex-bishop of the Picts, and other great men of the north, who came at the request of the synod of Twyford to entreat that he would accept the bishopric of Hexham. He reluctantly complies with their wishes, but his heart is still with his Northumbrian islands. He exchanges the see of Hexham for that of Lindisfarne, and still thirsting after solitude, at the end of two years he resigns his bishopric, and returns to his hut in Farne Island. Here he

died on the 20th of March 687. The anniversary of his death was a great festival in the English Church, which commemorated also the 4th of September, as the anniversary of the day on which his body was translated to Durham. The influence which St. C. exercised upon his age seems to have been due chiefly to his fervent piety and extraordinary asceticism. The gift of a persuasive tongue is ascribed to him, and he would seem to have had skill and prudence in the management of affairs, but nowhere is there any trace of his learning.

The fame of St. C. had been great during his life; it became far greater after his death. Churches were dedicated to him throughout all the wide country between the Trent and Mersey on the south, and the Forth and Clyde on the north. When his tomb was opened at the end of eleven years, it was believed that his body was found incorrupt, and so, for more than 800 years, it was believed still to continue. It remained at Lindisfarne till 875, when the monks, bearing it on their shoulders, fled inland from the fury of the Danes. After many wanderings through the south of Scotland and the north of England, it found a resting-place at Chester-le-Street in 882. It was transferred to Ripon in 995, and in the same year it was removed to Durham. Here, enclosed in a costly shrine, and believed to work daily miracles, it remained till the Reformation, when it was buried under the pavement of the cathedral. The grave was opened in 1827, when a coffin, ascertained to have been made in 1541—when the body was committed to the earth—was found to enclose another, which there was reason to suppose had been made in 1104; and this again enclosed a third, which answered the description of one made in 698, when the saint was raised from his first grave. This innermost case contained, not, indeed, the corruptible body of St. C., but his skeleton, still entire, wrapped in five robes of embroidered silk. Fragments of these, and of the episcopal vestments, together with a comb and other relics, found beside the bones, are to be seen in the cathedral library. The asceticism which distinguished St. C. in life, long lingered round his tomb.

Until the Reformation, no woman was suffered to approach his shrine; the cross of blue marble still remains in the cathedral floor which marked the limits beyond which female footsteps were forbidden to pass, under pain of instant and signal punishment from the offended saint. His wrath, it was believed, was equally prompt to avenge every injury to the honor or possessions of his church. It was told that William the Conqueror, anxious to see the incorrupt body of the saint, ordered the shrine to be broken up; but scarcely had a stroke been struck, when such sickness and terror fell upon the king, that he rushed from the cathedral, and, mounting his horse, never drew bridle till he had crossed the Tees. A cloth, said to have been used by St. C. in celebrating mass, was fashioned into a standard, which was believed to insure victory to the army in whose ranks it was carried. Flodden was only one of many fields in which the defeat of the Scots was ascribed to the banner of St. Cuthbert. It hung beside his shrine until the Reformation, when it is said to have been burnt by Calvin's sister, the wife of the first Protestant dean of the cathedral.

The life of St. C. was twice written by the Venerable Bede—briefly in vigorous hexameters in his *Liber de Miraculis Sancti Cuthberchti Episcopi;* at greater length, in prose, in his *Liber de Vita et Miraculis Sancti Cudbercti Lindisfarnensis Episcopi.* In this latter work, he made use of an earlier life by a monk of Lindisfarne, which is still preserved. Besides these lives—all of which have been printed more than once—and what is told of St. C. in Bede's *Historia Ecclesiastica Gentis Anglorum*, the chief ancient authorities are the *Historia Translationis S. Cuthberti*, published by the Bollandists in the *Acta Sanctorum, mens. Martii*, vol. iii.; the *Libellus de Exordio Dunhelmensis Ecclesiæ* by Symeon of Durham; the *Libellus de Nativitate S. Cuthberti de Historiis Hybernensium excerptus*, and the *Libellus de Admirandis B. Cuthberti Virtutibus*, by Reginald of Durham, both published by the Surtees Society. There are two modern memoirs of St. C.—the late Rev. James Raine's *St. Cuthbert* (Durham, 1828), and the Very Rev. Monsignor C. Eyre's *History of St. Cuthbert* (Lond. 1849).

CUTHBERT, a disciple of the Venerable Bede in the monastery of Jarrow, of which he himself was afterwards abbot, was present at the death of his master in 735, and has left a beautiful and touching relation of the event in a letter to his fellow-disciple, Cuthwine. It has been often printed; the best editions are those in Twysden's *Decem Scriptores* (Lond. 1652), and in Stevenson's edition of Bede's *Historia Ecclesiastica* (Lond. 1838).

CUTHBERT OF CANTERBURY, a native of the kingdom of Mercia, became Bishop of Hereford in 736, and Archbishop of Canterbury in 740. He died in 758. An instructive letter was addressed to him by St. Boniface (or Winfrid) on the ecclesiastical abuses of the age. It has been printed more than once, and will be found in the appendix to the late Professor Hussey's edition of Bede's *Historia Ecclesiastica* (Oxon. 1846).

CUTHBERT'S BEADS, ST. See BEADS.

CU'TICLE. See SKIN.

CU'TLASS is a sword about 3 feet long, broad and straight, with a japanned hilt. Cutlasses are mostly used by sailors in the navy, when boarding and taking possession of the enemy's ships.

CU'TLERY, the general name for all kinds of cutting instruments, such as knives, forks, scissors, razors, &c. The workman who makes these is called a cutler; the sword-maker, a sword-cutter; but the manufacturer of workmen's tools is called a 'tool-maker,' or a '*steel toy-maker*,' not a cutler. In Birmingham, for example, such implements as hammers, chisels, pincers, hatchets, &c., are technically called toys.

Shells, flints and other sharp-edged stones formed the rudest and most ancient cutting instruments, and the earliest traces of human existence upon our island and elsewhere, are associated with stone 'celts' and other weapons and cutting implements. These were followed by bronze weapons and implements, which were in use among the Romans for some purposes up to about the time of the Christian era, bronze surgical instruments having been found at Pompeii. This bronze, like steel, could be made soft for working into shape, and then hardened, but by the opposite means used for hardening and softening of steel, bronze being softened by a sudden cooling from a red heat, and hardened by slow cooling. Some cities in Spain and the north of Italy acquired a high reputation for the manufacture of cutting instruments, more particularly swords, during the middle ages, when the chivalry of the period sought the best equipments. Latterly, all countries have been outstripped by England as regards tastefulness, excellence, and cheapness in cutlery. In this kind of manufacture, the lead is taken by Sheffield, which had gained a name for its *whittles* as early as the reign of Richard I. Why, with their ingenuity, taste, and skill in the arts, neither the French nor Belgians succeed in their C., would be difficult to explain. Certain it is that their C. is comparatively inferior as regards temper and finish, while their apparent incapability of making the delicate hinges and springs of clasp-knives has provoked repeated remark. At the same time it is to be allowed that foreign C. is rapidly improving, particularly in table-knives, on which a few years have made a great difference in France. In the manufacture of American axes, Canada has made most marvelous advances, its produce as respects this article excelling that of England.

Good *table-knives* are made of steel and iron welded together; the tang, which goes into the handle, and the shoulder, are of iron, and the blade of steel. The tang and the shoulder are forged from bar iron, and the blade from shear or cast steel. Knife-blades, razor-blades, and other small articles, are usually forged into their required shape while still attached to the bar, which serves for the workmen to hold them by, and is called the 'porter.' When the bar becomes too short, it is grasped in a pair of tongs held close by a ring which clamps them by sliding up their conical handles. Two men are employed in forging such work, which is said to be 'two-handed.' The principal workman, or 'fireman,' uses a small hammer of 2 to 4 lbs. weight, while the 'hammerman' wields the sledge-hammer, weighing from 10 to 15 lbs. The 'fireman,' who attends the heating as well as the anvil-work, directs the hammerman, whose blows merely follow those of the small directing hammer of the fireman. In *drawing down* or *reducing* a bar both in length and width, the flat face of the hammer is used; but when the length or breadth alone is to be extended only the 'pane' or narrow edge of the hammer. The concavity of razor-blades is made by hammering the blade on a small round-faced anvil; the notch or 'nail-hole' of a penknife is struck by means of a chisel of the required form. Superior work, such as razor-blades, are *smithed* after forging—that is, beaten upon an anvil, to condense the metal as much as possible—and slightly ground or *scorched* on a rough stone, to finish the shaping, and remove the 'scale' or black oxidized surface, which would interfere with the color of the tempering. Common knives are made entirely of iron, and the difference of price arises not merely from the difference of cost of the material, but from the greater facility of working. It should also be understood that, in many articles composed of steel welded to iron, the saving of steel is not the only advantage, for steel being more brittle than wrought iron, it is very desirable, in all articles subject to a transverse breaking strain or to concussion, that every part except the cutting or working edge should be of iron. Thus, a hatchet made entirely of steel would be far less durable than one of iron with a welded steel cutting-edge. A table-knife with a steel tang would be weaker than one with an iron tang. Hammers should only be *faced* with steel, &c.

The great usefulness of steel for all kinds of implements used for cutting or exposed to wearing friction, depends upon its property of acquiring a high degree of hardness when heated and suddenly cooled, and of then being capable of softening again in various degrees by reheating moderately. See TEMPERING METALS.

Table-forks are forged rudely into the shape of the tang and shank, first as though but a single thick prong were required; the

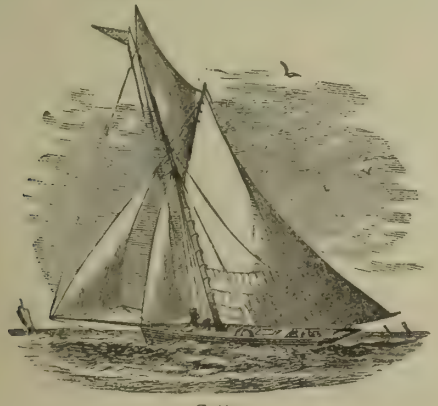
part for the prongs is then beaten out, and a stamping-die is brought down upon it, which forms the prongs, with a thin film of steel between them; this is cut out by a cutting-die. Then they are softened and filed up, again hardened, and tempered, and ground, to smooth and finish. The dry-grinding of forks, needles, &c., is a very deleterious trade, on account of the particles of steel which enter the nostrils of the workmen, and produce most painful irritation, followed by a peculiar disease called 'grinders' asthma,' which is said to shorten life so seriously that few dry-grinders, exposed to the steel dust, reach forty years of age. Many remedies have been proposed for this. A magnetic mouthpiece was invented; but the workmen would not wear it, on account of its novelty, its grotesque appearance, the trouble of cleaning it, and the belief that if their trade were made more healthy, greater numbers would enter it, and wages would be reduced. A revolving fan, which sets in motion a current of air, that is carried by a pipe to the outside of the building, has been used with greater success, and is now in general use when it can be applied, though its introduction was much opposed by the workmen. In the needle-trade especially, it has been most beneficial, entirely removing all danger from the operator. The use of wet stones would, of course, entirely obviate the evil, but they are not applicable to many kinds of work, especially that which is ground before hardening, as the stone wears away very rapidly under these circumstances.

Penknives and other pocket-knives are the work of many hands. Besides the blades, there are the separate pieces of the spring, the handle, rivets, &c., the making of each of which is a distinct trade. All these pieces are finally fitted and put together by the finisher; a good two-bladed knife passes through his hands from 70 to 100 times. The difference in the amount of labor bestowed on the best and the commonest C. is very remarkable, and the difference of price is of course proportionate.

CUTTA'CK ('Royal Residence'), the capital of a district of its own name in the province of Orissa, presidency of Bengal, stands immediately below the bifurcation of the Mahanuddee, thus occupying the apex of the delta of that river. The advantage, however, of this position, in a political and commercial point of view, seems to be in a measure neutralized by the cost of providing against the encroachments of the bordering streams. With a population in 1871 of 50,878, the city has no pretensions to architectural beauty. It has very little trade; and its manufactures are principally shoes and brass cooking-vessels. C. is 220 miles south-west of Calcutta, in lat. 20° 28′ N., and long. 85° 55′ E.

CUTTACK, the district, is in the province of Orissa, on the north-west coast of the Bay of Bengal, and has an area of 3178 square miles, and a pop. (1871) of 1,494,784. The name, however, has been generally used to include the three districts of C., Pooree, and Balasore, with a joint area of 7717 square miles, and a pop. (1871) of 3,034,690. This larger district extends in N. lat. from 90° 40′ to 21° 45′, and in E. long. from 85° 8′ to 87° 31′. The Mahanuddee is the main river, its delta being wholly comprised within the district. Among the natural features of the country, the most remarkable is the Chilka Lake, which is, for many miles, separated from the sea by a strip of sand not more 300 yards wide. Next to Cuttack, the chief towns, reckoning from the south, are Poorree, with its temples of Jaggernaut, at the mouth of the most southerly arm of the Mahanuddee; Kanarak, or the Black Pagoda, about twenty miles further to the north; and Balasore. The trade of the district is inconsiderable. Iron ore is said to be found.

CUTTER is a name given to two kinds of small vessels. The



Cutter.

cutters used by yachtsmen, smugglers, and revenue cruisers, and which are built with especial reference to speed, have a single mast, and a straight running bowsprit that can be run in on board occasionally. They are much like sloops in rig, but have larger sails. Such small vessels occasionally venture on long voyages. In 1857 the *Charter Oak*, a C. of 23 tons, crossed the Atlantic from New York to Liverpool; and, in 1858, the *Christopher Columbus*, a C. of 45 tons, with a crew of only two boys besides the owner, performed the same voyage in 45 days. The cutters belonging to ships of war are clincher-built boats, from about 24 to 28 feet in length, employed for various purposes; they weigh from 10 cwt. to 24 cwt. each. Two such cutters are supplied to every ship of war, except those of the smallest kinds.

CUTTEAMU'NDU, the juice of the *Euphorbia Cuttimundu*, a species of Spurge (q. v.), a native of India, particularly of the Northern Circars. It is used for cementing iron with other substances, as for uniting the blade and handle of a knife. The fresh juice is used as a vesicant. In a dried state, it is capable of being moulded into any form, and a great variety of articles may be made of it, as of gutta-percha.

CUTTINGS are branches or portions of branches of trees or shrubs, employed to produce new plants, by the insertion of the lower end into the earth. By care, and in the most favorable circumstances, almost any tree or shrub may be propagated by C., but some only with great difficulty, and softwooded trees or shrubs most easily. Nothing is more easy than to propagate willows, fuchsias, currants, gooseberries, &c., in this way; but many other plants, commonly propagated by C., require greater attention on the part of the gardener, warmth, a uniform damp atmosphere, and shade. Some kinds of apple are occasionally propagated by C., and in warmer climates than that of Britain, this mode of propagation is found suitable for a greater number of kinds. C. are most advantageously taken from branches of which the wood is young, yet at least a year old. The top is generally cut off, and not much more left above ground than is inserted into it. Care must be taken in planting C., not to use such force as to strip off the bark. Some herbaceous plants are propagated by C., which, in pinks and carnations, are called *pipings*.

CU'TTLE-FISH (*Sepia* and *Sepiadæ*), a genus and family of cephalopodous molluscs of the order *Dibranchiata*. See CEPHALOPODA. The body is oblong and depressed, sac-like, with two narrow lateral fins of similar substance with the mantle. There is an internal shell lodged in a sac on the back part of the mantle, somewhat oval and blade-shaped, being comparatively thick near the anterior end, where it is terminated by a sharp point affixed, as it were, to its general outline; the whole shell is light and porous; it is formed of thin plates with intervening spaces divided by innumerable partitions; and consists chiefly of carbonate of lime with a little gelatinous and other animal matter, which is most abundant in the *phragmocone*, or internal harder part of the shell, where also the laminæ and partitions are closer than in the outer part. The eyes are very large, and the head is furnished with eight arms, each of which has four rows of suckers, and two long tentacles expanded and furnished with suckers on one side at the extremity. The COMMON C. (*Sepia officinalis*) is abundant on the British coasts. Its skin is smooth, whitish, and dotted with red. It attains the length of a foot or more. It is one of the pests of fishermen; often, along with calamaries, partially devouring the fish which have been caught in their nets.

Cuttle-fish.

In Scotland, the fishermen call it the O fish. It is not itself easily caught, being very active in making its escape by swimming, and also promptly throwing out its ink to darken the water around it. It is sometimes cast upon the shore, but far more frequently its bone, which is used for making pounce, tooth-powder, &c., for forming moulds for small silver castings, for polishing, and for other purposes in the arts; and was formerly often used

Cuttle-fish Bone.

in medicine as a corrective of acidity in the stomach, for which purpose, however, it is no better adapted than any other form of carbonate of lime. The ink of the C. furnishes the valuable pigment called *Sepia* (q. v.), which is said by some chemists to contain a peculiar animal principle called *Melanine* (Gr. *melas*, black), and is wonderfully indestructible. Dr. Buckland indeed found the pigment remaining in fossil molluscs akin to the C. to be fit for use, and to make excellent sepia, notwithstanding all the unreckoned ages that had elapsed from the time of its secretion by the living organisms.—The eggs of the C. are not unfrequently cast ashore, clustered together like grapes, and are known to the frequenters of the coast as *Sea-grapes*. The flesh of the C. was

esteemed by the ancients. A receipt for making a C. sausage will be found in Athenæus.—Numerous species of C. inhabit different seas.

CUVIER, Georges Chretien Leopold Dagobert, Baron, was born August 23, 1769, at Montbéliard, in the department of Doubs, a town which then belonged to Würtemberg. His father was an officer in a Swiss regiment. Having made rapid progress in learning at the Montbéliard gymnasium, C. entered, in 1784, the Karlsakademie at Stuttgart. Here, in the midst of various studies, he retained that predilection for natural history which he had displayed when only twelve years old. The restricted means of his parents, however, compelled him, in 1788, to take a situation as private tutor in the family of Comte d'Héricy, who resided near Fécamp, in Normandy. Here C. lived for six years, quietly but ceaselessly pursuing his studies in natural history. An acquaintance accidentally formed between him and the Abbé Tessier (noted as a writer on agriculture), was the cause of C.'s obtaining an introduction to Geoffroy St. Hiliare and other eminent Parisian savans. Startled by the novelty and comprehensiveness of his views on zoology, Geoffroy St. Hilaire urged him to come to Paris, which he did, and, in 1795, was appointed professor in the Ecole Centrale of the Panthéon.

Soon after this appointment, C. was made assistant to Mertrud, the teacher in comparative anatomy at the Jardin des Plantes, and now he began to form that collection in natural history which ultimately became the largest in Europe. In 1796, he was made a member of the National Institute; in 1800, he succeeded Daubenton in the Collége de France; and, in 1802, was made perpetual Secretary of the Institute. He gradually rose in the estimation of the Emperor, and in 1808, was commissioned to superintend the institution of academies in the new territories attached to France. Shortly before the fall of Napoleon, C. was admitted into the Council of State. The Restoration did not deprive him of his honors, but added to them; he was made Chancellor of the University of Paris, and, henceforward, received from time to time new rewards for his services to science. After a visit to England (1818), where he was received with great honors, he was, in 1819, admitted into the cabinet by Louis XVIII., and, in 1826, was made Grand Officer of the Legion of Honor; but his decided opposition to the royal measures for restricting the freedom of the press, lost him the favor of Charles X. Uuder Louis Philippe, he was made a peer of France in 1831, and in the following year was nominated Minister of the Interior, when he was suddenly attacked with paralysis, of which he died, May 13, 1832.

It is difficult, in our narrow compass, to give a summary of the merits of C., so various were his attainments, so great was his success in so many departments. He laid the foundation of the now universally recognized method of classification in Zoology (q. v.), and raised comparative anatomy (which until his time had been merely a heap of unconnected details) to the dignity of a science. After a long series of patient observations on numerous animals, especially the hitherto little-known order of mollusca, he published (1801—1805) his *Leçons d'Anatomie Comparée*, which was completed by the *Mémoire pour servir à l'Histoire de l'Anatomie des Mollusques* (1816). With admirable sagacity, he applied the principles of his Comparative Osteology to the remains of fossil vertebrate animals, and thus opened a field of investigation in which numerous explorers have since successfully labored. His *Recherches sur les Ossements Fossiles des Quadrupèdes* (1821—1824) is a mine of information in natural history, and affords the strongest arguments in favor of the theory of a progressive series of animals, advancing from the most simple to the most complex forms of organization.

C.'s rare faculty of expressing scientific truths in a popular and elegant style, was displayed in his celebrated *Discours sur les Révolutions de la Surface du Globe et sur les Changements qu'elles ont produits dans le Règne Animal* (latest edition, Paris, 1851). This discourse was published as an introduction to the above-named *Recherches sur les Ossements Fossiles*. In concert with Valenciennes, C., in 1828, commenced a *Natural History of Fishes*, which was founded on the largest ichthyological collection ever made by an individual. It was continued by Valenciennes. Lastly, we may notice the éloges delivered by C. (and published in the *Recueil d'Eloges Historiques*, 1839), as valuable contributions to the history of science.

In public life, C. was as remarkable for activity as in the quiet work of the study. He never blindly surrendered himself to any party, but at all times gave proof of an honest, sagacious, and resolute character. In his plans for the extension and improvement of national education, he was zealous and indefatigable, as also in his efforts for the welfare of the Protestant Church in France, of which he was a member.—Mrs. R. Lee's *Memoirs of Baron C.*(Lond. 1833); Pasquier's *Eloge de C.* (Paris, 1833).

CUXHA'VEN, a town of Germany, situated on the left or southern bank of the Elbe, just where it is lost in the German Ocean. It is about 60 miles distant from Hamburg, to which free city it belongs. C. is a small place, but of importance as the port from whence the Hamburg steamers ply when in winter the Elbe is frozen over. The harbor affords good shelter, and is much resorted to by vessels waiting for favorable winds. Pilots for the Elbe are taken in here. Pop. (1880) 2200.

CUYA'BA, capital of Matto Grosso, the second largest and most westerly province of Brazil, occupies pretty nearly the center of South America, being in lat. 15° 36′ S., and long. 55° W. It stands on the left bank of a river of the same name, and is estimated to contain about 10,000 inhabitants. Its mines, which have yielded gold and diamonds since 1719, are now nearly abandoned, the cost of working them being unremunerative. C. sends to Rio, the principal seaport of the country, large quantities of hides and ipecacuanha by caravans of 200 or 300 mules each. The chief edifices of the city are its three churches, an hospital, a school of philosophy, and the public buildings of the province.

CUYP, or KUYP, Jacob Gerritse, commonly called the Old C., was born at Dordrecht in 1575. Jacob C.'s representation of cows and sheep, battles and encampments, are clever, but his fame rests principally upon his excellent portraits. His coloring is warm and transparent; his manner, free and spirited. C. died in 1650.—Aelbert Cuyp, Jacob's son, was born at Dordrecht, in 1605.

He excelled in the painting of cattle grazing or reposing, moonlights, wintry landscapes, still waters with ships, horse-markets, hunts, camps, and cavalry-fights. During his lifetime and long after, Aelbert's pictures, although in many respects equal to those of Claude, were held in little estimation. Opinion, however, has now changed regarding them. One of his still waters, which was sold in 1777 for 416 guilders (£34 13*s*. 4*d*.) brought 12,720 guilders (£1060) in 1844. England is particularly rich in his works. He died at Dordrecht, 1691.—Benjamin Cuyp, a nephew of Aelbert, lived at Dordrecht, and painted biblical pieces in Rembrandt's style, and familiar scenes of country-life. His best works are in the manner of Teniers. His sea-shores have less repute. The dates of his birth and death are unknown, but, from the multitude of his pictures, it is conjectured that he lived to a great age.

CU'ZCO, the name of a city, a province, and a department in Peru. 1. C., the city, was originally the capital of the Incas (in the language of the Incas, says Garcilasso, C. signifies 'naval') and the center of the empire, which, besides the territory of the existing republic, comprised Bolivia, most of Ecuador, and portions also of Chili and the Argentine Confederation; and is still, next to Lima, the most populous city in the state, containing fully 47,500 inhabitants. It stands on the Guatanai, one of the remotest headwaters of the Amazon, in lat. 13° 31′ S., and long. 72° 2′ W., at the eastern end of that section of the Andes known as the Knot of Cuzco, 11,000 ft. above sea-level. Notwithstanding its aboriginal name, C., with the exception of some neighboring ruins, part of which, perhaps, carry one back beyond the era of the Incas, is really of Spanish origin, being built in the form of a square, and presenting many handsome edifices. It is about 200 miles to the north-north-east of Arequipa, having its maritime outlet in Islay, the port of that city. The manufactures of the place are cottons, woollens, embroidery, and jewelry.—2. The province, otherwise styled the Cereado, embraces nothing beyond the city itself but the suburb of San Jeronimo.—3. The department subdivided into 11 provinces, lies wholly in the sierra or Andine region of the country, having the coast on the west, and the montana, or Transandine territory, on the east. It numbered in 1871, 464,000 inhabitants, being considerably more populous than any other department. It stretches in S. lat. from 13° to 15°, and in W. long. from 70° to 73°, with an area of about 45,000 square miles. In addition to C. itself, it has the towns of Abancay and Urubania.

CY'AMUS BALÆNA'RUM. See Whale Louse.

CYA'NIC ACID is a compound of cyanogen (q. v.) and oxygen along with water, and is represented by the symbol C_2NO,HO, or CyO,HO.

CY'ANITE, KYANITE (Gr. *kyanos*, blue), DISTHENE, or SAPPARE, a mineral composed of alumina and silica. It often occurs crystallized, and generally in broad prisms. It is sometimes colorless, red, yellow, &c., but frequently of a fine sky-blue, slightly tinged with violet; it is transparent, and sometimes beautifully opalescent. It occurs chiefly in mica-slate, talc-slate, and granite; is found in different parts of Europe, Asia, and America, and in several places in Scotland. It is sometimes used as a gem.

CYA'NOGEN (C_2N or Cy) is a compound organic salt radical, which is mainly interesting as being the principal component of hydrocyanic or prussic acid. It is most easily prepared by heating the cyanide of mercury (HgCy) or the cyanide of silver (AgCy) in a tube, when the C. is evolved as a gas at ordinary temperatures, but can be condensed by cold and pressure into a thin, colorless liquid, which freezes at —30° F. Gaseous C. has a specific gravity of 1806 (air = 1000), is inflammable, and burns in air or in oxygen

with a characteristic purple or rose tint; is soluble in water to the extent of 4 to 5 volumes of the gas in 1 of water. It combines with metals, such as potassium, to form a class of important cyanides, as the cyanide of potassium. See POTASSIUM, HYDROCYANIC ACID, &c.

CYANOHY'DRIC ACID. See HYDROCYANIC ACID.

CYANO'SIS (Gr. *kyanos*, blue), lividity of complexion, with fulness of the capillaries and minute veins, especially of the face and lips. A name characteristically applied to the color in certain cases of congenital disease or malformation of the heart. See HEART, DISEASE AND MALFORMATION OF.

CYA'NOTYPE PRO'CESSES, in Photography, are those in which the compound radical cyanogen is employed; they were discovered by Sir John Herschel, and depend for their successful practice on the reduction of a persalt of iron to the state of protosalt, by the action of light, in the presence of organic matter.

Good paper is immersed in a solution of ammonio-citrate of iron of the strength of 40 grains to 1 ounce of water; it is then dried, and exposed—at any convenient time during a fortnight—under a negative, when a picture of a pale brown tint becomes faintly visible upon a yellow ground; it is then brushed over with a solution of ferrocyanide of potassium (yellow prussiate of potash), which develops the picture of a deep blue tint; and this may be further deepened by immersion in a solution of carbonate of soda, which has the effect, at the same time, of removing the unaltered ammonio-citrate, and permanently fixing the picture. Similar results may be obtained by employing ferridcyanide of potassium (red prussiate of potash), or a mixture of the ferridcyanide and ammonio-citrate, in which latter case the paper is sensitive as soon as treated with the mixed solutions, and must therefore be dried in the dark. To fix the picture, it is only necessary to wash with water. A subsequent treatment with a weak solution of protonitrate of mercury, has the effect of apparently removing the whole of the picture. If the mercury salt, however, be perfectly washed away, and the picture dried, and ironed with a very hot iron, it is speedily reproduced in all its vigor.

CYANU'RIC ACID is an organic acid allied to cyanic acid, and having the formula $C_6N_3O_3,3HO$, or $Cy_3O_3,3HO$, it is obtained by heating urea to expel ammonia, or by the destructive distillation of uric acid.

CYA'THEA, a genus of ferns (q. v.), of the sub-order *Polypodiceæ*, containing many species, natives of tropical and subtropical regions, both of the Old and of the New World. They are tree-ferns, and some of them have lofty stems and gigantic fronds; they are generally also characterized by great gracefulness and beauty. *C. arborea*, sometimes designated the Common Tree-fern, is a native of the West Indies, Brazil, &c. The fronds are bipinnate, the pinnules deeply pinnatifid. The roots of *C. medullaris*, a species found in New Zealand, contain much starch, and are baked and used as food.

CYATHOPHY'LLUM, a genus of fossil stony corals, with a simple or branched polyparium, internally lamellated, the lamella having a quadripartite arrangement. The older portions are cut off by transverse 'tables' or septa, and the base of the stem is often supported by root-like processes. This genus was especially abundant in the Devonian measures, 36 species having been described from them. It made its first appearance in the Silurian seas, and perished at the close of the carboniferous epoch.

CY'BELE. See VESTA.

CY'BIUM, a genus of fishes of the family *Scomberidæ* (q. v.), having a long fine dorsal, detached finlets, an elongated body, a keeled tail, no pectoral cuirass, and no armature on the lateral line, compressed trenchant teeth in the jaws, and very numerous villiform teeth in other parts of the mouth. A number of species are natives of the seas of the East Indies, some of which are much esteemed for the table; and one species, *C. Commersoni*, is used in a dried as well as in a fresh state; and in a dried state is, to some extent, an article of commerce in India.

CYCADA'CEÆ, or CYCA'DEÆ, a natural order of exogenous plants, consisting of small trees and shrubs, somewhat resembling palms in their general appearance, but much more nearly allied to *Coniferæ* (pines, firs, &c.) in their botanical characters; C. being one of the few orders placed by Lindlay along with *Coniferæ* in his class of *Gymnogens* (q. v.).

The stems are generally simple, and either cylindrical or short and spheroidal; sometimes they are branched by successive forkings; they are much marked with scars of leaf-stalks; they consist internally of a mass of pith traversed by woody bundles, and rings of woody matter. The leaves are large and pinnated, and unfold by unrolling, like the fronds of ferns. This curious and beautiful order contains about fifty known species, natives of tropical and sub-tropical countries. None are found in Europe. They all have a mucilaginous nauseous juice, but with this there is often much starch, which being separated, forms a wholesome article of food. A kind of sago is made in Japan from the cellular substance which occupies the interior of the stem of *Cycas revoluta*, in the Eastern Peninsula from *C. pectinata*, and in the Moluccas from *C. circinalis*. From these species, which are trees 30—40 feet high, there exudes a transparent gum, resembling tragacanth in its properties. Their nuts are also eaten, after being fermented and roasted. The large seeds of *Dion edule* afford a kind of Arrow-root in Mexico; and a starchy substance, sometimes called Arrow-root, and sometimes Sago, is obtained from *Zamia pumila* and other dwarf species in the West Indies. Caffer bread (q. v.) belongs to this order.—Fossil C. are numerous, and occur in some of the oolitic and other strata in England.

CY'CHLA, a genus of fishes of the family *Chromidæ* (included by Cuvier in the *Labridæ*, or Wrasse family), of which many species occur in the rivers of tropical America. They have small and crowded teeth, forming a large band. Some of them are reckoned among the finest fishes for the table in Brazil and Guiana. They are also remarkable for the beauty and brilliancy of their colors. Some of them are large, and some small. Allied to this genus is *Chromis*, of which one species, *C. Niloticus*, the Egyptian *Corycina* of the ancients, inhabits the Nile, and is reckoned the best fish in Egypt. It attains the length of two feet.

Cyclamen Europæum.
a, the whole plant; *b*, the fruit.

CY'CLADES. See ARCHIPELAGO and GREECE.

CYCLA'MEN, a genus of plants of the natural order *Primulaceæ*, having a wheel-shaped corolla, with a long reflexed limb, and flower-stalks twisted spirally downwards after flowering. The species are herbaceous perennials, not numerous, and chiefly natives of the south of Europe.

They have turnip-like, partly subterranean stems, which are very acrid, but nevertheless are greedily eaten by swine, and the plants are accordingly often designated SOWBREAD. They are drastic and emmenagogue. A very stimulant ointment is prepared from them, which externally applied by friction, expels intestinal worms from children. Several of the species are frequent in our flower-gardens, on account of the beauty and fragrance of their flowers, which have the additional charm of being produced early in spring. One species only, *C. hederæfolium*, has a very doubtful claim to a place in the flora of Britain.—The active properties of the species of C. have recently been found to depend upon a peculiar principle called *Cyclamine*, which produces effects on the animal system similar to those of Curari (q. v.).

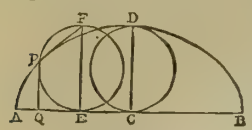
CY'CLE (Gr.), which means simply circle, is a term used in Chronology to denote an interval of time in which certain phenomena always recur in the same order. Cycles have chiefly arisen from the periods of revolution of the earth and other celestial bodies not being commensurable. One unit of time is the day of 24 hours, being the period of revolution of the earth round its axis. But neither the year—the period of the earth round the sun—nor the month—the period of the moon round the earth—can be measured by days, or even by hours, so exactly as not to leave fractions. Cycles have been invented to swallow up these fractions of time in whole numbers expressing days, in such a way that after a certain number of revolutions of the body whose period has been put against that of the earth on her axis, the body shall at last occupy the same place in the heavens and calendar as it did when the C. commenced. Of the numerous cycles or periods of this kind that have been invented, the more important are noticed under their specific names. See INDICTION, METONIC CYCLE, PERIOD, GOLDEN NUMBER, &c.

CYCLOBRANCHIA'TA (Gr. circle-gilled), an order of gasteropodous molluscs, in which the gills usually form a series of lamellæ, surrounding the body between the foot and the mantle. To this order belong the univalve *Patellidæ*, or Limpets, and the multivalve *Chitonidæ*, or Chitons.

CY'CLOID (Gr. circle-like). If a circle roll along a straight line on its own plane, a point on the circumference describes a curve which is called a cycloid. The curve is one of the most interesting we know in respect both of its geometrical properties and connection with dynamics. One of its most interesting properties is this: The time of a body's descending from rest from any point in the arc of an inverted C. to the lowest point is the

same, from whatever point of the curve the body begins to descend. This is sometimes expressed by saying that C. is the *isochronous* (Gr. equal-time) *curve*.

The body having reached the lowest point, will, through the impetus received in the fall, ascend the opposite branch of the curve to a height equal to that from which it fell, losing velocity in its ascent by the same degrees as those by which it acquired it in its descent, and it will employ precisely the same time in ascending as it did in descending. It is clear that if a surface could be procured that would be perfectly smooth and hard, the C. would thus present a solution of the perpetual motion. The curve was discovered by Galileo in 1615. The line AB, which is called the base of the cycloid, is equal to the circumference of the generating circle; and CD, which is the axis of the cycloid, is equal to the diameter. In any position EPF of the generating circle, AE is equal to the arc EP; AQ, the abscis, = AE — QE = arc EP — sine of EP; and PQ, the ordinate, = 1 — cosine of EP.



The Cycloid.

CYCLOID FISHES, an order of fishes, according to the classification proposed by Agassiz, having *cycloid* scales (Gr. *kyclos*, a circle)—scales formed of concentric layers, not covered with enamel, and not spinous on the margins. Cycloid scales are generally imbricated, but are sometimes placed side by side without overlapping. Very many of the existing fishes are of the cycloid order, and fossil C. F. are numerous in the more recent strata from the chalk upwards, but they first appear in the chalk.

CYCLONES. See STORMS.

CYCLO'PEAN ARCHITECTURE, or MASONRY, the name which has come to be generally used for a wall of large irregular stones, unhewn and uncemented. The term originated in Greece, where structures of this kind were fabled to have been the work of the Cyclopes, or one-eyed giants. The walls of Tiryns, near Nauplia—alluded to by Homer—are an example of the ruder style of Cyclopean masonry. They are of irregular unshapen stones, from 6 to 9 feet long, from 3 to 4 feet wide, and from 2 to 3 feet deep; the interstices are filled up by small stones, but no mortar is used. The walls of Mycenæ and of Epirus are examples of more advanced C. A.: here, the blocks, although irregular in size and shape, are fitted carefully to each other, showing close joints and a smooth surface. These structures are now commonly believed to have been reared by the Pelasgians (q. v.), probably more than a thousand years before the Christian era. They are found not only in Greece, but in Italy and Asia Minor.

The next stage of Cyclopean masonry shows an approach to horizontal courses, as in the walls of several towns in Greece, and of some in Etruria. Lastly, the name of Cyclopean work is applied, but not perhaps quite accurately, to a kind of masonry which obtained among the Etruscans (q. v.), where the blocks are both squared and laid in horizontal courses, but not cemented. In some cases—as in the walls of Cosa, in Tuscany, believed to have been first a Pelasgian, and then an Etruscan city—the lower part is of irregular polygonal blocks, the upper part of squared stones in horizontal courses. In at least one instance—a wall in the Peloponnesus—a foundation of excellent ashlar is surmounted by irregular polygonal blocks of the usual Cyclopean type.

Masonry, partaking more or less fully of the Cyclopean character, is to be found in Persepolis, and elsewhere in Asia, in several parts of Western Europe, and in some parts of America. The walls of Cuzco, and the ruins of what is called the house of Manco Capac, on an island in the lake of Titicaca, in Peru, are interesting examples of the C. A. of the New World. Instances of Cyclopean work on a smaller scale are to be found in the British Islands, in the walls of the primitive 'duns' or hill-forts, or in the 'cashels' or precincts of early religious houses. Among Irish examples may be mentioned the Grianan of Ailech, in the county of Donegal; Staigue Fort, in the county of Kerry; Dun Ængus, on one of the Isles of Arran, on the west coast of Galway; the Giant's Scone, near Coleraine; and the Rock of Cashel. Among Scotch instances may be named the Laws, in the parish of Monifieth, not far from Dundee, and the ruins on St. Columkille's Island, near Migsted, in Skye. In the Bibliothèque Mazarine at Paris, there is an interesting set of models of the Cyclopean buildings of Greece and Italy, by M. Petit-Radel, the author of *Recherches sur les Monumens Cyclopéens*.

CYCLOPE'DIA. See ENCYCLOPÆDIA.

CYCLO'PÉS (Gr. *kuklopes*, 'the round-eyed'), in Greek mythology, are of three kinds. 1. The Homeric C., a wild, lawless, gigantic race inhabiting the sea coasts of Sicily, the most prominent of whom is Polyphemus (q. v.). Although Homer does not directly call them one-eyed, yet he expressly terms Polyphemus such, andthe later poets attribute his peculiarity to the rest. 2. The three C. mentioned by Hesiod, Brontes, Stereopes, and Arges, each having one eye in the middle of his forehead; these were sons of Uranus and Gæa, belonged to the race of Titans, and forged thunderbolts for Zeus.

Hurled into Tartarus by their father, but delivered by their mother, they helped Kronos to usurp the government of heaven. Kronos, however, in his turn, threw them back to Tartarus, from which they were again released by Zeus, whose servants they now became. Finally, they were slain by Apollo, because they forged the thunderbolt with which Zeus killed Asclepius. Later tradition placed their workshop in Mount Etna, or in the volcanoes of Lemnos and Lipari, and made them the slaves of Hephæstus. 3. The C. mentioned by Strabo, as a people who had come from Thrace or Lycia to Argolis, and were distinguished for their skill as builders. Their constructions are known as the Cyclopean walls, and many of them still exist in parts of Greece and Italy. The statement of Strabo is quite untrustworthy. More probably the so-called Cyclopean walls were built by some ancient race, perhaps the Pelasgians (q. v.), at a period long anterior to the historical civilizations of Greece and Rome.

CY'CLOPS, a genus of minute entomostracous crustaceans of the order *Branchiopoda* (q. v.), having a soft and rather gelatinous body divided into two portions, one consisting of the head and thorax, the other forming the tail. There is only one eye, situated in the middle of the forehead, and generally of a bright crimson color, sparkling like a gem when the animal is viewed through a microscope. The species of C. are numerous; they inhabit both the sea and fresh waters, generally residing among or upon aquatic plants. They are extremely active, and dart about with great rapidity.

CYCLO'PTERUS. See LUMPSUCKER and SUCKING FISH.

CYCLORA'MA, a series of views, which, being wound round cylinders, are made to pass in consecutive order before the spectator, so as to produce the effect of motion on his part, as the banks of a river are seen from a steamboat, or the country from a railway.

CYCLO'SIS (Gr. circulation), the name employed to designate certain still very imperfectly understood movements of the contents of cells in plants. As they have been observed in plants of the most different natural orders, it is not unreasonably presumed that they prevail throughout the whole vegetable kingdom.

CYCLOSTOMATA, a division of the Vertebrates, including the Lamprey (q. v.). See also CARTILAGINOUS FISHES, and the table in ZOOLOGY.

CYDO'NIA. See QUINCE.

CY'GNET, a young swan.—CYGNET-ROYAL, in Heraldry, a swan gorged with a ducal coronet, having a chain thereunto affixed, and reflexed over its back.

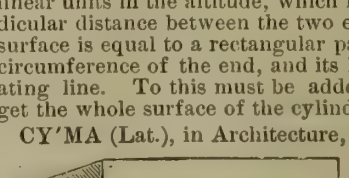
CY'GNUS. See SWAN.

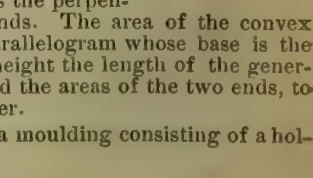
CYGNUS (Lat. the Swan), a constellation in the northern hemisphere, between Lyra and Cassiopeia. See STARS.

CY'LINDER (Gr. *kylindo*, to roll) is the name of a genus of geometrical solid figures, of which there may be endless species. The most common kind of C. is that which is generated by the revolution of a rectangular parallelogram about one of its sides, which line is called the axis of the cylinder. But in order to embrace all varieties of cylinders, we must generalize the mode of generation. A C., then, is a solid generated by a line which moves parallel to itself while one end traces upon a plane any curve whatever. When the position of the generating line is at right angles to the plane, the C. is *right;* when not, it is *oblique*. If the curve traced is a circle, and the line perpendicular to the plane, the C. is a *right circular C.*, &c. In all cases the content of the C. is found by multiplying the number of square units in the base by the number of linear units in the altitude, which is the perpendicular distance between the two ends. The area of the convex surface is equal to a rectangular parallelogram whose base is the circumference of the end, and its height the length of the generating line. To this must be added the areas of the two ends, to get the whole surface of the cylinder.

Right Circular Cylinder.

CY'MA (Lat.), in Architecture, a moulding consisting of a hollow and round conjoined. When hollow in the upper part, it is


Cyma Recta.


Cyma Reversa.

termed C. recta; when hollow in the lower part, it was called C. reversa.

CYMA'TIUM. See ENTABLATURE.

CY'MBALS are military instruments of percussion, which, when struck one against the other, produce a loud harsh sound of no fixed pitch. The best C. are those made in Turkey and in China. Attempts to discover and imitate the composition of the metal have all failed. The notes in music for this instrument are all placed on the same line or space, in rhythmical succession. C., although military instruments, are now much used in the orchestra by modern composers.

CY'MBEL, an organ stop of the mixture species, consisting of three ranks of pipes. Also a stop found in very old continental organs, consisting of a machine like a star placed high up on the front of the organ, on which were hung small bells, which sounded when the star was moved round on its center by a current of air from the organ.

CY'ME, in Botany, a common form of Centrifugal (q. v.) inflorescence, in which the rachis or floral axis disappears by separating into irregular branches, and these are short and corymbose. It is of very general occurrence in the *Caryophyllaceæ*. Examples may be seen also in the common elder, different species of *Viburnum*, &c. The *verticillasters* of the *Labiatæ* are small cymes in the axils of opposite leaves, assuming nearly the appearance of whorls.

Example of a Cyme.

CY'MRY. See CELTIC NATIONS.

CYNA'NCHÉ (Gr. *kuon*, a dog, and *ancho*, I suffocate), a term applied to the severer forms of sore throat. See THROAT, AFFECTIONS OF THE.

CYNA'NCHUM, a genus of plants of the natural order *Asclepiadaceæ*, having a wheel-shaped corolla, and a lobed or cleft corona. *C. Monspeliacum*—a herbaceous twining plant, with roundish, heart-shaped, stalked leaves, a native of the shores of the Mediterranean—yields the drug called *Montpellier Scammony*, a violent purgative, and not much used. *C. ovalifolium* is a native of Penang, and its sap yields caoutchouc of excellent quality.

CYNAROCE'PHALÆ. See COMPOSITÆ.

CY'NICS, the name applied to a sect of Greek philosophers, who were distinguished mainly for their morose and snarling ethics. For a knowledge of their peculiar opinions, see articles ANTISTHENES, DIOGENES, MENIPPUS, &c.

CY'NIPS. See GALL-FLY.

CY'NODON, a genus of grasses, having digitate or racemose, spikes, with spikelets on one side, glumes nearly equal, boat-shaped, and containing one floret, which has two awnless paleæ, the fruit coated with the hardened paleæ. The most important species is *C. dactylon*, a grass very widely diffused, being the principal fodder grass and best pasture grass of India, where it is the principal covering of many thousands of square miles, and is known by the names of *Dhob*, *Doorba*, &c., and also common in the south of Europe. In Britain, it is rare, being found only on the sandy shores of Cornwall. Its creeping roots, and those of its congener, *C. lineare*, have medicinal virtues, and are sometimes used as a substitute for sarsaparilla.

CYNOMO'RIUM, a genus of plants of the curious parasitic natural order *Rhizantheæ* (q. v.). *C. coccineum*, a plant of a strange fungus-like appearance, is found in the islands of Malta and Gozo, most abundantly on a particular rock in Gozo. It was long known as *Fungus Melitensis*, and enjoyed the highest reputation as a styptic, besides being used as an astringent in dysentery and other maladies. So high a value was set upon this plant, that the knights of Malta took it under their particular care as one of their choicest possessions; it was carefully gathered and deposited in a government office, from which the grand-master sent it to friendly sovereigns, and to the hospitals of the island. A keeper of the rock which produces the plant is still appointed, and his salary appears in the public accounts of Malta.

CY'NOSURE, (Gr. *kynosoura*, the tail of the dog; *Ursa Minor*, the Little Bear) is the constellation of which the pole star is the principal star. Milton's lines—

> Where perhaps some beauty lies.
> The Cynosure of neighboring eyes.—*Allegro.*—

have made the word popular; the metaphor is grounded on *Ursa Minor* being the constellation towards which the others look, as it were, and round which they wheel.

CYNOSU'RUS. See DOG'S-TAIL GRASS.

CYPERA'CEÆ, or CARICI'NEÆ, sometimes popularly called SEDGES, a natural order of plants, akin to Grasses, but having generally a triangular stem, which is without joints, or almost so, and often leafless. The leaves are sometimes sheathing, but their sheaths are always entire, not split, as in the grasses. The flowers, which are hermaphrodite in some, and unisexual in others, consist of a scale-like *glume*, under which lie the organs of fructification, the pistils alone being frequently enclosed in a separate urn-shaped covering; the place of the perianth is sometimes supplied by a few bristles.

The stamens are 1—12 in number, the anthers erect: the ovary is one-seeded, the style single, trifid or bifid; the fruit a small crustaceous or bony nut, the embryo lenticular, and enclosed within the base of the albumen. Plants of this order, which contains fully 2000 known species, occur in all zones; some of the genera, as *Carex* (q. v.), abounding in the colder, some, as *Cyperus* (q. v.), in the warmer parts of the world. Many of them are plants of very humble growth, some, as Bulrushes, Papyrus, &c., comparatively large, but none rival in size the bamboos and other gigantic grasses. Most of them grow in marshy and moist places, but a few in sunny dry places. Their stems and leaves are in general very deficient in succulence, and in most of them, also very rough, so that they are eaten by domesticated cattle only when in a very young state, and rather from necessity than from choice, and are regarded by farmers as mere weeds. See CAREX, CYPERUS, and SCIRPUS. Some of the uses of plants of this order are noticed in the articles BULRUSH, COTTON-GRASS, and PAPYRUS.

CYPE'RUS, a genus of plants of the natural order *Cyperaceæ*, distinguished by hermaphrodite flowers and compound spikelets of numerous two-rowed glumes including no bristles or scales. It contains a great number of species, chiefly tropical, and gradually decreasing in number towards the colder parts of the globe. Only two are found in England, and these are very rare. Many of the species have tubers or corms, which in some are mucilaginous and nutritious; in others, contain also a bitter principle, and possess medicinal qualities. Of the latter class is *C. longus*, or Sweet C., one of the species which have been found in England, common in ditches and wet meadows in some parts of Europe, the rhizome of which has an odor of violets, and is astringent, tonic, and stomachic. It has been employed in medicine from very ancient times; but is now more used in perfumery. Some of the Indian species are also used medicinally and in perfumery in their native country, as well as species of kindred genera. Of those with esculent tubers, the most important is *C. esculentus*, sometimes called Rush-nut, a native of the south of Europe and north of Africa, which is cultivated to a considerable extent in Egypt, Italy, Spain, Portugal, and the south of France. The root of this plant throws out creeping branches, at the end of which form farinaceous tubers of the size of a hazel-nut, which are called Earth Almonds (*Amande de terre*) by the French. They have a sweetish taste, and are used like almonds for the dessert, and also for making *Orgeat* (q. v.).

Cyperus Esculentus: *a*, whole plant; *b*, cluster of spikelets; *c*, a single flower.

They are said to possess not only nutritive, but restorative and stimulant properties. Of late, they have become a considerable article of commerce, upon account of the bland fixed oil which they yield, and are chiefly exported from Spain and Portugal to Holland. They contain about 16 per cent. of oil. The roots of this plant and its allies are the only roots known to contain much oil. The tubers of *C. bulbosus* or *Jemenicus* are eaten in India, either roasted or boiled, or are dried in the sun and made into bread; but their small size makes them troublesome of collection and preparation. Those of *C. geminatus* are also eaten. The tubers of some species of Sirpus (q. v.) resemble in quality those of the esculent species of cyperus. The fibre of *C. textilis* is so strong that it is employed in India for making mats.

CYPRÆ'A. See COWRY.

CY PRÈS, doctrine of, in English law. As the law forbids the giving of an estate tail to the son of an unborn son of a living person, after a life-estate given to such unborn son, and would re-

gard such estate tail as void, the courts, when such a gift is made in a will, apply the doctrine of C. P., and endeavor, *as near as possible*, to carry out the testator's wish, by giving to the unborn son of the living person an estate tail, instead of for life, and so enabling his son to succeed if the entail be not barred. See ENTAIL. So also, when a charity cannot reasonably be administered, precisely as directed by the testator, the court will, by the doctrine of C. P., administer it as near as possible to his directions.

Branch and Fruit of Cypress (*Cupressus sempervirens*).

CY'PRESS (*Cupressus*), a genus of plants of the order *Coniferæ*, the species of which are evergreen trees or shrubs, with small generally appressed and imbricated leaves, and with almost globular cones, the scales of which bear numerous hard seeds. The best known species is the COMMON C. (*C. sempervirens*), a native of the Levant, the north of Africa and the south of Europe, and sometimes met with in England. It is a tree of no great height, with quadruple twigs. The leaves are dark-green, and the tree has, therefore, a sombre aspect, and from very early times has been an emblem of mourning; the Greeks and Romans put its twigs in the coffins of the dead, they used it to indicate the house of mourning, and planted it about burial-grounds, as is still the custom in the East.

The wood of the C. is yellow or reddish, and has a pleasant smell. It is very hard, compact, and durable; the ancients reckoned it indestructible; and the resin which it contains gives it the property of resisting for a long time the action of water. It is not liable to the attacks of insects, and was formerly much esteemed for the purposes of the cabinet-maker. Some believe that the C. is the true cedar-wood of Scripture, and it has also been supposed that it is *Gopher wood*. Specimens of this wood are in existence in museums, which are known to be several thousands of years old. The doors of St. Peters's at Rome, made of C., lasted from the time of Constantine the Great to that of Pope Eugene IV., above 1100 years, and were perfectly sound when at last removed, that brazen ones might be substituted. Medicinal virtues were formerly ascribed both to the wood and seeds of the C. and the balsamic exhalations of the tree were reckoned very salutary in diseases of the chest.—Several other species of C. are natives of temperate and warm climates in different parts of the world. There are many species, the principal of which are the Portugal C. or Cedar of Goa (*C. Lusitanica*), a native of Goa, naturalized in Portugal; *C. thurifera*, a native of Mexico, which exudes a resin used in that country for incense; *C. torulosa*, a native of the Himalaya, and which has been grown successfully in Britain; *C. funebris*, lately introduced into Britain from China; the White C. or White Cedar of North America (*C. thyoides*). The Deciduous C. or Virginia C. (*Taxodium distichum*, or *Schubertia disticha*) is now regarded as belonging to a different genus, and attaining a height of 120 feet, and found in the cypress swamps of Delaware and elsewhere.

CY'PRIAN, THASCIUS CÆCILIUS, an illustrious father of the African Church, was born in Carthage about the beginning of the 3d century. He belonged to a respectable family, and was a distinguished teacher of rhetoric before his conversion to Christianity, which took place 246 A.D. His benevolence secured for him a high degree of popularity, and his piety no less veneration, in consequence of which he was made bishop of his native city in less than three years. In 250 he fled into the desert, to avoid the persecution of Decius. Here he remained a whole year, but not in idleness. The same prudence, energy, and activity that he had always displayed, were now shown in that extensive correspondence which he carried on with his clergy on ecclesiastical matters. On his return to Carthage in 251, he suppressed, but with moderation, the rising controversy regarding the *Lapsed* (q. v.), or Christians who, during the time of trial, had apostatized. C.'s views regarding the proper dignity of the Bishop of Rome have frequently been mistaken: he, indeed, recognized the Roman bishop as the successor of Peter, and as the representative of the unity of the church; but he asserted that the pre-eminence of the Roman see was confined to the earliest times, and that, in later times, other bishops, or successors of the apostles, had dignities equal to that of the successors of Peter.

He therefore firmly opposed the supremacy asserted by the Roman bishop, Stephanus, in the question of baptism by heretics. In the persecution under Valerian, 257, C. was banished to Curubis; but having returned to Carthage in the following year, he was there beheaded. C. was both a learned and eloquent divine, but he was even more conspicuous for his dignified, moderate, and wise conduct. His knowledge of human nature enabled him to exercise a wide influence over the African Church; and his correspondence, from which the best idea of his character is obtained, gives us an interesting picture of the times in which he lived. His writings—less crabbed and rhetorical than those of his teacher, Tertullian—contain, besides 81 *Epistolæ*, or official letters, several important treatises, among which may be mentioned the *De Unitate Ecclesiæ Catholicæ*, the *De Lapsis*, the *De Disciplina et Habitu Virginum*, the *De Gratia Dei*, and the *De Idolorum Vanitate*. The best editions of C.'s complete works are that of Fell, Bishop of Oxford (1682), and that of Baluze (Paris 1726). There are many lives of C. One of the most recent is by Reinkens (1873).

CYPRI'NIDÆ, a family of malacopterous fishes, having a small mouth, the jaws almost toothless, but the pharynx or hinder part of the mouth furnished with teeth; the body generally covered with scales, the gill-rays few, and no adipose fin (like the second dorsal fin of the trout or salmon). The genera and species are numerous. All the C. are fresh-water fishes. They are found in the lakes and rivers of almost all parts of the world. To this family belong the Carp, Dace, Tench, Bleak, Bream, Barbel, Minnow, Gold Fish, Roach, Loach, &c. Many of the species are much esteemed for the table. The fecundity of the C. is great.

CYPRINODO'NTIDÆ, a family of malacopterous fishes, allied to *Cyprinidæ*, with which they were formerly ranked, but differing from them in having the jaws more protractile and toothed. Some of them are American, some Asiatic; some inhabit fresh, and some salt water. To this order belong some interesting and curious fishes, particularly the Anableps (q. v.), remarkable for the conformation of its eyes. The species of the genus *Orestias* are found in the lakes of the Andes, at a great elevation above the sea, and are highly esteemed for the table.

CY'PRIS, a genus of minute entomostracous crustaceans of the order *Branchiopoda* (q. v.), having the body enclosed in a shell of two horny pieces, somewhat resembling that of a bivalve mollusc. The antennæ and feet are beautifully feathered with long fringed bristles, by means of which these animals swim with much vivacity. They abound in every pool of stagnant water. Their horny shells are very abundant in a fossil state in the Wealden rocks of England, in the limestone of the carboniferous series, &c.

CY'PRUS (Anc. Gr. *Kupros*, Mod. Gr. *Kibris*, Fr. *Chipre*, Ital. *Cipro*), an island situated south of Asia Minor, in that portion of the Mediterranean called the Levant. C. was anciently divided into many small kingdoms. It was originally possessed by the Phœnicians, from whom it passed to the Greeks, and subsequently to the Egyptians and Persians. After the victories of Alexander, it declared for Macedon. It next became a portion of the Græco-Egyptian kingdom of the Ptolemies, then of the Roman and Byzantine empires. The Arabs conquered it 648 A.D.; in 1191, it was taken by Richard Cœur-de-Lion, who ceded it to the Templars. After several vicissitudes, it came into the possession of the Venetians, from whom it was finally conquered by the Turks in 1571. The 'conditional convention' concluded between the English and Turkish governments in 1878, leaves C. a Turkish possession, but provides for its being occupied and administered by England.

C. is nearly 150 miles long by 55 broad, has an area of 3700 square miles, and a pop. in 1881 of 135,869. A range of mountains —the Stavro Vuno and Santa Croce (ancient *Olympus*)—the sides of which are very bold and rugged, runs through the whole length of the island, attaining an elevation of more than 7000 feet above the sea. Three-fifths of the island is mountainous. Of these one-fifth has splendid forests of oak interspersed with walnut-trees, and would furnish large supplies of sulphur, pit-coal, and metals of various kinds, under intelligent management; while two-fifths is adapted for vine and olive culture, and the growth of fruit-trees generally. 'The remaining two-fifths is composed of magnificent plains, and extensive open country, which, though wanting in rivers and streams, are still very productive in cereals.' The soil is exceedingly fertile, yielding all kinds of grain. The chief products are wheat, barley, cotton, silk, madder roots, oil, wine, carobs, and salt. The wine of Cyprus is still excellent. The chief drawbacks to production, besides mismanagement, are the want of water—most of the streams becoming dry in summer—and the ravages of the locusts. It is said that there are good crops only twice in five years. The climate varies in various parts of the island; in the central plain, and about Larnaca, the summer heat is intense, especially from the middle of September till the end of October. Fevers, seldom fatal, are prevalent in the hot months. The first year of the English occupation, 1878, was exceptionally unhealthy both for natives and foreigners; 1879 and 1880 were 'extremely healthy.' The planting of trees, hitherto recklessly extirpated, will doubtless improve the climate and help

to fertilize again the more arid regions. Some swamps might with advantage be drained. Several roads have been made.

The English, in entering on the administration, endeavored in the main to improve, not to overthrow, the existing Turkish system. The courts of justice, having English assessors, became pure and were made less dilatory. Tithes were retained, but their collection simplified. Several rather high-handed ordinances, designed to prevent disturbance during a transition period, were gradually withdrawn; and in 1880 it was arranged that the administration of C. should be transferred from the Foreign Office to the Colonial Office.

The exports were valued (1878) at £157,328; (1879) £222,218. The imports (1878) £177,651; (1879) £208,407. The revenue in 1878 was £3,785,273; in 1879, £4,754,497. In 1879, 3639 ships entered and cleared the half-dozen harbors of C., the tonnage of those entering being 226,367 tons. The chief towns are Lefkosia or Nicosia, the capital; Famagosta; Larnaca; and Limassol. In 1871, C. was connected by telegraph with Syria.

See works on C., published in 1878 and 1879 by R. H. Lang, Hepworth Dixon, E. G. Ravenstein, Sir Samuel Baker, and Mrs. Stevenson, also the *Report by H. M. Commissioner* for 1879 (1880); and for archæology, Cesnola's Cyprus (1877).

CYR, St., the name of several places in France, the most important of which is St. C., in the department of Seine-et-Oise, about 3 miles west of Versailles. Pop. (1876) 1695. The village owes its origin to an educational institution for the daughters of nobles of fourth descent on the father's side, founded here in 1686 by Louis XIV., on the suggestion of Madame de Maintenon. There were about 250 pupils, for whom Racine wrote his tragedies of *Esther* and *Athalie*. Madame de Maintenon died here, and was buried in the choir of the church. The institution was suppressed at the Revolution. In 1803, the buildings were converted by Napoleon into a military school, as it still continues to be.

CYRENA'IC SCHOOL. See ARISTIPPUS.

CYRENA'ICA, the name of the district whose capital was Cyrene (q. v.). At one period, it nominally stretched from Carthage to Egypt, and extended inland as far south as the oasis of Fezzan; but a great portion of this territory was occupied by the subject Libyan tribes, and not by the Greek colonists, who were confined chiefly to the plateau of Barca, with the subjacent coast. This portion of C. was, and still is one of the loveliest and most agreeable regions of the world. The climate is delicious, mountains on the south sheltering the land from the scorching blasts of the Sahara, and cool sea-winds fanning it on the north. From the central plateau, whose breadth is about 80 miles, the land slopes down in verdant terraces to the Mediterranean.

These terraces are cut and watered by mountain streams, forming luxuriant ravines. The productions of C. mentioned by ancient writers are corn, oil, wine, honey, fruits of all kinds, cucumbers, truffles, cabbage; flowers yielding the richest perfumes; and a rare plant called *silphium* (still abundant), from which was obtained the gum-resin, greatly esteemed for medicinal purposes. The country was also celebrated for its breed of horses, but was much exposed to the ravages of locusts. Ancient C., which nearly corresponds with modern Barca (q. v.), was overrun by the Arabs in 647 A.D.

CYRE'NÉ, the capital of Cyrenaica (q. v.), was founded, 631 B.C., by a colony of Spartans under Battus, whose dynasty lasted for nearly two centuries. During this period, it made rapid advances. On the death of Arcesilaus IV., the last of the Battidæ, about 450 B.C., a republic was established, but the political condition of the city under the new government was far from prosperous. Party contests raged, until at last it fell into the hands of the Romans. During its prosperity, C. carried on a great commerce with Greece and Egypt, and to a less extent with Carthage. Its extensive ruins still attest its former magnificence. C. was the birthplace of the philosophers Aristippus, Anniceris, and Carneades, the poet Callimachus, the astronomer Eratosthenes, and the rhetorician Synesius, who afterwards became bishop of Apollonia.

CYRIL, St., Bishop of Alexandria, was one of the most energetic, but least amiable of the Church Fathers. The date of his birth is not known. He was educated by the fanatical monks of Nitria, with whom he lived for five years, and who probably inspired him with that fiery, intolerant, and ignorant zeal which characterized him through life. Subsequently, he went to Alexandria, where he became a presbyter, and on the death of his uncle, Theophilus, 412 A.D., obtained the episcopal see. The Alexandrian Jews, who were numerous and wealthy, were the first to feel the fierceness of his religious hate. Some Christian blood having been shed by them in a city tumult, C. put himself at the head of a rabble of zealots, attacked the Jewish quarter of Alexandria, destroyed the houses, and banished the inhabitants. Orestes, the prefect of Egypt, having drawn up an accusation against C., was attacked in the streets by 500 monks, who had come up from the deserts of Nitria, at the call of their old companion, eager for the work of destruction. One of these monks having fallen in the skirmish, his corpse was carried in procession to the High Church of Alexandria, where C. delivered a sanguinary discourse, gave the dead monk the name of *Thaumasius*, and pronounced him a martyr and a saint. But perhaps the most barbarous deed with which this persecutor of heretics and heathens had to do, was the murder of the heathen maiden Hypatia (q. v.), the daughter of the mathematician Theon.

Theodoret gravely accuses him of instigating the Alexandrian populace to this horrid act. But the most important historic event in his career was his controversy with Nestorius (q. v.). All the worst features of his disposition appeared in this broil. Even the gentle Neander overflows with pious wrath, and pursues C. through sixty pages of his *Church History* with the fiercest epithets. In the midst of unquietudes, which he himself had largely occasioned, he died 444 A.D. C.'s numerous writings consist of commentaries, treatises, homilies, epistles, &c. The best edition was published by Aubert (7 vols., Paris, 1638). See Neander's *Kirchengeschicthe*, transl. by Bohn, vol. iv. pp. 133—196.

CY'RIL, St., Bishop of Jerusalem, an eminent Church Father, was born at Jerusalem about 315 A.D., and ordained a deacon in 334, a presbyter in 345, and on the death of Maximus in 351, was elected bishop of his native city. His metropolitan was the Arian bishop, Acacius of Cæsarea, with whom he was soon engaged in hot conflict concerning originally the rights of his office, but ultimately their differences of doctrine. Acacius accused C., before a council hastily 'got up' at Cæsarea in 358, of selling the treasures of his church in a time of famine to feed the poor! Strange to say, C. was deposed for doing this praiseworthy action. He now appealed to a larger synod, which was held at Seleuceia. This synod restored him to his office; but once more, through the persevering hostility of Acacius, he was deposed by a council assembled at Constantinople in 360. On the death of the Emperor Constantius, he was again restored to his episcopate in 362. Soon after, his old enemy Acacius died, but C. was immediately involved in new difficulties. After considerable strife, C. was banished, by order of the Emperor Valens, in 367; nor did he return tilll the emperor's death in 378. He died in 386.

C.'s writings are extremely valuable, not on account of their vigor, profundity, or beauty, but on account of their theology. They consist of 23 treatises, 18 of which are addressed to catechumens, and 5 to the newly baptized. The former are for the most part *doctrinal*, and present to us in a more complete and systematic manner than the writings of any other Father the creed of the church; the latter are *ritual*, and give us a minute account of baptism, chrism, and the Lord's Supper. Their style is simple and unattractive. The best edition of C.'s works is that published by Touttée, the Benedictine monk (Par. 1720).

CYRIL, the apostle of the Slaves (in the 9th c.), sprang from a respectable family living in the half-Slavic, half-Greek town of Thessalonica. On account of his knowledge, he obtained the surname of the Philosopher. Having been consecrated a priest, he went forth, during the reign of the Byzantine emperor, Michael III., to evangelize the Chasars, who dwelt by the Caspian Sea. His labors were very successful, the khan himself being among his converts. Boris, the heathen prince of Bulgaria, having about this time besought the patriarch of Constantinople to send him a preacher of the gospel, C., along with his brother Method, were selected.

Their labors were not in vain. Boris was baptised in 860. Rastic, prince of Moravia, next invited them to his country. They accepted the invitation, and while there, assisted by a number of their own pupils, completed their translation of the Holy Scriptures, which is in use to the present day, as a sacred or church language, among all Greek-Catholic Christians (Russians, Bulgarians, and Serbs). From Moravia, Christianity, according to the Slavic ritual, spread into Bohemia, whose prince, Boriwoj, and his spouse, Ludmilla, were baptized by Cyril. C. died in 869. The *Apologi Morales*, ascribed to C., were published by Corter (Vienna, 1630). See Richter's *Cyril and Method* (Olmütz, 1825).

CY'RUS, the founder of the Persian monarchy, commonly called C. THE ELDER, was, according to Herodotus, the son of Cambyses, a Persian noble, and of Mandane, daughter of Astyages, the Medo-Persian king. His birth was a source of alarm to his grandfather Astyages, who had previously had a dream, the interpretation of which portended that the offspring of Mandane would one day be the ruin of the Median supremacy and the ruler of all Asia. He therefore contrived to get the infant into his own hands, and gave it to Harpagus, his chief servant, with orders to put it to death. Harpagus promised to do so, but intrusted it privately to the care of a herdsman, who brought it up along with his own children. The young C. quickly distinguished himself among the country lads by his superior daring and dignity. On one occasion, he was elected king in some boyish game by his companions, and in the exercise of his regal authority, caused a nobleman's

son to be severely scourged. The father complained to Astyages, who caused the culprit to be brought before him, and recognizing in his person and mien his own grandson, sent C. back to Persia —the Magi having in some way satisfied him that his dream had already received its fulfilment. C. himself, however, did not think so, and as he grew up to manhood, began to meditate ambitious schemes. All writers testify to his courage, amiability, and address. He was exactly the kind of man to gather round him brave, venturesome, loyal followers. The tyranny of Astyages had made him hateful to his subjects, and by the help of the crafty Harpagus, C. soon formed a party among the Medes favorable to his designs. Putting himself at the head of his Persian troops, C. advanced into Media, and overthrew the forces of Astyages (559 B.C). After consolidating his new dominions, which seem to have cost him many years' labor, he proceeded in his career of conquest. The kingdom of Lydia first yielded (546 B.C.), and its king, the famous Crœsus, fell into his hands. Ultimately, the whole of Asia Minor was subdued.

But the crowning triumph of C. was his capture of the city of Babylon, the metropolis of Assyria (538 B.C.), whose king was Labynetus, the Belshazzar of Daniel. Through the instrumentality of C., the Jews were delivered from their captivity, and allowed to return to Palestine. His vast ambition, however, proved his ruin. He wished his power to overshadow all Asia, in harmony with the dream of his grandfather; and although his dominions already extended from the Hellespont almost to the Indus, he resolved to subjugate the Scythian peoples, and began an unjust war with the Massagetæ, a nation or tribe who dwelt to the north-east of the Caspian, beyond the Araxes, whose queen was called Tomyris. At first C. was successful, but in a second engagement he was defeated and slain (529 B.C.).

Such is the account given by Herodotus, and although we are unable to affirm that it rests on absolutely historical ground, it is unquestionably to be preferred to any other. The work of Xenophon, entitled the *Cyropædeia*, is not a history; it is a historical romance, and was manifestly intended by the author for such. Xenophon wished to picture a great and wise king, and finding the elements both of greatness and wisdom in C., he took advantage of his historic personality, and engrafted upon it whatever, according to his own notion, would ennoble and dignify it.

CYRUS, THE YOUNGER, the second of the sons of Darius Nothus, or Ochus, lived about 130 years after the great Cyrus. He conspired against his brother Artaxerxes Mnemon, who had succeeded to the throne (404 B.C.). The plot, however, being discovered, he was at first sentenced to death, but afterwards pardoned, and even restored to his dignity as satrap of Asia Minor. Here he employed himself in making arrangements for war against his brother, although he concealed his purposes to the very last. In the spring of 401 B.C., he left Sardis at the head of 100,000 Asiatics, and 13,000 Greek mercenaries, under pretence of chastising the robbers of Pisidia. Artaxerxes being warned of C.'s perfidy, made preparations to oppose him, and the two armies encountered each other in the plains of Cunaxa, 500 stadia from Babylon. C. was defeated and slain, although the Greeks fought with the greatest courage, and even routed that portion of Artaxerxes' troops immediately opposed to them. The fortunes of the Greeks, on their retreat through the highlands of Armenia, in severe winter-weather, are recorded by Xenophon in his *Anabasis* (q. v.).

CYST (*kystis*, a bladder), a word sometimes used in the original sense as applied to hollow organs with thin walls, as the urinary bladder and gall bladder; but commonly reserved for the designation of pathological structures or new formations within the body, having the bladder form. Cysts are commonly transparent, and often almost structureless in their tenuity; they are commonly, however, lined by an Epithelium (q. v.), and have membranous walls, with faint indications of fibrous structure.

They are either simple or compound, unilocular or multilocular; they are sometimes small, numerous, and separate; in other cases, they grow to an enormous size, and are very complex. Some cysts are distinctly parasitic, and of independent animal nature; such are Hydatids (q. v.) and the cystic Entozoa (q. v.) generally. Others are probably formed out of the structures in which they arise, their true pathology being, however, obscure. Such are the cysts of the kidney, and still more distinctly, the immense complex cystic structures which form in the ovary. See OVARIES.

CYSTIC WORMS, an order of *Entozoa*, or Intestinal Worms, according to the system of Zeder and Rudolphi, for some time generally received by naturalists, characterized by the body ending in a transparent cyst or bladder filled with pellucid fluid, this body having sometimes only one head, as in *Cysticercus*, sometimes many, as in *Cœnurus*. It has, however, been found that certain species, *Cysticercus cellulosæ* and *Cœnurus cerebralis*, are the young of cestoid worms, and it is therefore concluded as highly probable that all the C. W. are of the same nature, more particularly as all present the appearance of immaturity, in the want of visible organs of reproduction. Until a comparatively recent date, the animal nature of C. W. was not recognized, nor is it long since their relation to tape-worms and other cestoid worms has been fully ascertained. See CESTOID WORMS, CYSTICERCUS, ECHINOCOCCUS, STAGGERS, and TAPE-WORM.

CYSTICE'RCUS (Gr. bladder-tail), according to many naturalists, a genus of Cystic Worms (q. v.), characterized by a dilated cyst with a single head, which has four suckers and a circlet of hooks. This genus has, however, latterly been displaced from the system of nature by the discovery that the forms referred to it are only the young of tape-worms. This discovery has been confirmed by a multitude of observations and experiments with regard particularly to *C. cellulosæ*, found in human beings, and in many rodent and pachydermatous animals—as rabbits, pigs, &c.—the young of the common tape-worm; and *C. tenuicollis*, found more rarely in human beings, but often in the abdominal cavity of ruminant quadrupeds, and of pigs, horses, and many other animals—the young of a tape-worm of the dog. *C. cellulosæ* often exists in great numbers in the flesh of pigs, causing the diseased appearance known as *measly*. See CESTOID WORMS, where it is figured. It sometimes occurs in like manner infesting the human body, in muscles of most various parts; it has been found even in the heart, in the brain, and in the eye.

That in such cases it sometimes causes death, is too certain, and its removal is not easy, except when it is so situated that it can be reached by the knife, nor is there any sure indication by which its presence in many situations can be known; but it appears also that it may die and be absorbed without causing any very serious consequences to the person in whom it has dwelt. The cysts of this species are always of small size; those of *C. tenuicollis*, however, which generally occurs in the liver, or in other abdominal organs, sometimes become, in some of the lower animals, as large as a child's head. Injurious consequences are produced by them when either numerous or very large.—See Cobbold's *Entozoa*.

CY'STIN, or CY'STIC OXIDE, forms a rare variety of Calculus (q. v.). It contains $C_6H_6NO_4S_2$, has a crystalline texture, a brownish-yellow color, and is semi-transparent. It is not soluble in water, alcohol, or ether, but dissolves in the strong acids.

CYSTI'TIS. Inflammation of the urinary bladder (q. v.).

CY'TISUS, a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, of which some of the species, having long twiggy branches, are popularly called BROOM (q. v.), others are called Laburnum (q. v.), whilst others still are generally known by the name Cytisus. The characters of the genus are stated in the article BROOM. The species are numerous—small trees or shrubs, with leaves of three leaflets, and yellow, white, or purple flowers, natives chiefly of the warmer temperate parts of the Old World. Many of them are very beautiful, and some are among the esteemed ornaments of our shrubberies, others of our greenhouses.

CY'TOBLAST. See CELLS.

CY'ZICUS, a peninsula of Anatolia, Asia Minor, projecting into the Sea of Marmora. It lies to the south-east of the island of Marmora, and about 70 miles south-west of Constantinople. It was at one time an island, but the gradual formation of an isthmus connected it with the mainland. Its length from south to north is about nine miles, and its breadth from east to west 18 miles. In early times, C. was a Milesian colony, and the city of C., upon whose site vineyards and orchards now flourish, is described by Strabo as one of the first cities in Asia, alike for extent and splendor.

CZACKI, TADEUSZ, an eminent Polish author, was born in 1765 at Poryck, in Volhynia. At the age of twenty, he obtained an office in the supreme justiciary court at Warsaw, and was also made director of the crown archives—a situation which enabled him to gratify his taste for Polish history. Some essays on Polish finance induced the diet to select him, in 1788, as a member of the commission of inquiry into the state of the revenue. His efforts to animate the industry and extend the commerce of his native country were most praiseworthy. A valuable result of his travels through Poland for this purpose is a map of its river-system. He also interested himself greatly in the navigation of the Dniester. At the second partition of Poland, he lost his property, but it was afterwards restored.

The chief labor of his life, however, was in connection with the education of his countrymen. His endeavors to instruct the people in the old Polish provinces of Russia, where education had been almost wholly neglected, met the approval of the Emperor Alexander. The most important of C.'s educational institutions was the gymnasium at Krzemieniec. In 1807, he was appointed the deputy of Prince Czartoryski, who had the care of public instruction in the Polish government of West Russia. C. died at Dubno, 8th February 1813. His writings prove the comprehensive character of his attainments. His most valuable work is upon

Lithuanian Law (*O Litewskich i Polskich Prawach*, 2 vols., War. 1800).

CZAR, more properly *Zar*, is a title of the Russian emperor. The word is derived from the old Slavonic language, and signifies much the same as Ger. *Kaiser*, Lat. *Cæsar*, to which it probably owes its origin; although some etymologists identify it with the termination of the names of the old Assyrian kings—such as Phalassar, Nabonassar, and Nabopolassar. After the 12th c., we find Russian annalists giving the title of C. to the Grand Duke Wladimir, Monomach (died 1125), and to several of his successors. In general, however, the rulers of the various Russian provinces were called Grand Dukes till the 16th century. Thus, we have the Grand Dukes of Wladimir, Kiew, Moscow, &c. The Grand Duke Wassilij Iwanowitch first assumed, in the year 1505, the title of *Samodershez*, which signifies autocrat. The son of Wassilij, Iwan II., Wassiljewitch the Cruel, caused himself to be solemnly crowned C., 16th January 1547. From this time, the Russian monarchs called themselves Czars of Moscow; and after the conquest of Little Russia and Smolensk, Czars of All the Russias. The word now became practically the equivalent of Emperor; yet Peter I., in 1724, thought fit to assume this latter title in addition; and as the Russian language had no term corresponding to it besides C., the Latin word *Imperator* was introduced, while the empress was termed *Imperatriza*. At first, several European powers refused to sanction the assumption of imperial dignity by the Russian C., but ultimately consented to do so. The wife of the C. was named Czariza (Czarina); the sons, Czarewitch; the daughters, Czarewna; but after the death of Alexei—Peter I.'s son—these titles were abolished, and the imperial princes were called Grand Dukes, and the Imperial princesses Grand Duchesses. In 1799, the Emperor Paul I, introduced the title of Cesarewitch (not Czarewitch) for his second son, the Grand Duke Constantine. The heir-apparent and his wife are still called Cesarevitch and Cesarevna. Among the Russian people themselves, the emperor is more frequently called Gossudar (Hospodar, i. e., Lord) than Czar.

CZARTORY'SKI, ADAM GEORGE, son of Prince Adam Casimir C., of an ancient Polish house, sometimes (but wrongly) said to be sprung from the Jagellons (q. v.), was born at Warsaw, 14th January 1770. Having completed an excellent education at Edinburgh and London, he returned to his native country, and took part against Russia in the war occurring on the second partition of Poland. On the defeat of the Poles C. was taken to St. Petersburg as a hostage, and here he exhibited so much ability and prudence as to gain the friendship of the Grand Duke Alexander, to whom he was attached, and the confidence of the Emperor Paul, who made him ambassador to Sardinia. When Alexander ascended the throne, he appointed C. assistant to the Minister of Foreign Affairs; and he took an active part in official life until after the peace of Tilsit. As curator of the university of Wilna, to which he was nominated in 1803 by Russia, he exerted all his influence to keep alive a spirit of nationality; and when some of the students were arrested on a charge of sedition, and sent to Siberia, C. resigned his office. His successor reported to the emperor, that the amalgamation of Russia and Lithuania had been delayed a century by C.'s occupancy of the curatorship. Russian favors could not deaden or even dull C.'s pure patriotism. Into the revolution of 1830 he threw himself with all his heart. He was elected president of a provisional government, and in this capacity summoned a national diet, which met, and in January 1831, declared the Polish throne vacant, and elected C. head of the government. He immediately devoted half of his large estates to the public service, and adopted energetic measures to meet the power of Russia, but in vain; the Poles were crushed, and C.—specially excluded from the general amnesty, and his estates in Poland confiscated—escaped to Paris, where he afterwards resided, the liberal friend of his poor expatriated countrymen, and the center of their hope of a revived nationality. In 1848, he liberated all his serfs in Galicia, and during the Crimean war he ineffectually endeavored to induce the Allies to identify the cause of Poland with that of Turkey. He died July 1861.

CZA'SLAU, a town of Bohemia, 45 miles east-south-east of Prague. Its deanery.church, in which the celebrated blind Hussite leader, General Ziska, was buried, is surmounted by the highest steeple in Bohemia. C. is also noted as the scene of an important victory gained over the Austrians by Frederick the Great, 17th May 1742. Pop. (1880) 6178. Here there are copper-works, manufactures of chicory, and beet-root sugar, and a distillery.

CZECHS, the most westerly branch of the great Slavic family of nations. About 451—495 A.D., the C. migrated from their lands in Carpathia, on the Upper Vistula, and came into the country now known as Bohemia. According to tradition, their chieftain was named Czech. Georgsberg, near Raudnitz, on the Elbe, is said to have been the first place chosen by the C. for their encampment. Other Slavic tribes migrated into Bohemia; but in the course of time the C. gained such an ascendency that, in the 9th c., the name C. was commonly applied to the whole Slavic population of Bohemia (q. v.). Here, in Moravia, and in other parts of Austria, the C. now number in all above 6,000,000.

CZE'GLED, a market-town of Hungary, 40 miles south-east of Pesth. It has some handsome buildings and large breweries. The inhabitants (1880) 24,872 in number, are employed principally in agricultural pursuits, the district around yielding much grain and red wine.

CZENSTOCHAU, or CZENSTOCHOWA, a monastery of the order of St. Paul the Hermit, in the Polish government of Kalisch. It is the most frequented place of pilgrimage in the whole country, and is celebrated throughout all the Slavonic nations. It occupies a commanding position on the Warthe, not far from the Silesian frontier, and possesses the famous dark-colored picture of the mother of Christ, which has given occasion to the worship of the Black Virgin by all the Polish Catholics. This picture is probably of Byzantine origin. According to the legend in connection with it, it was painted by Luke himself; passed into the hands of the Princess Helena; subsequently found its way through a Russian prince, Laon, to Belz in Galicia; and finally, through Wadyslaw, Duke of Oppeln, who built the monastery of C., was brought thither to assist him against the Tartars. In more recent times, C. is noted as being the only place in Poland which offered resistance to the army of Charles Gustavus, king of Sweden, on which occasion (1655 A.D.) the inmates, comprising 70 monks and 150 soldiers, withstood a siege of 38 days carried on by a Swedish force of 10,000 men. At a later period, however, C. lost its importance as a military position. At the foot of the eminence on which the monastery stands, lie two little towns, Old and New C., which carry on a considerable trade in holy pictures and amulets.

CZE'RNOWITZ, capital of Bukowina in Austria, situated on a hill near the right bank of the Pruth, about 140 miles south-east of Lemberg. It is the seat of a Greek archbishop; and in 1875 a university was founded here. The manufactures are fast developing. Pop. (1869) 33,884; (1880) 45,600.

CZE'RNY, GEORGE (Turkish, *Karadjordje*), i. e., Black George, the leader of the Servians in their struggles for independence, was born in 1770 in the neighborhood of Belgrade. He showed, when young, his hatred of the oppressors of his country by murdering a Moslem. After spending some time in Austria, he returned to his paternal estate. In August 1801, a band of janizaries broke into his dwelling, and plundered it. C. fled, vowing vengeance. He soon collected a band of malcontents, and commenced a sort of guerilla war. Gradually his numbers increased, and in 1804 he captured the fortress of Schabez. Subsequently, he invested Belgrade, and in the beginning of 1806 routed the Turks at the rivers Drina and Morawa. Assisted secretly by Russia, he captured Belgrade in December 1806. After the treaty of Slobosje (8th July 1808), he was elected governor by the people, and recognized as Prince of Servia by the sultan. The French invasion of Russia in 1812 compelled the latter country to let Servia shift for itself. Hostilities recommenced; the Turks were successful, and C. had to flee to Russia. He afterwards went to Austria, where he lived for some time. Meanwhile, the freedom of Servia had been secured through the leadership of Milosch Obrenowicz; and in July 1817, C. returned, intending, as some suppose, to rally his partisans round him for the furtherance of his ambitious schemes, when he was murdered at the instigation of Prince Milosch.

D.

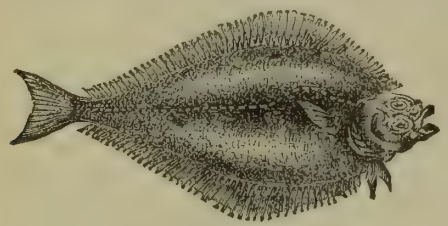
D THE fourth letter in the Græco-Roman alphabets, was called in the Semitic languages *daleth* (hence Gr. *delta*, i. e., 'door;' and in all probability its original hieroglyphic or picture form was a door. The Greek Δ, in fact, yet preserves a recognizable resemblance to the door or opening of a tent, the kind of door most familiar to a nomadic people. D. belongs to the order of letters called *dentals* (see LETTERS, ALPHABET), *t*, *d*, *th* (in *thin*), *th* (in *thine*), and in the corresponding words of sister-languages is often exchanged with those of the same order or organ; thus: Ger. *du*, Eng. *thou;* Ger. *tod*, Eng. *death;* Lat. *duc-*, Eng. *tug;* Lat. *duo*, Eng. *two*. A more remarkable interchange is that between *d* and *l*, and *d* and *r*. See L and R. D seems to have been drawn into some words (to which it does not radically belong) by a kind of affinity for *n*, as Lat. *canis*, Gr. *kyou*, Eng. *hound;* Lat. *gener-*, Eng. *gender*. *Di* followed by a vowel is sometimes transformed into J; as in *Janus* for *Dianus;* *Journal* from *diurnal*. *Di* followed by a vowel in Latin, has, in Italian, become *z;* and from MSS. and other evidence, we know that this sibilant sound of *di* prevailed, in the popular pronunciation at least, while Latin was yet a living tongue. Thus, *diabolus* is found written *zabolus*, and *Amazones, Amadiones*.—D, the Roman numeral for 500, arose out of the character Iↀ. See NUMERALS.

D, in Music, is the second note in the natural scale, and is a whole tone above C, to which it stands in mathematical proportion as 9 : 8, that is, when C vibrates eight times, D vibrates nine times. The whole tone from C to D is called the greater whole tone, being a comma larger than the next whole tone from D to E.

DA CA'PO (Ital. from the beginning), a term in Music, frequently placed at the end of a part or movement, indicating that the performer must return to the beginning of the movement, or to some other part of it usually marked with the sign :S:, and finish where the word *fine* is placed. Scarlatti was the first who introduced the use of the *da capo* in his opera of *Theodora*. The words are generally abbreviated thus, D. C., sometimes *D. C. al fine*.

DA VI'NCI, LEONARDO. See LEONARDO DA VINCI.

DAB (*Platessa limanda*), a fish of the same genus with the plaice and flounder, and very much resembling them, but easily distinguished from either of them by its more uniform and lighter-brown color, the roughness of its scaly surface, and its more curved lateral line, which rises into a high arch over the pectoral fin. It is common on all sandy parts of the British coasts, inhabits deeper water than the flounder, and does not, like it, enter the mouths of streams.



Dab (*Platessa limanda*).

It is known on the coasts of the Firth of Forth as the Salt-water Fluke. It is preferred to the flounder for the table. It seldom exceeds 12 inches in length. A rather larger species of the same genus, less plentiful on the British coasts, is the LEMON D. or SMOOTH 'D. (*P. microcephala*). Its body is smooth, its color a pretty mixture of various shades of reddish-brown and yellow: its head and mouth are very small.

DABCHICK. See GREBE.

DA'CCA, a city of Bengal Proper, stands about 190 miles to the north-east of Calcutta, in lat. 23° 43′ N., and long. 90° 25′ E. It is situated on the Burha Gunga, a considerable auxiliary of the Dulasseree, which is itself at once a mingled offset of the Brahmaputra and the Ganges, and an affluent of the lower course of the former stream. The city thus enjoys singular facilities in the way of inland navigation. Down to the close of the 18th c., D. was widely celebrated for the delicate texture of its muslins, which, in the phraseology of the East, were characterized as 'flowing water' and 'evening dew;' and, in connection with this manufacture, the French and the Dutch, as well as the English, had extensive establishments in the place. Since 1801, however, these European agencies have disappeared; while the annual value of the elegant fabric, under the influence of British competition, has gradually fallen from £250,000 to nothing at all. The present aspect of the city is in keeping with this utter decay of its staple trade. In many quarters are ruins overgrown with jungle, the haunts of tigers and serpents; and this remark is applicable to numerous splendid edifices, such as the residences of its native princes and the factories of its foreign sojourners. Still D., within a space of 4 miles in length by 1¼ in breadth, contains, by the census of 1872, 69,212 inhabitants. It seems, of late years, to have partially recovered from the effects of its commercial decline, and produces lac, dye, soap, cheese, and gold and silver ornaments. Sometimes as many as 300 elephants are for sale in the depôts here. There are 180 mosques and 119 pagodas and places of worship belonging to Romanists, Armenians, Greeks, and English, as also a college and several schools. D. is connected with Calcutta by the Eastern Bengal Railway. The maximum temperature in 1871 was 89°, and the minimum was 54·6°. The rainfall in 1871 was 82 inches.

DACCA, the district of which the above-mentioned city is the capital, extends in N. lat. from 23° 12′ to 24° 17′, and in E. long., from 90° 11′ to 90° 58′, containing 2897 square miles, and numbering (1872) 1,852,993 inhabitants. Forming part of the great delta of the Ganges and Brahmaputra, it is traversed by streams in every direction, being so low and level as to be generally flooded during the rainy season. It is, on this account, admirably adapted to the cultivation of rice. From the character of the country, roads—happily rendered less necessary by the net-work of rivers—are very difficult of construction. In addition to the city of its own name, the district has two principal towns, Narainganj and Islampoor. Though the climate, as a whole, is moist, yet it by no means presents uniformity in this respect, the annual rain-fall varying in different years from 46 to 93 inches. Among commercial crops, cotton—the raw material of the far-famed muslins—once occupied a prominent place. It is now comparatively neglected, being too short in the staple for the coarse fabrics which alone continue to be made in the district. Recent attempts to introduce a better variety from the United States have failed. It was in 1765—the epoch of the cession of Bengal, Bahar, and Orissa on the part of the Great Mogul—that D. became a subject to England; but down to 1845, the heirs of the native ruler succeeded each other as stipendiaries of the East India Company.

DACE, DARE, or DART (*Leuciscus vulgaris*), a fresh-water fish of the family *Cyprinidæ* (q. v.), and of the same genus with the roach, ide, chub, bleak, minnow, &c. It chiefly inhabits the deep and clear water of quiet streams. It is found in Italy, France, Germany, &c., and in some of the rivers of England, but is very local. It is in form not unlike the roach, but rather more elongated; the mouth is rather larger, the scales smaller. The upper parts are dusky blue, becoming paler on sides, and passing into white on the belly, the cheek and gill-covers silvery white. The D. is gregarious, and swims in shoals. Its flesh is preferred to that of the roach, but is not highly esteemed. The D. is perhaps the liveliest and most active of the *Cyprinidæ*, and affords the angler fair sport both with fly and bait. It is fished for with a light float and a fine gut-line. The float is set so that the bait may almost touch the bottom. At the least symptom of a bite, the angler must strike quickly. The best baits are the red-worm, the tail of a lob-worm, gentles, greaves, and flies or grubs of any kind. The best places to fish with bait are moderately sharp streams, of from two to four feet deep. Dace at times take the fly very freely, and show capital sport.

Small red and black palmers will be found the most useful flies for the purpose, and their killing properties will be greatly increased if the hook is tipped with a tough gentle, as D. are very apt to follow the fly without taking it, when the gentle overcomes their scruples; a small piece of the white, tough, inner rind of bacon answers equally well; and even a small piece of wash-leather may be used. Shallows, scours, and by the edge of weed-beds, are the best spots for the fly. D. may be taken also by 'dapping' with the natural fly, and those so taken are usually

the finest fish. D. seldom exceed a pound in weight, though in some rivers they have been taken up to 1½ lbs. In the Thames, a fish of half a pound is considered unusual. They spawn in the

Dace (*Leuciscus vulgaris*.)

end of April, or early in May, and soon recover their condition again.

DA'CIA, the land of the Daci or Getæ. Its geographical limits were very indefinite until its conquest by the Romans. After that period, it comprised the various countries now known as Eastern Hungary, Transylvania, Bukowina, Moldavia west of the Pruth, Wallachia, and the Banat of Temesvár. The Getæ came originally from Thrace, and were divided into various tribes. Their course northward can only be imperfectly traced; but we know that, shortly before the time of Alexander the Great (335 B.C.), they had migrated across the Danube. It is not known when or for what reason the Getæ changed their name to Daci. They seem to have been the most valiant of the Thracian barbarians. Curio, the first Roman general who ever penetrated as far north as the Danube, did not venture to assail them. Julius Cæsar, however, is said to have intended their subjugation. In 10 B.C. Augustus sent an army up the valley of the Maros. From this time, there was almost continual fighting between the Romans and the Daci, on the whole, to the advantage of the latter, who actually compelled their civilized enemies, in the reign of Domitian, to pay tribute. In 101 A.D., the Emperor Trajan crossed the Theiss, and marched into Transylvania, where he fought a great battle near Thorda. The peasant calls the battle-field to the present day *Prat de Trajan* (*Pratum Trajani*, field of Trajan). The Daci, who were commanded by their famous chief Decebalus, were defeated. A second expedition of the emperor's (104 A.D.) resulted in the destruction of their capital, the death of Decebalus, and the loss of their freedom. Roman colonists were sent into the country, a bridge was built over the Danube—the ruins of which are still extant—and three great roads were constructed. In 270—275 A.D., the Romans abandoned the country to the Goths, and the colonists were transferred to Mœsia. After a series of vicissitudes, D. fell into the possession of the Magyars in the 9th century.

DACIER, ANDRE, a French author, born of Protestant parents at Castres, in Upper Languedoc, 6th April 1651, studied at Saumur; and in 1672 came to Paris, where he was employed to bring out an edition of the Latin writer *Festus*, for the use of the dauphin, which he did in 1681. In 1683, he married Anna Lefèvre, also a Protestant, and two years later, both entered the Roman Catholic Church.

D. subsequently became royal librarian, member of the Academie des Inscriptions, and perpetual secretary of the 'Academie.' He died 18th September 1722. D.'s principal works, besides his *Festus*, are *Œuvres d'Horace en Latin et en Français* (Par. 1681—1689), an edition of Valerius Flaccus, and numerous translations into French of Greek authors, such as Plutarch and Epictetus, all of which are of very middling quality, while the expositions and criticisms are extremely shallow.

ANNE DACIER, wife of the preceding, was born at Saumur in 1651, and after the death of her learned father, who had developed her talent, came to Paris, where she acquired such a reputation by her edition of Callimachus (1674), that the Duke of Montausier commissioned her to edit several of the ancient authors for the use of the dauphin. Similarity of tastes and employment led to a marriage between her and André Dacier. Her domestic duties did not, however, weaken her literary ardor. Besides editing various of the classics, she translated the comedies of Terence; several plays of Plautus, with an able dissertation; and portions of Anacreon, Sappho, and Aristophanes. Her admiration of Homer was unbounded, and involved her in two learned controversies. She died 17th August 1720.

DACOI'TS, a name used for brigands herding in gangs in various parts of India, and living by *dacoity* or systematic robbery. They are now rarely heard of in British India.

DACOI'TS, or DACO'TAH INDIANS, in the United States. See SIOUX and INDIANS.

DACRY'DIUM, a genus of trees of the natural order *Taxaceæ*, having male and female flowers on separate trees. The species are lofty trees, chiefly natives of Australia and New Zealand. *D. Franklinii* is called HUON PINE, although rather a yew than a pine. Its timber is harder than any Baltic pine, and is excellent for spars for naval purposes. *D. taxifolium*, the Kakaterra Tree of New Zealand, attains a height of 200 feet, and is also very valuable for its timber. A beverage resembling spruce-beer is made from its branches.

DA'CTYL (Gr. *dactylos*, the finger), the name of a measure or 'foot' in Greek and Latin versification, consisting of a long and two short syllables, as in the word *omnibus*. It was called from its resemblance to the finger, which consists of three joints—one long and two short. The same name is sometimes applied to a trisyllabic measure in English verse, consisting of one accented syllable and two unaccented syllables, as in *déstiny*. See VERSE. Dactylic verses consist of dactyls and equivalent feet. See HEXAMETER.

DA'CTYLIS. See COCK'S-FOOT GRASS.

DACTYLO'LOGY, the art of communicating thoughts by the fingers. See DEAF AND DUMB.

DACTYLO'PTERUS. See FLYING GURNARD.

DA'DO (Ital. a die), in classical Architecture, the term applied to the cubic block which forms the body of a pedestal. It is also applied to the plane face and the series of mouldings which, in the interiors of buildings, form, as it were, a continuous pedestal. The interior D. is formed of wood, and, running round the bottom of the walls of a room, serves to protect the plaster or paper from injury. It is generally about three feet in height, and surmounted by a narrow cornice.

DADU'R, a town of Beloochistan, is five miles to the east of the Bolan Pass. Though it is in the 30th degree of N. lat., yet it is said to be one of the hottest places in the world. It contains about 3000 inhabitants. It is worthy of notice chiefly as the spot where, in November 1840, the British troops routed a Kelat force. The neighborhood yields grains of various kinds, pulse, cotton, sugar, madder and fruits.

DÆ'DALUS, according to the Greek myths, was sprung from the old Athenian race of kings, the Erechtheidæ, and was a contemporary of Theseus and Minos. He was famous for his ability as an artist and mechanician. Among the numberless works which he is said to have executed, may be mentioned the Cretan labyrinth, the Colymbethra, or reservoir, near Megaris in Sicily, the temples of Apollo at Capua and Cumæ, that of Artemis Britomartis in Crete, and an altar sculptured with lions on the Libyan coast. His mechanical genius is clearly celebrated in the poetic fiction of his flying safely over the Ægean by means of wings which he had himself made. D. got the credit among the Greeks of having invented carpentry, and most of its tools, such as the saw, the axe, the plumb-line, the gimlet, as also glue. The history of D. is obviously a myth, wherein, as recent criticism has conclusively shown, is embodied that epoch in which the first rude forms of art were thrown aside, and a higher skill and intelligence displayed.

DAENDELS, HERMANN WILHELM, a Dutch general, was born 1762 at Hattem, in Gueldres, took part in the revolutionary disturbances that broke out in Holland in 1787, and was in consequence compelled to seek refuge in France. In the campaign of 1793, he rendered important service to Demouriez, and was elevated to the rank of a general of brigade. In 1799 he commanded one of the two divisions of the republican army, which, with a third corps under the orders of General Brune, compelled the Anglo-Russian forces to surrender. Circumstances induced him to leave the service in 1803, but in 1806 he was re-instated in his former rank by the king of Holland. He now conquered East Friesland, and was made governor-general of Münster, commander-in-chief of the Dutch cavalry, marshal of Holland, and governor-general of the Dutch East Indian possessions. This last office he held from 1808 to 1811, and discharged its duties with great prudence. He also published a work upon his administration in Java, which was an important contribution to our knowledge of that island. On the overthrow of Napoleon, his services were secured by the new king of Holland, Wilhelm I., who intrusted him with the organization of government in those colonies on the coast of Africa which had been restored to the Dutch. In this capacity he labored with energy and success until his death in June 1818.

DA'FFODIL (corrupted from Lat. *asphodelus*), the English name of those species of *Narcissus* (q. v.) which have a large bell-shaped corona. The common D. (*N. pseudo-narcissus*) is a native of England and of most parts of Europe, growing in woods and hedges. It is naturalized in many places in Scotland, but seems scarcely indigenous. All the other species are more southerly, chiefly abounding in the countries near the Mediterranean. Some of them, as *N. minor*, have become naturalized in some places in England, having been long known as ornaments of gardens, in which double-flowered varieties are also cultivated. They are

favorites, not so much for their beauty, which is not of the most delicate kind, as on account of their large yellow flowers, which are produced early in spring. The bulbs are purgative and emetic. The mode of cultivation is the same as for other species of Narcissus.

DAG, a thick clumsy pistol, used in the 15th and 16th centuries. In the *Spanish Tragedy*, published in 1603, one of the characters shoots the dag.

DA'GGER, a weapon resembling a sword, but considerably smaller, being used for stabbing at close quarters. Daggers are generally two-edged, and very sharp towards the point. Originally, it had no guard for the hand, and was worn at the girdle in a sheath. It is now regarded as a general military weapon in European countries.

DAGHESTA'N (Tartar, *Tagh stan*, signifying mountainous country), a province of Asiatic Russia (called also Derbend), between the Caucasus and the west coast of the Caspian Sea. Area about 19,000 sq. m. Pop. (1880) 482,600. The surface is generally mountainous, being traversed by offsets from the Caucasus, but there are, however, valleys and level tracts of great fertility. The inhabitants are chiefly Lesghians (fanatical Mohammedans). Until 1812, the country belonged to Persia. Since its annexation by Russia, the Lesghians have fought desperately for independence (see SHAMYL and CAUCASUS). The chief town is Derbend (q. v.).—See *Daghestan*, by A. Cunynghame, 1872.

DA'GO, an island in the Baltic Sea, forming a part of the Russian government of Esthonia, situated near the entrance of the Gulf of Finland. The narrow channel called Sele-sund separates it from the island of Oesel on the south. Its length is estimated at about 34 miles, and its breadth at 15 miles. The soil, a mixture of sand and chalk for the most part, is not fertile, the coasts are rocky, and shoals make navigation dangerous. The population, Esthonians mostly, number about 10,000, and are chiefly employed in fishing and cattle-rearing.

DAGOBA, or DAHGOPA (according to Wilson, from *deha*, the body, and *gopa*, what possesses, because it contains the hair, teeth, &c., of Buddha; according to others, from *dhatu*, a relic, and *gabba*, a shrine), are monumental structures containing relics of Buddha. Dagoba seems to be the common Singhalese term for such monuments; but the more general name is Stupa or Tope (q. v.).

DA'GON (Heb. *dag*, a fish), the national idol of the Philistines, is frequently mentioned in Scripture; in profane history, the name by which it is known is Derceto. It is always represented on ancient medals as half-fish, half-woman, but the Hebrew writer or writers speak of it as a masculine being. Some scholars have attempted to show that the word D. comes from the Phœnician *dagan*, wheat; and that it is not the name of a fish-god, but of a god of agriculture. It is possible, however, to combine both notions, by supposing that D. was a deified mortal who had come in a ship to the coast, and taught the people agriculture and other useful arts. Ancient history abounds with such mythological personages, one of whom was called by the Babylonians *Odakon*, and is regarded by the learned Selden as identical with the fishy idol of the Philistines.

Dagon.

DAGUE'RREOTYPE PROCESS, the name given to the original photographic process as introduced by its inventor, M. Daguerre, in 1839. Notwithstanding that it has now become so unpopular, on account of the very circumstance which gives such perfection to the result—viz., the polish of the plate—it is a process which yields to none in point of microscopic perfection of detail and perfect gradation of shade. The pictures it yields are positive or direct, as given in the camera, though they also appear as negative when viewed at certain angles, and are the result of the successive action of the vapors of iodine, bromine, and mercury upon a highly polished surface of chemically pure silver. The manipulations involved in conducting the process are—1. Cleaning and polishing the plate; 2. Rendering the plate sensitive; 3. Exposing it in the camera; 4. Developing the latent image; 5. Fixing the picture.

A copper-plate of moderate thickness is coated with silver by the electrotype or other suitable method, and then polished to the utmost possible extent, so as to obtain, though by mechanical means, a chemically pure surface; it is then exposed first to the vapor of iodine, and then to the vapor of bromine for a length of time, ascertained in practice by watching the beautiful succession of prismatic colors which begin to appear with the first contact of the vapor. The length of exposure in the camera which follows is determined by the amount of light at the time of operating, and the relation between the diameter and focal length of lens employed. The development of the latent image, which is the next operation, is effected by exposing the plate in a suitable box to the vapor of mercury, which attaches itself to the various parts of the picture in proportion to the more or less intense action of the light.

Those portions of the iodide and bromide of silver unacted on by light, are next removed by immersing the plate in a solution of hyposulphite of soda; and the picture is subsequently fixed and intensified by pouring over its surface a solution of hyposulphite of gold, and applying heat; by which means it is coated with a thin film of metallic gold, and thereby rendered so permanent that it cannot be rubbed out by ordinary means, but requires a chemical solvent for its removal. It may be mentioned, in conclusion, that though M. Daguerre published, in 1839, the first *practicable* process for taking pictures by the agency of light, his experiments would seem to have been suggested by the researches of M. Niepce, who, in 1820, obtained impressions on silver plates rendered sensitive by exposure to the vapors of sulphur and phosphorus.

DAHL, JOHANN CHRISTIAN CLAUSEN, a Norwegian landscape painter, born at Bergen 24th February 1788, was at first intended for the church, but afterwards devoted himself to art. He studied painting for six years under the direction of Professor J. G. Moller. His first attempts were in *genre* and miniature. They did not exhibit much genius; but public attention was at length excited by a work which he exhibited in Dresden in 1819, entitled 'Cascade among Rocks in Norway.' Next year, he went to Italy, where Thorwaldsen and the Prussian consul-general, Bartholdy, commissioned him to execute several works. In 1821, he was appointed professor of painting at Dresden, where he subsequently resided. D. was fond of reproducing on his canvas the picturesque scenes of his native country, which he often revisited. Among his more famous works are a 'View of Naples,' 'Winter in Zeeland,' 'View of Bergen,' 'Scenes from the Environs of Christiana,' and a 'Winter Scene on the Banks of the Elbe,' the last two of which attracted great attention at the Paris Exhibition of 1855. D., who was a member of several academies, died at Dresden, 14th October, 1857.

DAHLGREN GUN, named after a naval officer in the service of the United States government, is the result of a careful series of experiments on the construction of large ordnance. One peculiarity consists in having relatively less metal in front of the trunnions, and more behind, than had hitherto been customary. Dahlgren guns, made to fire shells or hollow shot, have been introduced to a considerable extent in the United States navy.

DA'HLIA, a genus of large perennial herbaceous plants of the natural order *Compositæ*, sub-order *Corymbiferæ*, natives of Mexico. All the varieties in cultivation in our flower-gardens, of which not fewer than 2000 have been carefully enumerated, are derived from two species *D. variabilis* and *D. coccinea*, and chiefly from the former. Few plants manifest so strong an inclination to sport and produce new varieties as the D., and florists have also obtained many by the artificial fecundation of one with the pollen of another. Dahlias were first brought to Madrid by Spanish botanists in 1789, and were soon introduced into England, but did not become well known in English flower-gardens till about thirty years after.

The name was given in honor of Dahl, a Swedish botanist; but because another genus of plants had received the same name, an attempt was made to change it to *Georgina*, which is sometimes used on the continent, but D. universally prevails both popularly and among botanists in Britain. Among the most essential characteristics of a fine D., according to the estimation of florists, are a fulness of the flower, a perfect regularity in the shape of the florets, and the absence of an eye or disc; the florets of the disc, as in other 'double' *Corymbiferæ*, having assumed the appearance of florets of the ray. Dahlias have tuberous roots, which contain a considerable quantity of *Inulin* (q. v.), and are in use as an article of food in Mexico. It was at one time attempted to introduce them into cultivation in Europe for the food either of man or of cattle; but the taste is nauseous to European palates, and even cattle do not readily eat them. Dahlias are often cut down in the northern parts of Britain by early frosts, in the very midst of their flowering; and their tubers require to be taken up for the winter, and stored in a dry place out of the reach of the frost till spring. They are propagated by seed, by cutting, and by tubers. The finer varieties are sometimes grafted on more ordinary stocks.

DAHLMANN, FRIEDRICH CHRISTOPH, Professor of History and Political Science in the university of Bonn, was born, May 17, 1785, at Wismar. His earlier studies in Copenhagen and Halle were devoted to archæology and philology; but his attention was subsequently directed to the study of politics and the history of the middle ages. The results of his diligence appeared in his *Vita Ansgarii*, his *Researches in German History* (2 vols., Altona,

1822—1823), his edition of the *Ditmarsh Chronicle* (Kiel, 1827), and other works. In 1829, D. was appointed Professor of Political Science in Göttingen, where he published (1830) his valuable work on the *Sources of German History*. Banished in 1837, by King Ernest of Hanover, on account of his protest against the abolition of the Hanoverian constitution, he went to Leipsic and Jena, where he wrote his historical master-piece, the *History of Denmark* (3 vols., Hamburg, 1840—1843). In 1842, he became Professor of History at Bonn, and took a prominent part in the political affairs of Germany after the movement in 1848, heading the constitutional liberals, who were unfortunately too reasonable to be successful. At the close of the struggle, he returned to his academic duties, to which he devoted himself till his death, 5th December 1860.

DAHOMEY, an independent state of Guinea, Western Africa, extending along the coast from Fort Badagry on the east, to the river Volta, which separates it from Ashantee on the west. Its limits have not been precisely defined, but it is usually regarded as extending back to the Kong Mountains. It will thus lie between lat. 6°—8° 50′ N., and long. 0° 30′—3° E.; its breadth being about 200, and its length 180 miles. D. is for the most part a vast plain, rising with gentle ascent from the sea towards the Kong Mountains, with offsets of which it is traversed in its most northerly parts. Although it has no river of any importance save the Volta on its western boundary, it is well watered by springs and streams; and the soil, a rich, red-colored clay, almost quite free of stones, is extremely fertile.

Magnificent trees clothe the hills in the north, and maize, beans, and peas grow in splendid luxuriance on the plains, as well as yams, potatoes, melons, limes, oranges, pine-apples, and other tropical fruits; cotton, sugar, tobacco, and indigo are also raised. The scenery is described as exceedingly varied and beautiful. Lions, tigers, elephants, hyænas, and enormous snakes of the boa kind abound. The Dahomans, who came into possession of this tract of country about the beginning of the 18th c., are for the most part tall, well-formed, and intelligent, and, for an African race, singularly honest and far advanced in agriculture. With the exceptions of a few Mohammedans, whose religious belief is in no way interfered with, they are all pagans, and practise fetish-worship. The king is the most absolute of despots. Wholesale murder is one of the chief features in religious and state ceremonies; but, according to Captain Burton, who visited D. in 1864, the number of the victims has been greatly exaggerated. Still, as many as 500 human victims are sometimes sacrified at one 'grand custom;' the present king immolated that number at the death of his father. Of the regular army of 15,000, about 2500 are Amazons (devoted to celibacy), who are the most effective soldiers, but exceedingly ferocious. The revenue, until recent years, depended greatly upon the sale of slaves; but the vigilance of the cruisers employed to prevent the traffic has reduced this source of income materially. Hence the monster slave-hunts which periodically took place are now comparatively rare. In 1876 the coast of D. was placed under a strict blockade by Great Britain, on account of an outrage on a British subject, for which the king of D. refused satisfaction. Pop. 180,000.—ABOMEY, or AGBOME, the capital, is situated about lat. 7° 30′ N., long. 1° 40′ E. It is stated to be four miles in circumference, is surrounded by a ditch and clay walls, pierced by six gates, in each of which are two openings—one for the exclusive passage of the king, the other for his subjects. The houses are mostly of one story, built of clay, and thatched. There are no regular streets, each house standing within its own enclosure of clay wall. There are three palaces belonging to the king here, which differ little from the other houses, save in their greater size. Farms are cultivated within the city. Pop. about 20,000. The port of D. is Whydah.—See Forbes's *Dahomey and the Dahomans;* Burton's *Mission to Gelele, King of Dahomey;* Skertchly's *Dahomey as It is* (1874.)

DA'HRA, a district of Algeria, once inhabited by the Ouled-Riahs, a Kabyle tribe. It has acquired a melancholy celebrity as the scene of a frightful massacre perpetrated by the French in the month of June 1845. The district contains immense caverns. In these the Ogled-Riahs, hotly pursued by the French under Colonel (afterwards Marshal) Pelissier, took refuge. They were ordered to surrender their arms and horses, and were promised, in return, life and liberty. On their refusal, fascines were made up, kindled, and placed at the entrance of the caves.

Thrice Colonel Pelissier sent a flag of truce, exhorting the imprisoned Kabyles to accept his terms, but in vain—the last messenger being received with a discharge of musketry. The fire was therefore again kindled in all its intensity, and gradually the cries of agony from the interior of the caverns ceased, until nothing broke the dead silence but the occasional crackling of the green wood of which the fascines consisted. When the cavern swere examined, about 600 dead bodies were found scattered here and there; but it was calculated that in all (including those who afterwards died and those who could not be got at), about 800 had been suffocated by smoke, or gored to death by the maddened cattle whom they had brought with them into their fatal asylum. The news created a great sensation in Paris. Marshal Soult, then minister of war, formally condemned the deed; but Marshal Bageaud, the governor of Algeria, affirmed that Pelissier had only acted under positive orders.

DAIMIE'L, a town of Spain, in the province of Ciudad Real, twenty miles east-north-east of the city of that name. It is in general tolerably well built; it has several squares, and its principal streets, though unpaved, are wide and comparatively clean. Its chief buildings are the churches of San Pedro and Santa Maria —the former a Doric, and the latter a Gothic structure—a town-hall, and a hospital. D. is environed by fine public walks and gardens, and has manufactures of woollens, linen, blonde lace, &c. Pop. 10,000.

DAIR-EL-KA'MAR, or DEIR EL-KAMR, a town in Syria, and the capital of the Druses, about 13 miles south-south-east of Beyrout. It is situated on the edge of a deep and picturesque glen of Mount Lebanon, the banks of which and the slopes above are richly clad with mulberries, olives, and vines, which are cultivated in terraces by an exceedingly industrious population. On the opposite side of the glen stand the ruins of the palace Bteddîn, formerly the residence of Emîr Beshîr, who, for more than half a century, from 1788 to 1840, ruled over the Lebanon with a strong but impartial hand. Population of D. about 8000.

DAIRY, all that concerns milk and its management on a farm; or the place or house where the milk is kept, cheese made, &c. (The old word *dey*, the milkmaid who presided over the *deyry* or dairy, is probably allied to *dug*, a teat, and to Lat. *duc-*, to draw, or milk; in Polish, *doic* is to milk; and in Sw. *deja* is a dairy-maid.) Throughout the best cultivated districts, both of England and Scotland, the growing of corn and green crops, and the rearing and feeding of stock, were at one time to a considerable extent carried on in conjunction with the dairy. This mixed system of husbandry, though it may have reduced the farmer's risks, has gradually decreased. In many districts of the country, however, such as some parts of Ayrshire and Lanarkshire, the midland counties of England, and in Cork and neighboring Irish counties, great attention is still given to milk-cows, and dairy produce pays the bulk of the rent.

The selection of cattle of a sort profitable for the dairy, is a point of the first importance. Certain breeds have long been famed for their milking properties; at the head of these is generally placed the Ayrshires. In proportion to their small size, and the limited amount of food which they consume, they yield a large quantity of rich, good milk, and have been long and justly prized by the dairymen of Glasgow and other Scottish towns, as well as latterly by those in several districts of England, and Highland portions of Scotland. With all their superb milking properties, however, they are comparatively worthless as feeders or beef-producers unless crossed with the Short-horn. Some Ayrshire cows have been known to give from 18 to 20 quarts of milk daily, and yield 14 lbs. of butter per week. The cows of the Channel Islands also stand in high repute. The elegant, deer-like Alderneys are kept, more especially in England, by those who prize rich milk, and many landed proprietors and farmers have one or two amongst their herds to impart a higher color and richer flavor to the milk and butter. Alderneys frequently give 16 quarts of milk daily, and 8 or 9 lbs. of butter per week, while instances occur of their yielding as much as 12 or 14 lbs. The small Brittany breed, scarcely larger than goats, have also been brought to this country, and are profitable for gentlemen's families, and where only one or two cows are kept. These breeds are, however, in little favor with those who, besides dairying, look also to the breeding of profitable grazing-stock. Some families of the Short-horns unite, with size, substance, and aptitude for fattening, excellent milking properties. Short-horns, or animals with a large infusion of Short-horn blood, constitute the bulk of the handsome and high-priced cows seen in metropolitan markets, and long preferred to all others by the London dairymen. Throughout the north of England, such cows were in favor, and were used by the late Mr. Horsfall, whose excellent papers on dairy management, published in the *Journal of the Royal Agricultural Society of England*, should be read by all interested in this subject. With his liberal dietary, fifteen to twenty cows daily average, for seven or eight months, ten or eleven quarts of milk each, producing a pound of butter. The original Short-horns, in the hands of the Brothers Colling, Mr. Bates, the Earl Ducie, and other earlier breeders, were excellent milkers; and even at the present day certain families are to be found still retaining their ancient character. Of late, however, many breeders of our more fashionable and prize-taking Short-horns have devoted their undivided attention to early maturity, flesh, and quality, neglecting altogether the milking properties. This, in some respects, is to be regretted. Prize stock of this and some other breeds give no more milk now-a-days than fosters their calves, and some of them, indeed, make a poor

job of that. Many of the animals are thus never milked by the hand.

Herefords are not particularly famed for dairy purposes. The blood-red, plump Devons are more remarkable for the richness and butter-producing character of their milk than the quantity of it. The ancient Long-horns, once common in the midland counties of England, and prized for their milk, have mostly given place to more handy, symmetrical breeds. The old black Fife, or Scotch horned cows, included some famous milkers in their day, but scarcely any of them are to be met with now. The polled Angus, the Galloway, and the West Highland cows have a fair quantity of milk of remarkably fine quality, that of the West Highland breed in particular. The small Shetland breed produces an astounding quantity of splendid milk, and so do the Kerry and some other Irish cows.

Good milking animals of every breed possess certain qualities in common, which guide the farmer in profitably recruiting his dairy-stock. They have neat, tapering, well-placed heads; large, prominent bright eyes; small and rather narrow necks; light fore-quarters; oblique rather than upright shoulders; large and shapely udder, well under the belly; largely developed milk-veins; a pliant mellow skin, well covered with soft silky hair; thin tail, with a good brush at the end of it; small and fine below the knee. Of great importance, also, is the fact of the animals being descended of parents possessing good milking qualities, for certainly no property is more distinctly hereditary. The milk of small and young cows is usually richer than that of larger or older animals. From four to eight is the most profitable age of the dairy-cow; after that, the milk is poorer; the animals eat more food, especially during winter; and, moreover, become less profitable when dried for feeding. The stock is usually recruited by heifers bred on the farm, which are generally preferred to those bought in. Of course in the larger dairies about Glasgow, the west of Scotland, in the midland and southern counties of England, and in America, the cows cannot be all, or nearly all, bred and reared. Many must therefore be bought in, though they seldom turn out quite so well as the others. Heifers should not be put to the bull before they are two years old, and the milking properties of the animals will not be fully developed until they have had a second or third calf. Red and roan are the favorite colors.

In no department of the farm are carelessness and irregularity more injurious and ruinous than in the dairy portion. To produce large quantities of good milk, it is absolutely necessary that the cow be supplied with the materials which conduce to a great flow. These briefly consist of albuminous materials and phosphates for forming the caseine, and oily matters for producing the butter. In the ordinary or ancient dietary of cows, these materials, especially during winter, are seldom present in sufficient amount to produce, without waste, a copious flow of good milk.

Cows fed on meadow hay, when producing from 12 to 16 quarts of milk daily, require something more than 20 lbs. of turnips or mangold to sustain them. A still greater falling-off in flesh and fat—a constant robbing, in fact, of the materials of the body to supply the secretion of milk—is observed in the case of some milk cows kept on the Scotch system on straw and a full allowance of turnips. Under better management, the expensive hay and roots may be materially reduced in quantity, and the adequate amount of nutriment supplied by such articles as bean-flour, rape, or cotton cakes, bran, malt coombes, and the like; whilst sufficient bulk—an important matter in the feeding especially of ruminants—is attained by the use of chopped straw. The cutting of straw into chaff insures the eating of a larger amount, and thus becomes nearly twice as valuable as when employed merely as litter. Bean-straw, when steamed or fermented with pulped or grated roots, loses entirely its bitter flavor, and being rich in albuminous matters, is specially adapted for milking-cows. A portion of the roots, or all of them where the supply is small, should be pulped, mixed with the cut chaff, and the mixture allowed to lie in a heap for a day or two before being used. With the roots should be added 3 or 4 lbs. of rape-cake and 2 lbs. of bran for each cow. The moisture and flavor of the succulent roots permeate the dry food, inducing fermentation, with the development of sugar, and the mass thus becomes more palatable and digestible. Sometimes the mixture is steamed and given warm; and for milk cows in cold weather, one or two such messes given daily, usually pay for the cost and trouble of steaming. Of the mixture thus fermented or steamed, the cows should have as much as they can eat thrice a day. Cows in full milk, or intended to be speedily fattened, should have sprinkled over it a small quantity of bean or wheat meal, to the extent of 1 lb. or even 2lbs. daily. After each meal, give 3lbs. of good meadow-hay, and be careful never to allow of hay or anything else more than can be cleared up at once and with relish. In most parts, especially of England and west of Scotland, cabbage and green rape form the best succulent food for the first two winter-months; turnips and Swedes for the next two; whilst mangolds should serve until the grass is abundant in spring; but it should ever be borne in mind, that animals thrive best on varied and frequently changed food. A few feeds of mangolds, when the Swedes are the staple root, and *vice versa*, besides being a pleasing variety, will be found to augment the quantity of the milk. Rape-cake answers for milk cows quite as well as the more expensive linseed-cake, especially when its bitter taste is got rid of, as already advised, by fermenting or steaming. The increased produce, improved condition, of the cows, and the enhanced value of the manure, amply repay the trouble and the cost of this higher system of feeding, which amounts to from 1*s*. 6*d*. to 1*s*. 9*d*. per head daily.

The summer-feeding of cows is more natural and less expensive than the winter. In the English dairy counties, they are grazed upon the old pastures which are for this purpose preferred to those more recently laid down; whilst in Scotland they are often pastured upon the clovers. They should never have to work hard for their meals, and should further receive in the house, when brought in for milking, cut clover and rye-grass. Unless in the case of very fine and rich pastures, an allowance of rape-cake is also advisable. Such management not only improves the yield and quality of the milk, but supports the cows in high condition, and maintains the pastures in high and increasing fertility. This last matter is worthy of consideration, for under the older system, many of the once famed dairy farms of Cheshire, and other counties rapidly declined in value. The tons of butter and cheese carried away from the soil left it poor and unprofitable. In such circumstances, the use of bones and other such manures, by improving the condition of the soil, greatly improved the nutritive quality of the grass and hay. The produce of good land in high condition is always more valuable alike for dairy and for feeding purposes. A given acreage will support more animals, if the produce be cut and brought to them, than if they are permitted to depasture it. The advantages of both systems are, however, secured by running the cows at grass during part of the day, and giving them cut clover in the house during the remainder. Throughout the early and later part of the season, it is better that the animals be out during the day, and in at night; but in the intense heat of a warm summer, their being housed in the day secludes them from the attacks of troublesome flies, and permits their grazing undisturbed during the cool of the night. When cows run and jade themselves in the pastures during oppressive heat, their value as milkers is depreciated.

A good supply of water is necessary for milk-cows, which require much more than feeding stock. In winter, they should have access to it at least twice a day, and require it still oftener in summer. Adequate shelter, and comfortable and convenient buildings are very essential to successful management. Unless the housing is good and comfortable, the materials which ought to go to the formation of butter are wastefully spent in supporting animal heat. Cows in full milk are most profitably kept in well ventilated byres or hovels, of which the winter temperature should fall little below 60°.

The heifer may be put to the male when about two years old. The period of gestation is nine calendar months, or 284 days, but is usually shorter in young animals, and when the calf is a female. During pregnancy, cows fortunately are little liable to disease. Abortion occasionally occurs, and is most common about the third or fourth month. The heifer should receive the ordinary food of store-stock until within six or eight weeks of calving, when it is profitable to diet her as recommended for cows.

It is a great mistake to starve cows in calf. They should be fairly and carefully fed, and milking suspended entirely for about two months, or at least 6 weeks before calving. In older cows, especially if good milkers, for a fortnight before calving, the bowels must be kept relaxed, the teats drawn, and any milk removed several times a day, and an occasional dose of salts given. Such simple precautions will prevent that apoplectic form of milk-fever which destroys so many excellent milk-cows. The enlargement of the udder, and appearance of milk, the loosening of the ligaments of the pelvis, the relaxation of the vulva, and the animal's evident desire to be alone, betoken the approach of parturition. The act is generally accomplished speedily and easily, and without requiring much assistance. The calf usually comes with its forelegs first, and its head rather on one side, with the nose between the knees. The cow often stands, and as the calf drops, the navel string is ruptured. With a wisp of straw, the little animal is rubbed dry, and receives either from its mother, or from a bottle, a small quantity of the rich new milk popularly known as the 'beastings' or cherry-curds technically termed the Colostrum (q. v.). In this the caseine is mostly displaced by more easily digested albumen; whilst the large amount of sugar and oily matter promotes the clearing out of the bowels. In few cases of dairying are the calves allowed to suckle their dams. Many of the calves are sold young, to graziers and feeders; others are intended for veal, and are fed highly for a short time on good milk, meal, and cake; while some—a few of the female animals—are fostered and reared with a view to fill blanks in the cow ranks.

These latter get warm milk for five or six weeks, and skimmed for about as long, after which grass, early roots, and cake sustain them. For the first nine days, calves should be carefully muzzled to prevent them eating straw. They do not ruminate, until the ninth day is passed, and if before then they eat any straw, death generally ensues. The cow after calving should have a drink of meal and tepid water, to which a little salt may be added. For the first week steamed food, bran-mashes, with good hay, constitute the best food: roots at all times, and cold water during winter, are best withheld. Cleansing drinks are quite uncalled for; and if the placenta do not come away within twelve hours after calving, it may be very properly and safely removed by any one accustomed to such offices. After the lapse of a fortnight from the date of calving, roots may be given in considerable quantities, provided always the change has been accomplished gradually. Turnips touched by frost should be studiously avoided, to cows either before or after calving, especially before.

In England, milking is usually done by men, eight or ten cows being allotted to each, and the operation, except in the case of newly calved cows, is repeated only night and morning. In Scotland, the milking is generally done by women, three times a day; and more milk is thus got than by milking only twice. The removing of the whole of the milk at each operation is most essential; indeed, experienced dairymen aver that half their profit lies in carefully getting the last of the milk, which, as is well known, is much the richest. With liberal feeding, such as that above described, well-selected cows yield daily, in a fortnight or three weeks after calving, 12 to 16 quarts, and should continue to do so for six or eight months. Even with the same management, the milk of some cows is especially rich, and yields an unusually large proportion of butter; whilst others are equally remarkable for the way they fill the cheese-tub. A quart of ordinary milk yields about an ounce of butter; and more in summer than in winter; but under good feeding, the amount reaches and even exceeds an ounce and a half, and is tolerably equal at all seasons. A quart of new milk yields four ounces of curd; and each cow is estimated to produce 500 lbs. of cheese in the season. It is essential that the cows be kindly treated by those to whom their milking is intrusted; otherwise, the animals will retain the best of the milk. Some people approve of giving food to the cow during the milking process. This may secure a freer discharge of the milk, but it establishes a troublesome custom, which, once begun, must generally be carried out ere the cows allow their milk to flow; and in dairies not very systematically conducted, or small, the application of food at the milking hour is often inconvenient. On many farms, where dairying is not a special feature, much of the value of the cows is lost by imperfect and careless milking—the work of unscrupulous servants.

In the successful management of milk, butter, and cheese, much depends upon the dairy itself. It should have, if practicable, a northern exposure. Proximity to sewers, pig-sties, or any offensive smells, must be sedulously avoided. Stone and lime are the best materials. The walls may be advantageously lined with a skirting of brick, or, where the cost is not objected to, with white glazed tiles. A lofty roof and free ventilation must be provided, with windows looking north. A double door is advisable—a light sparred one placed inside, useful in summer for freely admitting plenty of air; and a solid, well-fitting, boarded one, removable in summer, and necessary for keeping out the winter cold. The temperature of the dairy may be further moderated, in hot weather, by allowing a stream of cold water to trickle slowly over the floor, or, better still, round the milk-vessels, placed in large vats, and by hanging throughout the room coarse calico saturated with water several times a day.

In winter, hot-water pipes, closed doors, windows protected by straw, and such other appliances, must be resorted to for the maintenance of the desirable temperature of from 50° to 56°. Further to insure an equable temperature, it is advisable to shelter the building with trees and shrubs, and, if possible, have it four or five feet below the level of the ground. No animal food, drying clothes, or indeed anything else, except milk, butter, and newly made cheese, should ever enter its walls. To remove any acidity or noxious emanations, charcoal-powder is sometimes kept strewn on the shelves. An annual whitewashing of roof and walls helps to cleanse and purify. Daily must the floor and shelves be thoroughly scrubbed and washed, and not a drop of spilled milk allowed to remain for many minutes unremoved. By far the neatest and best shelves are of stone or slate, two and a half feet wide, raised on stout iron rods about two feet from the bricked or paved floor. The dishes are best made of earthenware, or oak lined with lead. Where many cows are kept, these last may be conveniently made three feet wide, and four or five feet long. They will thus project six inches over the shelf, and should be provided with a brass plug, by which the milk, when skimmed, can be drawn off without moving the vessels. These, and the milk-buckets, and, indeed, every article, that comes in contact with milk or butter, must be kept scrupulously clean. Immediately after use, they should be rinsed out with cold water, and then with hot; wooden and metal articles well scoured with a scrubber, again washed, or, where practicable, dipped into a boiler amongst scalding water, and then set aside for several hours, to dry, air, and sweeten. For scrubbing purposes, a small tightly girded bunch of mountain heath, where such can be had, is best adapted, and failing it, a wisp of strong straw. These should be changed frequently. Indeed, the comparatively short period of their duration is a guarantee for that. Inattention to the proper cleaning and scouring of the dishes, especially in sultry weather, is sure to be marked by sour milk. Upon many farm homesteads in Scotland, loss is occasioned by the unsatisfactory condition in which the dairies are kept.

The milk, when brought into the dairy, is run through a wire-gauze or horse-hair strainer, into the vessels above described. To encourage the rapid rise of the cream, the layer of milk should be shallow, especially in summer. At the end of 12 or 24 hours, the cream is carefully removed; and in cool weather the milk may stand for another 12 or 24 hours, when it is again skimmed, the residue going to the pigs or calves. The cream removed at the first skimming is always richest and best; and where it is desired that the butter should be first-rate, any subsequent skimmings may be kept separate, and churned by themselves. Churning at short intervals of twice or thrice a week is preferable to allowing the cream to stand for a longer period.

Every time cream is added, the contents of the tank or cistern are well stirred, and a little salt added, unless, as in Scotland, where the butter is liked perfectly fresh. The cream should be kept as cool as possible, especially during the several hours preceding churning. For this end, in very hot weather, the cream-tank is sometimes lowered into a conveniently deep well, or placed for several hours in a water-cistern or under a running tap. In such weather, the churning, which generally occupies from 30 to 40 minutes, should be done at night, the butter laid in brine, and made up early next morning. When the whole milk is kept for churning, care must be taken never to add new milk to that which has already been sour. The establishment of large cheese factories, dairy factories, and dairy supply companies, first in the United States and afterwards in England, has promoted the invention of machinery for dairy purposes, and saves much manual labor both in the making of cheese (q. v.) and butter. The use of cream separators (usually Laval's) worked by a steam or gas engine, has quickened the process of butter-making immensely. Instead of standing in deep or shallow pans until the cream shall rise, by means of a centrifugal 'separator' the cream is removed from the fresh milk, and in a short time is made into butter by machinery in which all contact by hand is avoided. The manufacture and export of artificial butter, called butterine, and cheese made from clarified lard and a little milk (see OLEOMARGARINE), has been carried on to a great extent in the United States.

Much of the milk supply of London and other large towns is carried by rail from distances of 60, 80, or 100 miles, and is usually conveyed in steel cans, after having been passed through a refrigerator. The sale of the sweet-milk is found to pay better than the making either of butter or cheese. Quantity rather than quality of milk is usually the main requirement, and a liberal amount of soft succulent food is accordingly used. In large towns, the cow proprietors do not rear their own cows and often buy animals which they do not find it advisable to keep long. For the most part of the year they are necessarily stall-fed, the dietary consisting of cut grass, various sorts of early roots, and distillers' or brewers' draft and wash. The grass raised from town-sewage irrigation has latterly been given extensively to city dairymen's cows. It is worth noting that typhoid fever has been traced to infected milk, caused by cows drinking polluted water.

Statistics show that the United Kingdom is gradually becoming more dependent on foreign supplies of dairy produce. In 1856, 513,392 cwts. of butter were imported; and in 1880 the quantity had increased to 2,326,305 cwts. Cheese also shows a very great increase in the same period, the quantity imported in 1856 being 407,076 cwts., and in 1880, 1,775,997 cwts. To add to the significance of the statistics, the exports from Great Britain indicate a decrease. The butter exported in 1856 reached 139,548 cwts.; and in 1880, 31,408 cwts. Cheese exported in 1856, 39,545 cwts.; and in 1880, 11,903 cwts.

For further information, the reader is referred to the following works: *Dairy Farming*, by John C. Morton; *Dairy Management*, by J. Horsfall; *Dairy Management*, by Mrs. Scott; articles on Dairy Management in Morton's *Cyclopædia of Agriculture* (new ed. 1874); Stephens's *Book of the Farm; Dairy Farming*, by Rowland, edited by Ablett (1879).

DA'IS (Fr.). This term was used with considerable latitude by medieval writers. Its most usual significations are the following: 1. A canopy over an altar, shrine, font, throne, stall, chair, statue, or the like. The term was applied to the canopy without regard to the materials of which it was composed, which might be cloth,

wood, stone, metal, or other substance. 2. The chief seat at the high table in a hall, with the canopy which covered it, from which probably the word in all its significations was introduced, its French meaning being a canopy. 3. The high table itself. 4. The raised portion of the floor, or *estrade*, on which the high table stood, and by which the upper was divided from the lower portion of the hall; and 5. A cloth of state for covering a throne or table. In old writings, the word occasionally takes the form of *dois*, and more rarely that of *dez* or *detz*.

DAI'SY (*Bellis*), a genus of plants of the natural order *Compositæ*, sub-order *Corymbiferæ*.—The common D. (*B. perennis*), plentiful throughout Europe, flowers almost all the year in pastures, meadows, and grassy places. What are called double varieties, with flowers of various and often brilliant colors, are very commonly cultivated in gardens, the flowers consisting entirely of florets of the ray. A variety called the *Hen-and-chickens D.*, frequent in cottage-gardens, has the flower (head of flowers) surrounded by smaller ones, the short stems of which grow from the summit of the *scape* or leafless stem. The D. (*Gowan* of the Scotch) has long been a favorite with poets and lovers of nature, characteristic as it is of many of the fairest summer scenes, its blossoms gemming the pastures, and recommended also by its frequent appearance during the severer seasons of the year. Its flowers close at night. It is not found in America. A species of *Bellis* is, however, found in the United States (*B. integrifolia*), but it is confined to Tennessee, Arkansas, and the neighboring regions. Europe produces some species unknown in Britain, but of little interest; and species of the nearly allied genus *Bellium* are also found in the south of Europe. In the days of chivalry, the D. was the emblem of fidelity in love, and was frequently borne at tournaments both by knights and ladies.

DAISY, MICHAELMAS. See ASTER.

DAKO'TA, or DACO'TAH (so called from the Dacotah Indians or Dacoits—see SIOUX), a territory of the United States, bounded by Minnesota on the E., Nebraska on the S., Montana and Wyoming on the W., and the British possessions on the N. It was formerly part of the territory of Minnesota, but was detached when that became a state. D. is in length 414 miles, its average breadth is about 360 miles, and it has an area of 150,932 square miles.

The territory is watered by the Missouri and its branches. D. includes open grassy plains, high rolling prairies, and abounds in game furnishing valuable furs. The land is fertile and well timbered, and is rich in coal and other minerals. The N. Pacific Railway runs across D. from E. to W. The territory was organized in 1866; pop. (1870) 14,181; (1880) 135,180, without tribal Indians.

DALAI'-LA'MA. See LAMAISM.

DALAMOW, a city of Oude, on the left bank of the Ganges, in lat. 26° 4′ N., and long. 81° 7′ E. It is 68 miles above Allahabad. Pop. (1871) 5654, of whom only 250 are said to be Mohammedans. D. has long been regarded as a holy place in connection with its sacred river, having two antique temples of Siva on the margin of the stream, and an ancient ghat or stair for aiding the ritual ablutions of the pilgrims.

DALARADIA, the ancient name of a territory in Ireland which comprehended what is now the southern half of the county of Antrim, and the greater part of the county of Down. It was sometimes also called *Cric na Cruithne*, 'the region of the Picts,' from the Irish name of its inhabitants, otherwise called the Dal Araidhe, 'the race of Fiacha Araidhe,' a chief or prince of Ulster, who is said to have lived about 236 A.D. The name continued in use till the end of the 12th century. It must not be confounded with DALRIADA (q. v.).

DA'LBERG (formerly, DALBURG), the name of an ancient and noble German family, of which several members held, by hereditary right derived from the oldest times of the middle ages, the office of chamberlain to the archbishopric of Worms. So great was the renown of the D. family, that at every coronation of a German emperor the royal herald exclaimed: 'Is there no Dalberg here?' whereupon the representative of the family kneeled, and received from the new emperor the dignity of 'first knight of the empire.' Several members of this family have been celebrated as patrons of literature and art, of whom the most distinguished is

DALBERG, KARL THEODOR, BARON VON, Chamberlain of Worms and Archbishop of Regensburg, born at Hernsheim, February 8, 1744. He studied in Göttingen and Heidelberg, and, after some time passed in travel, devoted himself to the church. At Erfurt, of which he was appointed governor, 1772, he was active and generous as a patron of literature and art, and also contributed greatly to the social and commercial welfare of the little state placed under his control. After holding several high offices in the church, D. was sent to Paris (1804), in order to assist in adjusting several ecclesiastical affairs with Napoleon and Pope Pius VII. He died at Regensburg, February 10, 1817.

D. was as highly respected as a ruler and a scholar as for his private character. During his whole life, he cultivated the friendship of those eminent in literature and art, such as Goethe, Schiller, Wieland, &c. His writings—marked by sound learning and eloquence of style—include a treatise *On the Influence of the Arts and Sciences on Social Order* (1793), and *Pericles, or the Influence of the Fine Arts on the Public Welfare* (1806). These were his favorite objects of study; but natural history, chemistry, botany, mineralogy, and agriculture, also engaged his attention.

DALBE'RGIA, a genus of trees and climbing shrubs of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, having a stalked membraneous pod, which is flat, tapers to both ends, and contains 1—3 flat seeds. The leaves are pinnate, with a terminal leaflet. All the species are natives of warm climates. Some of them are valuable timber trees, particularly the SISSOO of Bengal (*D. Sissoo*), much prized, and more extensively used in the north of India than any other timber-tree except the Sal (q. v.). *D. monetaria*, a native of Surinam, yields a resin very similar to Dragon's Blood.

DALECA'RLIA, or DALARNÉ (signifying 'valley-country'), an old province of Sweden, now forming the län or county of Fahlun or Falun (q. v.). The Dalecarlians are celebrated for the part they took under Gustavus Vasa in freeing their country from the yoke of Christian II. of Denmark.

DALGA'RNO, GEORGE, an almost forgotten but very able author, was born at Aberdeen about 1626, studied at Marischal College, and afterwards kept a school in Oxford for 30 years, where he died August 28, 1687. He deserves to be remembered for two remarkable works—the *Ars Signorum, Vulgo Character Universalis et Lingua Philosophica* (Lond. 1661); and *Didascalocophus, or the Deaf and Dumb Man's Tutor* (Oxf. 1680). The former is a very ingenious attempt to represent and classify ideas by specific arbitrary characters irrespective of words. It contains the germs of Bishop Wilkins's subsequent speculations on a 'real character and a philosophical language.' Leibnitz has repeatedly alluded to it in complimentary terms. The latter work has for its design, 'to bring the way of teaching a deaf man to read and write, as near as possible to that of teaching young ones to speak and understand their mother-tongue.' D. has the great merit of having anticipated, by more than 130 years, some of the most profound conclusions of the present age respecting the education of the deaf and dumb.

DALHOU'SIE, MARQUIS OF, JAMES ANDREW BROUN-RAMSAY, Governor-general of India, third son of the ninth Earl of D. was born April 12, 1812, at Dalhousie Castle, Midlothian. He was educated at Harrow, and graduated at Christ Church, Oxford. In 1832, by the death of his only remaining brother, he succeeded to the honorary title of Lord Ramsay. In 1835, he contested the representation of Edinburgh, in the Conservative interest, against the Whig candidates, Sir John Campbell, afterwards Lord Campbell, and Mr. Abercromby.

He bore his defeat with great good-humor. In 1836, he married the eldest daughter of the eighth Marquis of Tweeddale; in 1837, was elected for Haddingtonshire. On the death of his father, in 1838, he succeeded to the earldom of D., and became a member of the Upper House. In 1843, he was appointed, by Sir Robert Peel, Vice-president of the Board of Trade, and in 1845 succeeded Mr. Gladstone as President of the Board. The 'railway mania' threw an immense amount of labor and responsibility upon his department; but the energy, industry, and administrative ability he displayed in his office, no less than his readiness and fluency in parliament, marked him out for the highest offices in the state. When Sir Robert Peel resigned office in 1846, Lord John Russell, who succeeded him, paid the Earl of D. the rare compliment of asking him to remain at the Board of Trade, in order to carry out the regulations he had framed for railway legislation and intercommunication. In 1847, he was appointed Governor-general of India, as successor to Lord Hardinge, and arrived in Calcutta, January 12, 1848—the youngest governor-general ever sent to that country. His Indian administration was not less splendid and successful, in regard to the acquisition of territory, than in the means he adopted for developing the resources of the country and improving the administration of the East Indian government. Pegu and the Punjab were conquered; Nagpore, Oude, Sattara, Jhansi, and Berar were annexed—altogether, four great kingdoms, besides a number of minor principalities, were added to the dominions of the Queen under his governor-generalship. Railways on a colossal scale were planned, and partly commenced; 4000 miles of electric telegraph were spread over India; 2000 miles of road between Calcutta and Peshawur were bridged and metalled; the Ganges Canal, the largest of the kind in the world, was opened; the Punjab Canal was undertaken; important works of irrigation all over India were planned and executed; and the official department of public works was re-organized. Among other incidents of his beneficent administration may be cited the permission to Hindu widows to marry again; relief to persons of all sects from

the risk of forfeiting property by a change of religion; the improvement of education and of prison-discipline; the organization of the Legislative Council; the improved training of the civil service, covenanted and uncovenanted; and the reform in the postal service of India, whereby a letter from Peshawur to Cape Comorin, or from Assam to Kurrachee, is now conveyed for three-farthings, or $\frac{1}{15}$th of the old charge. These, and many other achievements of his Indian administration, will be found in a minute which he drew up on resigning office, in which he reviewed, with pardonable pride, the events of his eight years' governor-generalship. His constitution had never been strong, and it gave way under the incessant labor and responsibility imposed upon him by his noble ambition.

Meanwhile, honors had been showered upon him by his queen and country with no sparing hand: in 1848, he was made a Knight of the Scottish order of the Thistle; in 1849, he received the marquisate, the thanks of both Houses of Parliament and of the East India Company, for the 'zeal and ability' displayed in administering the resources of British India in the contest with the Sikhs, immediately previous to the annexation of the Punjab; in 1852, on the death of the Duke of Wellington, he was nominated by the then prime minister, the Earl of Derby, to the office of Constable of her Majesty's Castle of Dover, and Lord Warden of the Cinque Ports. D. sailed from Calcutta in March 1856. On his arrival in England, he was unable to take his seat in the House of Lords; and the remainder of his days was spent in much physical suffering and prostration of strength. On the 19th December 1860, he died at Dalhousie Castle in his 48th year, leaving behind him a name that ranks among the highest in the roll of Indian viceroys for statesmanship, administrative vigor, and the faculty of inspiring confidence among the millions subjected to his sway. As he died without male issue, his title of marquis became extinct on his death, the earldom of D. and other Scottish honors reverting to his cousin, Baron Panmure, who died in 1875.

DA'LIAS, a town of Spain, situated in the province of Almeria, 20 miles west-south-west of the city of that name, and about 4 miles from the Mediterranean. It is badly and irregularly built, and is subject to earthquakes. Pop. 9000, who are employed chiefly in mining, smelting, and fishing.

DA'LIAS, a town of Spain, 17 miles west-south-west of Almeria. Near are lead and antimony mines. Pop. 9360.

DALKEI'TH, a burgh of barony, 6 miles south-east of Edinburgh, stands near the junction of the North and South Esk, and is a station of the North British Railway. It chiefly consists of one main street. Pop. (1881) 6931. It has one of the largest corn-markets in Scotland; has a large and commodious market-hall, erected in 1854; manufactures of brushes, woollens, and hats, besides iron-foundries, tanneries, and coal-works. D. arose round an ancient castle, which was long a great stronghold. The regality of D. was successively held by the Grahams, the Douglases, the Earls of Morton, and the Earls of Buccleuch—the latter having bought it from the Mortons in 1642. During the minority of James VI., D. Castle was the chief residence of the Regent Morton; hence it was called the Lion's Den. General Monk lived in it during his government of Scotland under Cromwell. Dalkeith Palace, the chief seat of the Duke of Buccleuch and Queensberry, built about 1700 on the site of the old castle, is a large square structure overhanging the North Esk, amid fine grounds, in which the two Esks flow and unite. There are about a dozen places of public worship.

Besides the old parish church there is another, a fine cruciform structure in the early English style, built (1840) and endowed by the Duke of Buccleuch. An Episcopal Chapel stands within the palace grounds. D. possesses several good public and private schools. The Dalkeith union workhouse, opened in 1849, was the first of such houses in Scotland. The town has much improved during the last thirty years, and is becoming gradually more extensive.

DALKISSO'RE, a river of Bengal Proper, joins the Hoogly from the right at Diamond Harbor, about 30 miles below Calcutta. It has a south-east course of about 170 miles, rising in lat. 23° 30′ N., and long. 86° 34′ E. In its lower section the D. assumes the name of the Roopnerain. The Channel of the Hoogly which receives the Roopnerain, has of late years become silted up through the same cause to which the adjacent delta owes its existence, so as to be now frequented only by native craft. Nor does it, on other grounds, afford a desirable passage upwards, for as the tide sets strongly into the Roopnerain, as offering less resistance to its progress, many vessels bound to Calcutta have been swept up the shallow estuary, and lost.

DA'LLAS, GEORGE MIFFLIN, an American statesman and diplomatist, was born at Philadelphia, July 10, 1792. He was educated at Princeton College, where he graduated with high honors in 1810. Soon after he was called to the American bar, he accompanied Mr. Gallatin in his special embassy to St. Petersburg as private secretary. On his return, he resumed the practice of the law, and successively filled the offices of deputy of the attorney-general of Philadelphia, mayor of Philadelphia, and district-attorney of Philadelphia, an office which his father had held. In 1831, he represented Pennsylvania in the Senate of the United States, but after two years retired, and resumed his profession. In 1837, he was appointed American minister at St. Petersburg, but was recalled in 1839. In 1844, he was elected vice-president of the United States, and held this office until 1849. In 1856, he succeeded Mr. Buchanan as American minister at the court of St. James's. He was empowered to settle the Central American question; but shortly after his arrival, a dispute between the two governments, arising out of the dismissal of Mr. Crampton, the British minister at Washington, by the president of the United States, threatened to bring the diplomatic mission of D. to a premature termination. Through the forbearance of Lord Palmerston, he was, however, permitted to remain, and discharged the duties of American minister until 1861, when he was succeeded by Mr. C. F. Adams. In person, he was tall, and of venerable aspect. He diligently studied the politics and institutions of the mother-country, and during his embassy assiduously attended the debates in both Houses of Parliament. He died in 1864.

DALLES, romantic and perilous rapids on the Columbia or Oregon, form, along with the Chutes above them, and the Cascades below them, an almost continuous interruption between the tide-water of the river and its long reach—about 400 miles—of comparatively practicable navigation towards the interior. They are subdivided, reckoning downwards, into the Little D. and the D. Proper. On the latter, the basaltic rocks, which, from a considerable distance above, bound the channel, suddenly confine the stream to one-third of its width, with a perpendicular wall on either side; while the damming up of the plunging surges fearfully aggravates the difficulties and dangers of the descent.

DALMA'TIA, a narrow strip of territory, extending along the Adriatic Sea, and bounded on the N. by Croatia, on the E. by Bosnia, Herzegovina, and Montenegro. Lat. 42° 15′—44° 54′ N., long., 14° 30′—19° E. It forms, with its adjacent islands, the most southern crownland of the Austrian empire. Area, 4881 square miles; pop. (1869) 456,961. The coast of D. is everywhere steep and rocky, and the adjacent series of islands, divided by picturesque straits and channels, are of a like character. Numerous bays intersecting the coast form excellent havens and landing-places. Offsets from the Dinaric Alps traverse the interior, and attain in Mount Orien, the highest culminating point, an elevation of 6332 feet; the Velebich Mountains, separating D. from Croatia, and which belong to the Julian Alps, have a height of more than 5000 feet. The mountains of D., for the most part composed of limestone, present a bleak and barren aspect, with many romantic chasms and fissures, through which dash impetuous mountain-streams. The chief rivers—none of which, however, are of any importance—are the Zermagna, Kerka, Cettina, and Narenta, the second and third of which are broken in several places by beautiful cascades and falls. The lakes are numerous, but with the exception of Lake Vrana—which is separated from the Adriatic by only a narrow tongue of land, and the waters of which are brackish—they are periodical, drying up in summer, and filling their beds in late autumn. A large part of the whole area of D. consists of moor and morass, yet in summer there is often a great scarcity of water. The climate is in general warmer than that of any other part of Austria, the African sirocco being occasionally felt on its shores. The minerals are limestone, coal, gypsum, &c. Agriculture is in a backward state. About one-ninth of the land is arable, and produces wheat, barley, oats, maize, rye, and potatoes. Wine and olives are also produced. More than half the land is pasture, and wood occupies about a fifth. The islands are not very fertile, but supply good timber for ship-building.

Cattle-rearing, sea-faring, and the fisheries on the coast, are the chief kinds of industry. The live-stock in 1872 consisted of 673,600 sheep, 280,650 goats, 6000 mules, 16,000 asses, 17,000 horses, and 26,300 pigs. The annual value of the exports and imports is £1,500,000. The exports consist principally of wine, oil, brandy, hides, wool, wax, honey and fruits. Of the whole population it is computed that about 55,000 are Italians, 1000 Albanians, 1000 Germans, 500 Jews, and the remainder consists of Southern Slavonians—chiefly Dalmatians and Morlaks. The Dalmatians are a fine race of men—bold and brave as seamen and soldiers—and formerly were the main support of the military power of Venice. But it must be added that they are deceitful and rapacious, while the love of independence is extreme. They speak the Illyrian-Servian or Herzegovinian dialect; but the language used in the government offices, especially in Spalatro, is the Italian. The Morlaks—who inhabit the interior, the mountainous districts, and the Turkish sanjak of Hersek—are also good soldiers, hospitable and faithful to their engagements, lovers of independence, but it is said they are addicted to robbery and drunkenness. D. is divided into four circles—Zara, Spalatro (or Spalato), Ragusa, and Cattaro. These are also the names of the chief towns.

In ancient times, D. was a considerable kingdom, and after many unsuccessful attempts, was first subjugated by the Romans in the time of Augustus. After the fall of the Western Empire, D., which had formed the most southern part of the province Illyricum, was captured by the Goths, from whom it was taken by the Avari (490), who in their turn yielded it to the Slavonians about 620. The state founded by the Slavonians continued until the beginning of the 11th c., when King Ladislaus of Hungary incorporated a part of D. with Croatia, while the other part, with the title of Duchy, placed itself under the protection of the Venetian republic. The Turks afterwards made themselves masters of a small portion; and by the peace of Campo-Fornio (1797), the Venetian part of D., with Venice itself, became subject to Austrian rule; and when Austria, in 1805, had ceded this part of D. to Napoleon, it was annexed to the kingdom of Italy; afterwards (1810) to Illyria. Since 1814, D. forms part of Austria; the commune of Spizza being added by the Congress of Berlin in 1878.

DALMA'TIC (*Dalmatica*), the deacon's robe in the Roman Catholic Church. The most ancient form of the D. is exhibited in the annexed wood-cut, after an early Christian painting on the walls of catacombs at Rom . It was originally of linen, but it is now generally made of the same heavy silk as the Planeta (q. v.) worn by the priest.

DALRI'ADA, the ancient name of a territory in Ireland, comprehending what is now called 'the Route,' or the northern half of the county of Antrim. It signifies primarily, 'the race of Riada;' and secondarily, 'the country of the race of Riada,' i. e., Cairbre Righfada, or 'Cairbre of the Long Arm,' the son of a chief or prince of the Scots in Ireland, and himself a warrior of note. He lived in the 3d c., and not only obtained an ascendency in the district of Ireland which came to be called after him, but, according to some writers, planted a colony of his Scottish countrymen on the shores of Argyleshire in Alba, or Albany, as Scotland was then called. It is certain that about 506 A.D. some of his descendants, led by Loarn, Fergus, and other sons of Eirc, son of Muinreamhar, passed over to Argyleshire, where they settled themselves permanently, and founded the kingdom of 'Dalriada in Albany,' or 'the Scots in Britain.' More than twenty kings of this state are enumerated before Kenneth MacAlpin, who, about 843, united under one sceptre the Dalriads, or Scots, and the Picts, and thus became the first king of Albany, which about two centuries afterwards began to be known as Scotia or Scotland.

DALRI'ADS, or DALREUDI'NI, the inhabitants of DALRIADA (q. v.).

DALRY', a town of Ayrshire, Scotland, on the Garnock, 20 miles south-west of Glasgow. D. was recently a small village, but has of late rapidly increased in population and importance in consequence of the establishment of iron-works at and near it. D. possesses also a large woollen mill. Pop. (1851) 2706; (1861) 4232; (1871) 5214; (1881) 5010.

DALRY'MPLE FAMILY, a very old and illustrious Scottish family, deriving its name from the lands of Dalrymple in Ayrshire. The principal members are:

DALRYMPLE, JAMES, VISCOUNT STAIR, a lawyer and statesman, son of a small proprietor in Ayrshire, was born at Drummurchie, in the same county, May 1619, educated at Glasgow University, and at an early age, entered the army raised in Scotland to repel the religious innovations of Charles I. But the bent of his mind lay towards civil and literary pursuits; and in 1641, he was appointed professor of philosophy at Glasgow. The use which he made of philosophy, however, was rather to aid him in basing law—his favorite study—on profound and comprehensive principles, than to add another metaphysical system to those already in existence. In short, his wish was to be a philosophic lawyer, rather than a philosopher. In 1648, he entered as an advocate at the Scotch bar, where he rapidly acquired great distinction; in 1649, and again in 1650, he was appointed secretary to the commissioners sent to Holland by the Scottish parliament to treat with Charles II.; and in 1657, was induced—but with difficulty—to become one of the 'commissioners for the administration of justice' in Scotland under Cromwell's government.

Dalrymple was a conscientious, but at the same time an exceedingly moderate and enlightened royalist; and although appointed one of the new Scotch judges after the Restoration, he resigned his seat in 1663, because he could not take the 'Declaration' oath, which denied the right of the nation to take up arms against the king. His great talents, however, induced the monarch to accept his services on his own terms. Dalrymple was now created a baronet. In 1671, he became Lord President of the Court of Session. As a member of the Privy Council, he was invariably the advocate, though not always successfully, of moderate measures. In 1681, when the infamous 'test' oath was under consideration, Dalrymple, with the dexterity of a lawyer, caused John Knox's Confession of Faith to be introduced as a part of the test; but as this Confession inculcated resistance to tyranny as a duty, the one half of the test contradicted the other. Dalrymple's private conscience, however, was more fastidious than his public one, for he himself refused to take the very oath which, by his ingenuity, he had virtually deprived of its despotic character, and in consequence had to resign all his appointments. Before this, he had published the *Institutions of the Law of Scotland*, which is still the grand textbook of the Scotch lawyer. The disquisitions are both profound and luminous, characterized alike by their philosophic insight and their sound common sense. After some time spent on his estate in Wigtonshire, Dalrymple went to Holland in 1682, to escape the persecution to which he was subjected at home. During 1684—1687, he published at Edinburgh—though he himself was then residing at Leyden—his *Decisions;* and in 1686, at Leyden, a philosophic work in Latin, entitled *Physiologia Nova Experimentalis*. He accompanied the Prince of Orange on his expedition to England. When matters were prosperously settled, William re-appointed him Lord President of the Court of Session, and elevated him to the peerage under the title of Viscount Stair. He died 25th November 1695.

JOHN DALRYMPLE, eldest son of the preceding, held office under James II., and also under William III. While Secretary of State for Scotland, he incurred great odium on account of his share in the barbarous transaction known as the 'Massacre of Glencoe.' In 1703, he was elevated to the earldom of Stair. He died in 1707. —SIR JAMES DALRYMPLE, second son of Viscount Stair, was the author of *Collections concerning Scottish History preceding the Death of David I.* (1705), and the grand father of Sir John Dalrymple of Cranstoun, author of *Memoirs of Great Britain and Ireland, from the Dissolution of the last Parliament of Charles II. until the Seabattle off La Hogue*.—The other sons—Viscount Stair had altogether nine children, five sons and four daughters—were more or less distinguished.

DALRYMPLE, JOHN, second Earl of Stair, second son of the first Earl of Stair, and grandson of Viscount Stair, was born at Edinburgh, July 20th, 1673. He had the misfortune, while young, to kill his elder brother, by the accidental discharge of a pistol. This unhappy circumstance induced the parents, both for their own comfort and that of the boy himself, to educate him away from home. He was placed under the care of a clergyman in Ayrshire, who, by his prudence and kindness, soon developed the excellent qualities of the youth. Dalrymple afterwards went to Leyden, where he had the reputation of being one of the best scholars in the university. He completed his curriculum at Edinburgh. In 1701, he accepted a commission as lieutenant-colonel of the Scottish regiment of foot-guards, and gained the highest distinction in Marlborough's campaigns. When the accession of the Tory ministry, in 1711, put a stop to the brilliant career of the great duke, Dalrymple retired from the army. When George I. succeeded to the throne, Dalrymple—who had become Earl of Stair by the death of his father in 1707—was made a lord of the bedchamber, a privy-councillor, and commander-in-chief of the forces of Scotland. Next year, he was sent as ambassador to France, in which capacity he exhibited the highest ability, and was of the greatest service in traversing the schemes for the reinstatement of the Pretender; but as he refused to flatter his countryman, Law—notorious in connection with the fatal Mississippi scheme—who was then omnipotent in France, the government was mean enough to recall him. For 22 years he lived in retirement at Newliston, near Edinburgh, devoting himself chiefly to agriculture, which was then beginning to improve in Scotland. He was the first to plant turnips and cabbages in the open fields. In 1742, he was sent as ambassador to Holland, and in the following year served under George II., at the battle of Dettingen. Later, he was made commander-in-chief of the forces of Great Britain. He died in 1747. See *Annals, &c. of the Viscount and Earls of Stair*, by S. M. Graham (1875).

DALRYMPLE, SIR DAVID, a Scottish judge and historical antiquary, commonly known as Lord Hailes, was born at Edinburgh, 28th October 1726. He was the grandson of Sir David Dalrymple, youngest and reputedly the ablest son of Viscount Stair. He was educated first at Eton, afterwards at Edinburgh, and finally at Leyden, whence he returned to Scotland in 1746. In 1748, he was called to the Scottish bar, where his success was highly respectable, but not astonishing. Dalrymple was a man of extensive culture and classical tastes, of sound judgment and

great industry, but a very indifferent orator; and, in consequence, men of far inferior powers often acquired a greater reputation and a more lucrative practice. In 1766, he was appointed one of the judges of the Court of Session, and assumed the title of Lord Hailes, by which he is chiefly known to posterity, His accuracy, diligence, judicial impartiality, and dignified demeanor, secured him the highest respect in his new office. Ten years after, he was made a justiciary lord.

He died 29th November 1792.—Although Dalrymple's official duties were very arduous, he found time to compose numerous works, surpassing in value those of many men whose lives have been wholly devoted to literature. We can afford to mention only a few: *A Discourse on the Gowrie Conspiracy* (1757); *Memorials and Letters relating to the History of Britain in the Reign of James I.* (1762), a curious and interesting volume; *The Works of the ever-memorable John Hailes of Eton, &c.* (1765); *Memorials and Letters relating to the History of Britain in the Reign of Charles I.* (1766); *Annals of Scotland from the Accession of Malcolm III., surnamed Canmore, to the Accession of Robert I.* (1766); and *Annals of Scotland from the Accession of Robert I., surnamed the Bruce, to the Accession of the House of Stuart* (1779). Besides these, Dalrymple wrote works on legal antiquities and ancient church history, edited old Scotch poems, and published sketches of the lives of various notable Scotchmen, as specimens of how a *Biographia Scotica* might be executed.

DALRYMPLE, ALEXANDER, F.R.S., F.S.A, younger brother of the preceding, was born at New Hailes, the seat of his father, near Edinburgh, 24th July 1737. In 1752, he obtained an appointment in the East India Company's service; but his extreme youth, as well as the imperfect education he had received at home, rendered it necessary, on his reaching Madras, that he should be placed under the store-keeper for a time. Lord Pigot himself, at that time governor of the presidency, condescended to give him lessons in writing; but young Dalrymple having, unluckily for his own prospects, fallen upon some papers in the secretary's office relating to the commerce of the Eastern Archipelago, became so engrossed with the importance of the subject, that after some bickerings with his superiors, he relinquished his appointment, and made a voyage of observation among the eastern islands. At Sooloo, in the course of his expedition, he concluded a commercial treaty with the sultan, which might have led to beneficial results; but on his return in 1762, he found political affairs entirely changed, small-pox raging, and most of his influential friends dead. The scheme, in consequence, proved a failure. In 1765, he returned to Britain, to urge its importance on the home-authorities, but did not succeed. In 1775, however, he was sent out to Madras as a member of council, but was recalled in two years, apparently without good reason, for in 1779 he was appointed hydrographer to the East India Company, and shortly after received a pension. In 1795, when the Admiralty resolved to establish a similar office, it was conferred on Dalrymple, who held it till within a short period of his death, which occurred 19th June 1808, at Marylebone, London. Dalrymple wrote a vast number of letters, pamphlets, &c., containing plans for the promotion of British commerce in various parts of the world, political dissertations, accounts of geographical expeditions, &c. His library was rich in works of navigation and geography, all of which were purchased by the Admiralty. His collection of poetry, also very valuable, was deposited in the library at New Hailes, as a family heirloom.

DA'LTON, JOHN, was born September 5, 1766, at Eaglesfield, near Cockermouth, in Cumberland. He received his early education in the school of his native place, and, after 1781, in a boarding-school kept by a relative in Kendal. Here his love of mathematical and physical studies was first developed. He wrote several mathematical essays, and, in 1788, commenced a journal of meteorological observations, which he continued throughout his whole life. In 1793, he was appointed teacher of mathematics and the physical sciences in the New College at Manchester, where he resided chiefly during the remainder of his life, though frequently employed, after 1804, in giving lectures on chemistry in several large towns. In the years 1808—1810, he published his *New System of Chemical Philosophy*, 2 parts (Lond.), to which he added a third part in 1827. In 1817 he was appointed president of the Literary and Philosophical Society at Manchester. He was also a member of the Royal Society, and of the Paris Academy, and, in 1833, received a pension of £150, afterwards raised to £300. In the same year, D.'s friends and fellow-townsmen collected £2000, to raise a statue to his honor, which was executed by Chantrey, and placed at the entrance of the Royal Institution in Manchester. D. was also honored by the university of Oxford with the degree of D.C.L., and with that of LL.D. by the university of Edinburgh. He died, universally respected, at Manchester, July 27, 1844. His chief physical researches were those on the constitution of mixed gases, on the force of steam, on the elasticity of vapors, and on the expansion of gases by heat. In chemistry, he distinguished himself by his progressive development of the Atomic Theory (q. v.), as also by his researches on the absorption of gases by water, on carbonic acid, carburetted hydrogen, &c. His treatises are mostly contained in the *Memoirs of the Literary and Philosophical Society of Manchester*, the *Philosophical Transactions*, Nicholson's *Philosophical Journal*, and Thomson's *Annals of Philosophy*. Besides these, we have his *Meteorological Essays and Observations*. (Lond. 1793; 2d edit. 1834). D. was unquestionably one of the greatest chemists that any country has produced. Profound, patient, and intuitive, he had precisely the faculties requisite for a great scientific discoverer. His atomic theory elevated chemistry into a science. In his habits, D. was simple; in his manners, grave and reserved, but kindly, and distinguished by his truthfulness and integrity of character.

DA'LTON, a town of Furness, Lancashire, and 18 miles west-north-west of Lancaster. There are iron mines and foundries in the vicinity. Pop. (1881) 13,350.

DA'MAGES, in Law, are the pecuniary recompense claimed on account of suffering an injury through the act of another. The peculiar constitution of the English common-law courts, which, till lately, prevented them in most cases from giving any other remedy than by way of D., rendered the questions relating to this subject of unusual importance; but the progress of recent legislation has been in the direction of restricting actions for D. to the cases in which the restitution of property or enforcement of a right cannot be otherwise attained. The Court of Chancery, on the other hand, could not give D., it could only enforce performance of an obligation by personal restraint, and hence, according to the nature of the remedy desired, the suitor resorted to the one or other court. In Scotland, the supreme court has always been able to give redress in either way.

Where a sum ascertained in amount is due, the action is one not properly for D., but of debt. But where the sum is not ascertained, as where an injury has been done to a man's character or property, the action in either country can in general only be for D., the amount of which the injured party estimates, and which is determined by the judgment of the court, or verdict of a jury, subject to certain fixed rules which the courts have laid down, as the principle according to which the estimation is to be made. These, it is obviously impossible to detail here, and reference must be made to the title of the special subjects out of which a claim may arise for such information as it is practicable to give. It may be observed, however, that it is a general rule to restrict the amount of D. to that of the actual pecuniary loss, wherever it can be ascertained; and that neither in Scotland nor England will a stipulated penalty for breach of agreement be accepted as determining the sum due for D., unless it shall appear, by the use of the term 'as liquidated damages,' or some equivalent expression, that both the parties had intended to fix conclusively the sum payable in case of default. Other general rules are, that the injury for which D. are claimed must have affected the claimant individually, and not merely as one of the general public, although it is not essential that the injury should have done material hurt to him, as this only affects the amount of damages. And the injury suffered must have been the direct and immediate consequence of the act done; if it has only been a secondary or remote result of the act, no D. will be given. And any act sued on must be an actual injustice; it is not enough that it produces disadvantageous results, if these arise only from doing what the party was justified in doing. D., therefore may be sued for in respect of a crime involving liability to criminal punishment; but in England, in the case of a felony, no action for D. will lie against the offender, because it is the duty of the complainant to prosecute him criminally. It is otherwise, however, in the case of misdemeanors; an action for D. is there independent of criminal proceedings. In Scotland, this is the rule in reference to every species of crime.

DAMA'N, a seaport town, province of Guzerat, Hindustan, belonging to the Portuguese. It stands at the mouth of the Daman Gunga, or Daman River, which rises in the Syadree Mountains, as the upper extremity of the Western Ghauts is called by the natives, in lat. 20° 11′ N., and long. 73° 42′ E. Common spring-tides give at least three fathoms on the bar, while outside is a roadstead of more than double that depth. The harbor affords good shelter from the south-west monsoon, and, as the neighborhood is well-stocked with suitable timber, the people are largely employed in the building and repairing of ships. The peculiar drawback of the locality is the scarcity, or rather the want, of fresh-water. The river, even when swollen by the rains into an inundation, is brackish, and the wells likewise are so in some degree. Endemic fevers are the natural consequence. The place is fortified with a rampart and bastions, and it is described as having been, before the arrival of the whites, 'a town great and strong.' Pop. 6000.

DAMAN, an outlying portion of the Punjab, runs about 300 miles along the right or west bank of the Indus, extending back,

with an average breadth of about 60 miles, as far as the Suliman Mountains. It stretches in N. lat. from 28° 40′ to 33° 20′, and in E. long. from 69° 30′ to 71° 20′. In the absence of irrigation, the district in general is little better than a plain of smooth, bare, hard clay—the result of alternate inundation and evaporation. But when duly irrigated, this baked and burned surface becomes very productive, more especially in the strip of land—known as the Derajat—which is nearest to the bordering stream.

DA'MAN (*Hyrax*), the name of one or more species of the order *Hyracoidea*, established by Huxley, and containing 13 species. They were long regarded as a link between *Rodentia* and *Pachydermata*. They were always ranked among the former, till Cuvier pointed out their essential agreement, in dentition and anatomical characters, with the latter, and assigned them a place next to the elephant and rhinoceros, remarking, that 'excepting the horns, they are little else than rhinoceroses in miniature.' He adds that 'they have quite similar molars, but the upper jaw has two stout incisors curved downwards, and during youth, two very small canines, the lower jaw four incisors without any canines.' The skull, also, and other bones of the head, resemble those of the pachyderms. The muzzle is short; the ears, short and round. The ribs are more numerous than even in the pachyderms—21 pair, a number exceeded in no quadrupeds except the sloths, whereas no rodent has more than 15 pair. The toes are united by the skin to the very nail, as in the elephant and rhinoceros, and are round and soft, merely protected in front by a broad nail, which does not reach the ground. The legs are short. The tail is a mere tubercle. There are several species of this genus, natives of Africa and of the south-west of Asia.

The SYRIAN D. (*H. Syriacus*) is now generally believed to be the *shaphan* of the Old Testament, the *Cony* (q. v.) of the authorized English version, an illustration of which will be found under article CONY. The D. is common in Syria and Palestine, inhabiting rocky places, and sheltering itself in the holes of the rocks, but not burrowing, for which its feet are not adapted. It is a timid harmless creature, quick and lively in its movements, completely herbivorous, easily domesticated, and, in confinement, readily eating bread, roots, fruits, and herbs. It is about eleven inches long, and ten inches high; brownish-gray above, white beneath, the thick hair interspersed with long scattered bristles. The ASHKOKO (*H. Abyssinicus*) of Abyssinia, first described by Bruce, and supposed by him to be the shaphan, is now believed to be distinct from the Syrian D., although very similar. The KLIP-DASSE (*H. capensis*) of South America differs from the shaphan in its darker color and rather larger size, and also in having only three toes on each foot, whereas the Syrian D. has four toes on the fore-feet and three on the hind-feet. It is very common in rocky places in South Africa, both on the hills and near the seashore. Its favorite food consists of aromatic plants, and its flesh, although eatable, is highly flavored. In the places which it frequents, a peculiar substance called *Hyraceum* (q. v.) is found—an animal secretion, to which medicinal virtues are ascribed, but the nature and origin of which have not yet been thoroughly ascertained.

DAMA'R, a town of Yemen, Arabia, pleasantly situated on an elevation about 120 miles north-north-west of Aden. It has about 5000 houses, is the residence of a governor, and has a college, attended by several hundred students.

DAMASCE'NUS, JOANNES, the author of the standard textbook of Dogmatic Theology in the Greek Church, was born at Damascus about 700 A.D. On account of his eloquence, he was surnamed *Chrysorrhoas* ('Golden Stream'). In 730. he became a monk in the convent of St. Saba at Jerusalem, where he spent the rest of his days in the composition of theological works. He died about 756 A.D., and had the honor of being canonized by both the Latin and Greek churches. D. was a man of extensive erudition, and was considered the ablest philosopher of his time; but the word 'philosopher' must have meant something very different in those days from what it does now, as D.'s writings are characterized by weakness of judgment and want of critical power. The best edition is that of Le Quien (2 vols., Paris, 1712).

DAMA'SCUS (Arabic, *Dimishkesh-Shâm*), a city of Syria, the largest in Asiatic Turkey, occupies a situation of unrivalled beauty on a luxuriant plain at the eastern base of the Anti-Libanus, and 53 miles east-south-east of Beyrout, which forms its port, lat. 33° 27′ N., long. 36° 23′ E. The appearance of the city from a distance is beautiful in the highest degree.

The bright buildings, sparkling beneath a Syrian sun, rise out of a sea of various tinted foliage, while all around—save on the north-west, where stretches the long bare snow-white ridge of the Anti-Lebanon—extend charming gardens, rich cornfields, and blooming orchards, with the river Barrada (the Abana of Scripture) and its branches winding through until they lose themselves far to the east in the Lake Bahr-el-Merj, into which the Phege (the Pharpar of Scripture), a smaller stream, also flows. As in the case of all eastern cities, the expectations excited by a distant view of D. are by no means realized on a close inspection. The city proper is about 6 miles in circumference, and is partly surrounded by old tumble-down walls, portions of which date from early Roman times, while other parts are of Saracenic architecture, and some mere mud-patches of the present day. The streets generally are dirty and decayed, and so very narrow that a loaded donkey almost entirely blocks up the passage. The best street is 'Straight Street,' mentioned in the Acts of the Apostles in connection with St. Paul. The houses for the most part are very mean-looking structures, often presenting to the street nothing but a dead-wall with a doorway in it, while the best have rough mud-walls, with a projecting upper story extending so far over the narrow street that hands may be shaken from opposite windows. But as the interior of the city presents a sad contrast to its charming surroundings, so do the rich interiors of the houses contrast with their miserable externals. Fine marble-paved courts ornamented with trees, shrubs, and fountains, rooms with arabesqued roofs and walls, most luxuriously furnished, are the common features of all the dwellings of the wealthier classes. The principal buildings of D. are places of worship, chief of which is the Great Mosque—formerly a heathen temple, then a Christian church—composed of different kinds of architecture, and occupying a quadrangle 163 yards by 108 yards, the interior dimensions being 431 feet by 125. The floor is of marble tesselated, and covered with Persian carpets, and the walls and piers of the transept are enriched with beautiful devices formed of various colored marbles, while rows of noble Corinthian pillars divide the interior into nave and aisles. Altogether, this is one of the handsomest ecclesiastical buildings of which Mohammedans can boast. The citadel is large and imposing, but not strong; and the Great Khan is a splendid building, erected of black and white marble. There are many interesting remains of antiquity in D., but they are lost amid the mean modern structures and the bazaars. The latter are numerous, and finer than those of Cairo or Constantinople, and very well supplied with goods of oriental manufacture; each class of goods having a bazaar for itself. The manufactures of D. used to be important, consisting of silks, cottons, coarse woollen cloth, jewelry, saddlery, and arms; but her productions are now little more than sufficient for local consumption.

Before 1860, her looms were reckoned at 3000, while now they are said to barely reach 1300. The manufactures of the famous Damascene blades have long ceased to exist. This decline is chiefly caused by the taxation upon raw products. The trade with Bagdad was large; but in 1857 the caravan was plundered on its way across the desert, the loss to the merchants of D. being estimated at £40,000. This paralyzed the commerce. The annual caravan to Mecca from D. at one time consisted of some 50,000 or 60,000 persons, most of whom engaged to some extent in trade; but the facilities which in recent years have been afforded for making the pilgrimage by way of Egypt and the Red Sea, has caused a considerable diminution in the pilgrims, and consequently in the trade. One of the greatest blows at the prosperity of D. was struck in 1860, when the Druses (q. v.) entered the city, and destroyed about 6000 houses in the Christian quarter, killing from 3000 to 5000 persons, and selling many of the women into Turkish harems. The imports of British goods, chiefly plain and printed calicoes, cotton handkerchiefs, and cotton yarn, have been valued at £150,000. In 1870 the value of the goods brought into D. by the great (Bagdad) caravan was £90,000 Pop., including the adjoining village of Salahîyeh, 150,000: 130,000 are Mohammedans, 15,000 Christians, and 5000 Jews.

D. is perhaps the most ancient city in the world. Josephus attributes its foundation to Uz, the great-grandson of Noah; but whether it dates so far back or not, it is certain that it was a place of consequence in the days of Abraham. During the time of the Hebrew monarchy, it was the capital of Syria. It afterwards passed successively under the rule of the Assyrians, Persians, Macedonians, Romans, and Saracens; and finally, in 1516, it was captured by the Turks under Sultan Selim I.—in whose hands, with the exception of a short interval (from 1832 to 1840), when it belonged to the Pasha of Egypt, it has remained ever since. Under every change of dynasty and every form of government, D., unlike most cities, has retained its prosperity.

The vilayet of D. comprises all the territory between the Lebanon and the Euphrates—that is, all between lat. 31°—36° N., and long. 35°—41° E. The surface is for the most part level and very fertile, and produces grain of various kinds, hemp, flax, silk, cotton, madder, tobacco, and cochineal. The vilayet of D.—or of Syria as it is also called—is accounted the most important vilayet of Turkey. Pop. 518,750.

DA'MASK, the name given to all textile fabrics in which figures of flowers, fruits, or others not of geometrical regularity, are woven. The word is supposed to be derived from the city of Damascus having been an early seat of these manufactures. From the intricacy of the early process, the art of D. weaving was long a mystery confined to a few localities; but since the introduction

of the Jacquard-machine, it is extensively employed wherever ornament is wanted in the stuffs used for dress or house-furnishings.

The rich satins and brocades of Lyon and Spitalfields, the flowered ribbons of Coventry, and the bed and window curtains of Halifax and Bradford, are all examples of D. manufacture; but it is in the department of table-linen that the art has had its widest scope and greatest triumphs. The principal seats of the manufacture, on the continent of Europe, are at Courtrai and Liege in Belgium, and in some parts of Saxony, Silesia, and Austria; in England, to a considerable extent at Barnsley, in Yorkshire; in Ireland, at Belfast, Lisburne, and Ardoyne; and in Scotland, at Dunfermline, which may be called the metropolis of manufacture.

There are three descriptions of D. known in the trade—viz., 1. Full Harness, which is generally employed in patterns of limited size and minute detail, the peculiarity being that the Jacquard-machine only lifts one thread by each needle, and in such cases, the pattern is repeated to fill up the breadth wanted. 2. 'Single' or 'Common' D., in which any number of threads, from two to seven, can be lifted by one needle, to form the pattern; while the ground is produced by a set of five shafts and heddles, giving from twice to seven times the extent of pattern obtained from the same machine by the full-harness process. In full harness and single D. goods, a square fabric is considered the proper medium, that is, the warp and weft equal; but sometimes a thread or two less or more on warp or weft is used, according to the effect wanted to be produced. 3. In Double D., the pattern is produced in the same way as in single, and the ground formed by eight shafts and heddles, forming what the weavers call an eight-leaved twill, absorbing one-half more weft than warp, and giving that fine satin-like ground which distinguishes double damask. Besides these descriptions of D., a mixed cotton and woollen colored fabric in table-covers has been introduced, and is now manufactured extensively, the ground of which is woven with twelve shafts.

To give an idea of the capital required to work the finer branches of the trade, it may be mentioned, that it is quite usual for the mere designing and painting of a pattern to cost £50; and £70 has been paid for some extensive designs; while the famous 'Crimean Hero' pattern, containing portraits of the Queen, Prince Consort, Emperor Napoleon, &c., cost £600 of outlay, ere a yard of cloth could be brought to market, employing seven Jacquard-machines, consuming 50,000 cards, and containing 4800 threads in the square yard. In 1836, there were in Dunfermline 3000 D. and 517 diaper looms, and the capital embarked in the trade was estimated at £826,261, and the total number of persons employed, 5044. Steam-power was successfully inaugurated in 1849, when one factory employed about 100 power-looms. In 1877, there were 11 power-loom factories, with 4000 looms, two-thirds of which were employed in the weaving of damask. When it is considered that the production of one power-loom is equal to that of four hand-looms, some idea may be formed of the development of the trade since 1836.—A good description of D. and the D. loom is to be found in Chalmers's *History of Dunfermline*, vols. i. and ii.

DAMASKEE'NING, or DAMASCE'NING, is the art of producing upon ordinary steel certain ornamental appearances resembling those observed on the famous Damascus blades. Attention was first drawn to this branch of industry by the Crusaders, who brought from Damascus to Europe many articles made of superior steel, such as sword-blades and daggers. These were found to possess not only great elasticity, united with considerable hardness, but their surfaces were covered with beautiful designs, formed by a tissue of dark lines on a light ground, or light lines upon a dark ground, and occasionally by the inlaying of gold on the steel-blue ground. These Damascus blades appear to have been constructed of steel and iron welded together; and the elegant designs were brought out by immersing the blades in dilute acids, which, eating away unequally the surface, gave rise to the mottled appearance. In genuine Damascus blades, the designs run through the substance of the blade, and the *watering*, or regular, almost symmetrical figuring is not worn off by friction, or even grinding. Imitations of the watering of Damascus steel are produced on common steel by etching with acids; and in this way landscapes, inscriptions, and ornaments, and decorations in general, are imprinted on the steel-blue ground. Gold and silver are also inlaid in the higher-class of sword-blades and other articles. Gun-barrels are occasionally subjected to the process of Damaskeening. Attempts have been made in France to accomplish damaskeening by means of photography, but as yet with very imperfect results.

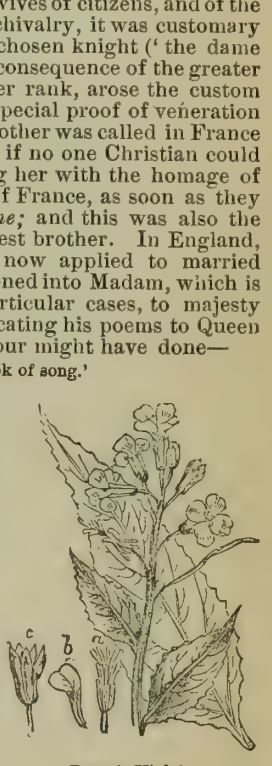
DA'MASUS, St., Bishop of Rome, was by extraction a Spaniard, and born probably early in the 4th century. In 366 A.D., he was elected Bishop of Rome, but had to struggle fiercely for the possession of his office with one Ursinus, who was supported by a considerable party. His career was throughout far from peaceful. It was mainly spent in subduing the still numerous Arians in the West; in combating the heresy of Apollinaris, which he caused to be condemned by the council assembled at Constantinople in 382; and in defending the cause of Paulinus against Meletius. He died 384. It is difficult to form a just estimate of D.'s character. His enemies used to call him *Auriscalpius Matronarum* ('The ear-tickler of the married ladies'), and hinted that he was in the habit of inducing rich female penitents to make testamentary bequests in his favor—a conspicuous vice of the clergy at that time; so much so, indeed, that Valentinian was obliged to issue an edict forbidding ecclesiastics to receive such bequests for the future. The edict was addressed to D., who was required to announce it to the church. On the other hand, he was a great friend of St. Jerome, and was primarily instrumental in inducing that learned divine to undertake a new translation of the Bible. His extant works consist of seven epistles, addressed to various bishops, and rather more than forty short poems, religious, descriptive, &c., but of little or no merit. The first edition was published at Rome by Sarrazanius in 1638. D.'s festival falls on the 11th December.

DAMBOO'L, a vast rock-temple of the Buddhists in Ceylon, containing, among a profusion of carvings, figures of Buddha of extraordinary magnitude. See *Ceylon*, by Sir J. Emerson Tennent (Lond. 1859), vol. ii. p. 577.

DAME (Lat. *domina*, a mistress), a title of honor which long distinguished high-born ladies from the wives of citizens, and of the commonalty in general. In the age of chivalry, it was customary even for a queen to be so called by her chosen knight ('the dame of his heart, of his thoughts,' &c.). In consequence of the greater courtesy shown towards women of higher rank, arose the custom of prefixing the word *ma* to *dame*, as a special proof of veneration and homage. Hence, too, the Virgin-mother was called in France *Notre-Dame* ('*Our* Mistress,' or Lady, as if no one Christian could exclusively claim the privilege of serving her with the homage of his heart). The daughters of the king of France, as soon as they came into the world, were called *Madame;* and this was also the sole title of the wife of the king's eldest brother. In England, the word D., though not much used, is now applied to married women of all classes. *Madame* is shortened into Madam, which is still a word of honor, applicable, in particular cases, to majesty itself. Thus, Alfred Tennyson, in dedicating his poems to Queen Victoria, speaks as a chivalrous troubadour might have done—

'Take, *Madam*, this poor book of song.'

DAME'S VI'OLET (*Hesperis*), a genus of plants of the natural order *Cruciferæ*, having four-sided or two-edged pods, and containing several species, annual and biennial herbaceous plants, natives, chiefly, of the middle and south of Europe. One only, the COMMON D. V., or WHITE ROCKET (H. *matronalis*), is found in Britain, in hilly pastures, but perhaps rather escaped from cultivation than a true native. It has an erect branched stem, with ovata-lancelot leaves, and terminated by numerous large lilac-flowers, which are scentless by day, but very fragrant at night, on which account this plant is cultivated in flower-pots by German ladies. The custom appears to have been an old English one also, and from it the plant derives its common name. The NIGHT-SCENTED ROCKET (*H. tristis*) is also a favorite flower in Germany.



Dame's Violet: *a*, a flower divested of calyx and carolla; *b*, a petal; *c*, calyx.

DAMIENS, ROBERT FRANÇOIS, known for his attempt to assassinate Louis XV., was born in 1714, at Tieulloy, a village near Arras, in France. He was evilly-disposed from his early youth, being known even then as *Robert le Diable*. On account of a robbery which he had committed, he was obliged to flee into Belgium in 1756, whence he returned to Paris about the end of the year. It was during his absence in that country that he formed the intention of assassinating his sovereign. The motives which led him to this are not well understood. He himself alleged that it was the conduct of the king towards the parliament; while a more popular, but apparently groundless opinion was, that he was instigated by the Jesuits. On the 5th of January 1757, having gone to Versailles on the previous day, he assiduously followed the king and his courtiers about everywhere; and about six o'clock at night, when the king was entering his carriage to leave Trianon, managed to stab him. The king, however, recognized his assassin, and D. was seized. The punishment inflicted on him was horrible. The hand by which he attempted the murder was burned at a slow fire; the fleshy parts of his body were then torn off by pincers; and, finally, he was dragged about for an hour by four strong horses, while into his numerous wounds were poured

molten lead, resin, oil, and boiling wax! Towards night, the poor wretch expired, having by an effort of will almost superhuman, kept his resolution of not confessing who were his accomplices—if, indeed, he had any. His remains were immediately burned, his house was destroyed, his father, wife, and daughter were banished from France for ever, and his brothers and sisters compelled to change their names.

DAMIE'TTA, a town of Lower Egypt, situated on the right bank of the chief of the Nile's eastern branches, about 8 miles from its mouth in the Mediterranean, in lat. 31° 25′ N., long., 31° 49′ E. It is in general ill and irregularly built, but it has some handsome mosques and marble baths, and several bazaars. Its commerce has been much injured by the prosperity of Alexandria. It still, however, carries on a considerable trade in exporting rice, which grows abundantly in the neighborhood, fish, &c.; and in importing charcoal, soap, silk, &c. The exports in 1871 were £85,200, the imports £150,600. It is connected by railway and telegraph with Cairo, &c. The cloth known as *dimity* received its name from D., where it was first manufactured. A bar at the mouth of the river prevents vessels of more than fifty or sixty tons burden for ascending to Damietta. Population, 37,100. The existing town was erected about 1251, but, prior to that, a city of the same name (more anciently Tamiáthis) stood about four miles to the south. It was strongly fortified by the Saracens, and formed on that side the bulwark of Egypt against the early Crusaders, who, however, succeeded in capturing it more than once. It was razed, and rebuilt further inland on the site it now occupies, by the Sultan Baybers.

DA'MMAR, or DA'MMAR PINE (*Dammara*), a genus of trees of the natural order *Coniferæ*, distinguished from all the rest of that order by their broad lanceolate leathery leaves, which have numerous nearly parallel veins, and by their seeds being winged, not at the end, but on one side. The tree from which the name, originally applied to its resinous product, has been extended to the whole genus, is the MOLUCCAN D. (*D. orientalis*), which grows on the high mountain-ridges of the Molucca islands. It grows to a great height, attains a diameter of nine feet, and generally has the lower part of the trunk beset with knots as large as a man's head. The timber is light and of inferior quality; and the tree is chiefly valuable for its resin, which is soft, transparent, hardens in a few days, and is then white, with a crystalline appearance. The resin often flows spontaneously from the tree in such quantity, that it hangs in masses like icicles of a handbreadth and a foot long. At another period of the year, it is yellow, and less valued. By incision, especially in the protuberances of the stem, it is obtained in large pieces. So long as *Dammar Resin* is soft, it has a strong smell; but loses it when it dries. It contains only a trace of volatile oil, but consists of two distinct resins, one of which is soluble in alcohol, the other not. It is light, brittle, and easily friable, readily soluble in oil of turpentine; quickly becomes viscid when heated; when sprinkled on burning coal, diffuses an odor like that of resin or mastich; readily takes fire, and burns with much smoke and a somewhat acid smell. It is used in Asia for domestic purposes, and in the arts like other resins; it is an article of commerce, and in Europe is employed in various ways to form varnishes, which dry quickly, have a very bright lustre, and being colorless, allow the beauty of the colors over which they are spread to be perfectly seen; but readily become viscid again, and are not permanent, so that this resin cannot be made a substitute for copal and amber. It is almost completely soluble in benzole, and in this solvent, makes an excellent colorless varnish for positive photographs on glass—it is, however, scarcely hard enough for negatives.—To this genus belongs also the KAURI PINE (q. v.) of New Zealand (*D. australis*), which produces the resin known as *Kauri Resin*, or *Kauri Gum*.—The word *Dammar*, *Dammer*, or *Damar*, signifies *resin* in some of the languages of India. The resin known as BLACK DAMMAR is obtained in the Molucca Islands from the trunk of *Marignia acutifolia*, a tree of the natural order *Amyridaceæ*. It is a semi-fluid soft resin, with a strong smell, becoming black when it dries: it is used as pitch, also to yield a kind of turpentine, which is obtained by distillation.

Canarium microcarpum, a tree of the same order, also a native of the furthest east, yields, by incision of the trunk, a viscid, odorous, yellowish substance, very similar to Balsam of Copaiva, which is called *Damar* or *Dammar*, and is used in naval yards as oakum, being mixed with a little chalk and the bark of reeds, and becomes as hard as a stone.—Quite distinct from all these is the resin also called *Dammar* or *Piney Dammar* in India, often also called Copal (q. v.) in India, and *Anime* (q. v.) in Britain, the produce of *Vateria Indica*, a large tree of the natural order *Dipteracæ*. It is obtained by wounding the tree, and when fresh, is clear, fragrant, and acridly bitter; when dried, it becomes yellow, brittle, and glass-like. It is used in India as a varnish (*Piney Varnish*), which is hard, tenacious, and much esteemed. It is also made into candles in Malabar, which, in burning, diffuse an agreeable fragrance, and give a clear light with little smoke. Some of these candles were sent to Britain, and were highly prized, but the excessive duty stopped the importation. *Shorea robusta*, the sal (q. v.), so much valued in India as a timber-tree, also of the natural order *Dipteraceæ*, and some other species of *Shorea*, yield a resin, also known as *Dammar*, and as *Ral* and *Dhoona*, which is much used in dockyards in India as pitch.

DAMMU'DAH, or DUMMO'DAH, a river of India, rises in Rangurh, a district in the presidency of Bengal, about lat. 23° 55′ N., and long. 84° 53′ E., and after a generally south-east course of 350 miles, it enters the Hoogly from the right, in lat. 22° 13′ N., and long. 88° 7′ E. The valley of the D.—traversed by the main railway between Calcutta and the North-west (The East Indian Railway)—abounds in coal and iron; and competent judges have calculated that bar-iron may here be manufactured 20 per cent. cheaper than it can be imported from Great Britain.

DA'MOCLES, one of the courtiers and sycophants of the elder Dionysius, the tyrant of Syracuse. It is recorded by Cicero that D., having lauded in the highest terms the grandeur and happiness of royalty, was reproved by Dionysius in a singular manner. The sycophant was seated at a table, richly spread and surrounded by all the furniture of royalty, but in the midst of his luxurious banquet, on looking upwards, he saw a keen-edged sword suspended over his head by a single horse-hair. A spectacle so alarming instantly altered his views of the felicity of kings.

DA'MON AND PY'THIAS, or PHI'NTIAS, two noble Pythagoreans of Syracuse, who have been remembered as models of faithful friendship. Pythias having been condemned to death by Dionysius the tyrant of Syracuse, begged to be allowed to go home, for the purpose of arranging his affairs, Damon pledging his own life for the reappearance of his friend. Dionysius consented, and Pythias returned just in time to save Damon from death. Struck by so noble an example of mutual affection, the tyrant pardoned Pythias, and desired to be admitted into their sacred fellowship.

DAMPER, a door or valve which, by sliding, rising and falling, turning on a hinge, or otherwise, diminishes the aperture of a chimney or air-flue; this lessens the quantity of air that can pass through a furnace or other fire, and thus 'damps' or checks the combustion.—The D. of a pianoforte is that part of the mechanism which, after a key is struck, and the finger is lifted up from the key, immediately checks or stops the vibration of the string. It consists of a second hammer, which, on the rising of the key, strikes the string and remains upon it, instead of bounding off as the sounding-hammer does. Perfect damping is always desirable, but seldom obtained, especially in upright pianofortes. In respect of damping, the pianofortes of the German makers are superior to the English. The more perfect the damping is, the more distinctly and clearly the passages and harmony are heard, while the instrument gains in purity of tone, when there is none of that confusion of sounds which arises from imperfect damping.

DAMPER is also the name given in Australia to a simple kind of unleavened bread formed of wheat-flour. It is made while traveling in the bush, and baked among the ashes of a fire often kindled for the purpose.

DA'MPIER, WILLIAM, a celebrated English navigator, was born of a Somersetshire family in 1652. He early went to sea, where he was soon distinguished alike by his intelligence and enterprise. Along with a party of buccaneers, D. crossed the Isthmus of Darien in 1679, and embarking on the Pacific in canoes and similar small craft, captured several Spanish vessels, in which they cruised along the coast of Spanish America, waging war with the Spanish subjects. In 1684, D. engaged in another buccaneering expedition, in which he coasted along the shores of Chili, Peru, and Mexico, sailing thence to the East Indies, touching at Australia, and after some time returning to England, where in 1691 he published an interesting account of the expedition, entitled *A Voyage Round the World*. He was afterwards deputed by government to conduct a voyage of discovery to the South Seas, in which he explored the west and north-west coasts of Australia, also the coasts of New Guinea, New Britain, and New Ireland, giving his name to the Dampier Archipelago and Strait (q. v.). The events of the latter part of D.'s life are not well known. Besides the one already mentioned, the following are his principal works: *Voyages to the Bay of Campeachy* (Lond. 1729); *A Treatise on Winds and Tides*; and a *Vindication of his Voyage to the South Sea in the Ship St. George* (1707).

DAMPIER ARCHIPELAGO AND STRAIT take their names from the famous navigator and buccaneer. The *strait*, which is 35 miles wide, separates the island of Waygiau from the north-west extremity of Papua or New Guinea, lying almost immediately under the equator, and about long. 131° E., so as to be, as nearly as possible, the antipodes of the mouth of the Amazon. The *archipelago*, again, is off the north-west coast of Australia, about lat. 21° S., and long. 117° E. The principal islands of the cluster are Enderby, Lewis, Rosemary, Legendre, and Depuch.

DAMPING OFF, in Horticulture, the death of plants from excess of moisture in the soil and atmosphere. Young seedlings in stoves and hotbeds are particularly liable to it. Although the cause is sufficiently obvious, prevention is not always easy; not only because some plants are very sensitive as to moisture, but also because the necessity of keeping sashes closed on account of temperature often stands in the way of the ventilation which would otherwise be desirable, and it is when a moist atmosphere stagnates around them, and the temperature is not very low, that plants are most liable to damp off.

DA'MSON, a rather small oval-fruited variety of the common plum, much esteemed for preserving, and not wholly unfit for dessert. The tree grows to a considerable height, but has a bushy, sloe-like appearance. It is extremely fruitful. There are many sub-varieties, with fruit of different colors, dark purple, bluish, black, yellow, &c. Damsons are produced in great quantities in some parts of England. D. pies, and *D. cheese*—made somewhat in the manner of fig-cake—are well known English luxuries. The name is a corruption of *Damascene*, from Damascus.—The MOUNTAIN D. or BITTER D. of the West Indies is the Simaruba (q. v.).

DAMUGGO', a large and populous town of Upper Guinea, Africa, situated on the left bank of the Niger, in lat. 7° N., long. 7° 50' E. The houses, built of mud, and supported by wooden props, are circular in shape. The town is dirty, and has a miserable appearance. The population, the number of which has not been ascertained with any degree of accuracy, support themselves by trade and the cultivation of the soil.

DA'NA, RICHARD HENRY, an American poet and novelist, was born in 1787 at Cambridge, Massachusetts. After leaving Harvard College, at which he had remained three years, he adopted law as a profession, but eventually renounced it, and applied himself to literature. In 1817, he became a contributor to the *North American Review*, his connection with this periodical continuing for three years, during a portion of which time he assisted in its editorship. The *Idle Man*, which contains many of his best prose efforts, was commenced in 1821, but proving a failure in a commercial point of view, was soon discontinued. Having at an earlier date published the *Dying Raven*, a poem of great merit, he came forward, in 1827, with the *Buccaneer*, and other poems, and in 1839 he delivered a series of lectures on Shakspeare. He died in Jan. 1879.—RICHARD H. DANA, a son of D., is well known as the author of *Two Years before the Mast* (enlarged ed. 1869). *To Cuba and Back* appeared in 1859. D. was also a distinguished authority on maritime law. He was nominated in 1876 to be ambassador in England, but the appointment was not sanctioned by the Senate. He died 6th Jan. 1882.

DA'NAE, the daughter of Acrisius, king of Argos, and Ocaleia. An oracle had announced that she would one day give birth to a son, who should kill his grandfather. Acrisius, of course, felt extremely uncomfortable after this declaration, and took every precaution to keep D. a virgin. He shut her up in a dungeon, where, nevertheless, she was visited by Zeus in a shower of gold, and became, in consequence, the mother of Perseus. Acrisius put both the mother and child into a chest and exposed them on the sea. The chest, however, drifted ashore on the island of Scriphos, and D. and her child were saved. D. remained in the island until Perseus had grown up and become a hero famous for his exploits. She afterwards accompanied him to Argos. On his arrival, Acrisius fled, but was subsequently slain accidentally by Perseus at Larissa.

DA'NAUS, a mythical personage, the son of Belus and Anchinoë, brother of Ægyptus, and originally ruler of Libya. Thinking his life in danger from the machinations of his brother, he fled to Argos, accompanied by his fifty daughters, known as the DANAIDES, where he was chosen king, after the banishment of Gelanor, the last of the Inachidæ. The fifty sons of Ægyptus followed him, and under the pretence of friendship, sought the hand of his daughters in marriage. D. consented, but on the bridal-night he gave his daughters each a dagger, and urged them to murder their bridegrooms in revenge for the treatment he had received from Ægyptus. All did so, except one, Hypermnestra, who allowed her betrothed, Lynceus, to escape. D., as may naturally be supposed, found great difficulty in obtaining new husbands for his daughters; and in order to get them off his hands, instituted games, where they were given as rewards to the victors although they could scarcely have been considered very tempting prizes. As a punishment for their crime, they were compelled, in the under-world, to pour water forever into a vessel full of holes. So runs the myth; but Strabo mentions an old tradition, which declares D. and his fifty daughters to have provided Argos with water, which is probably the origin of the scene in Hades. Greek art, of course, represents the Danaides in conformity with the popular myth. The tomb of D., in the Agora of Argos, was shown as late as the time of Pausanias.

DA'NBY, FRANCIS, A.R.A., a painter, born about six miles from Wexford, in Ireland, 16th November 1793. He was educated in the school of the Society of Arts, Dublin, and soon gave indications of superior artistic talent. His first attempts were sent to the Dublin Exhibition. After 1820, he took up his residence at Bristol, whence he sent to the Royal Academy, London, his 'Disappointed Love' (1821), 'Warriors of the Olden Time listening to the Song of their Minstrel' (1823), and 'Sunset at Sea after a Storm' (1824). In 1825, D. produced 'The Delivery of Israel out of Egypt;' in 1826, 'Christ Walking on the Sea;' in 1827, 'The Embarkation of Cleopatra on the Cyndus;' and in 1828—1829, 'An Attempt to Illustrate the Opening of the Seventh Seal,' 'The Passage of the Red Sea,' and 'The Deluge.' Circumstances now induced him to visit the continent, where he resided till 1841, during which interval he executed very few paintings.

On his return, he took up his abode at Exmouth, where he died in 1861. Among his later works, may be mentioned, 'A Morning at Rhodes' (1841), 'The Enchanted Island' (1841), 'The Contest of the Lyre and Pipe in the Valley of Tempe' (1842), 'The Tomb of Christ after the Resurrection,' 'Fiensford Lake (Norway)—a Sudden Storm passing off,' 'Caius Marius among the Ruins of Carthage' (1848), and 'The Departure of Ulysses from Ithaca' (1854).

DANCE OF DEATH (Lat. *Chorea Machabæorum*, Fr. *La Danse Macabre*), a name given to a certain class of allegorical representations, illustrative of the universal power of Death, and dating from the 14th century. When the introduction of Christianity first banished the ancient Germanic conception of a future state, a new description of death-mythology arose, partly out of biblical sources, partly out of the popular character itself, wherein the Last Enemy was represented under simple and majestic images, such as that of a husbandman watering the ground with blood, ploughing it with swords, rooting out weeds, plucking up flowers, or felling trees, sowing it with corpses; or of a monarch assembling his armies, making war, taking prisoners, inviting his subjects to a festival, or citing them to judgment. But with a gradual change in national manners came a change in the mode of treating the subject, and it was associated with everyday images, such as the confessional, chess-playing, and above all, with the adjuncts of a festival—viz., music and dancing. This tendency to familiarize the theme increased during the confusion and turmoil of the 14th c., when the national mind alternated between fits of devotion and license, or blent both elements in satire and humor. Such a mood as this naturally occupied itself with personifying Death, and adopted by preference the most startling and grotesque images it could find—that of a musician playing to dancing-men, or a dancer leading them on; and as the dance and the drama were then intimately connected, and employed on religious occasions, this particular idea soon assumed a dramatic form.

This drama was most simply constructed, consisting of short dialogues between Death and four-and-twenty or more followers, and was undoubtedly enacted in or near churches by religious orders in Germany during the 14th c., and at a rather later period in France. It would appear that the seven brothers, whose martyrdom is recorded in the 7th chapter of the 2d Book of *Maccabees*, either played an important part in the drama, or the first representation, which took place at Paris, in the Cloister '*aux Innocents*,' fell upon their festival, and hence the origin of the ancient name, Chorea Machabæorum, or La Danse Macabre. As early as 1400, the dramatic poem was imitated in Spain, and appears there in 79 strophes of 8 lines each (*La Dança General de los Muertos*), but it did not spread; while the French, having a love for pictorial representation, very early affixed an illustration to each strophe, and in 1425 painted the whole series on the churchyard-wall of the Cloister of the Innocents, where the Dance of Death was habitually enacted.

We find the subject treated in painting, sculpture, and tapestry, in the churches of Anjou, Amiens, Angers, Rouen, to say nothing of the numerous wood-cuts and accompanying letter-press which succeeded the invention of printing. From Paris, both poem and pictures were transplanted to London (1430), Salisbury (about 1460), Wortley Hall in Gloucestershire, Hexham, &c.

But nowhere was the subject so variously and strikingly treated as in Germany. A picture in one of the chapels of the Marienkirche, at Lübeck, still, in spite of repeated re-paintings, bearing the unmistakable impress of the 14th c., exhibits the very simplest form of the drama, and has some genuine Low-German verses attached to it. Here we see 24 figures, partly clerical, partly lay, arranged in a descending scale, from the pope himself down to a little child, and between each of them a dancing-figure of Death, not in the form of a skeleton, but a shrivelled corpse, the whole being linked in one chain, and dancing to the music of another Death. This representation is almost the same as a very ancient one at La Chaise-Dieu, in Auvergne, and points to the identity of the original dramatic spectacle in both countries.

The celebrated Dance of Death on the cloister walls of the Klin-

genthal, a convent in Basel, though painted probably not later than 1312, exhibited a departure from the simplest form—the number of persons exceeding the original 24, and the chain being broken up into separate couples. But both alike are only to be regarded as scenes from a drama, and cannot, therefore, be justly compared with a contemporary Italian painting, the 'Triumph of Death,' by Andrea Orcagna. And the acted drama enduring till the 15th c., we find that while there were varieties in the paintings, the poem, which was the most important feature, remained almost unchanged.

About the middle of the 15th c., however, the drama being altogether laid aside, the pictures became the main point of interest, the verses merely subsidiary. Accordingly, we find from this time the same pictures repeated in different places, with different verses, or no verses at all, till at length both verses and pictures entirely change their original character. The Dance of Death being transferred from the quiet convent walls into public places, gave a new impulse to popular art. Duke George of Saxony had, in 1534, the front of his Dresden castle ornamented with a life-size bas-relief of the subject, and other representations are to be found at Strasburg and Bern. There was a Dance of Death painted round the cloister of old St. Paul's in London, in the reign of Henry VI.; and there is a sculptured one at Rouen, in the cemetery of St. Malcou. But Holbein has the credit of availing himself most effectively of the original design, and giving it a new and more artistic character. Departing from the idea of a dance, he illustrated the subject by 53 distinct sketches for engravings, which he called 'Imagines Mortis.' The originals of these are at St. Petersburg, and impressions of them have been frequently repeated under different names.

We may cite as authorities on this subject, Peignot's *Recherches sur les Danses des Morts* (Dijon and Paris, 1826); Massman's *Baseler Todtentänze* (Stuttgart, 1847), and Douce's *The Dance of Death* (Lond. 1833).

Dancette.

DANCE'TTE, one of the lines of partition in Heraldry, which differs from Indented (q. v.) only in the greater size of the notches. The indentations where the division is *per fess* dancette, never exceed three in number.

DANCING may be defined in a general way as the expression of inward feelings by means of rhythmical movements of the body, especially of the lower limbs, usually accompanied by music. Dancing may almost be said to be as old as the world, and prevails in rude as well as in civilized nations. Children, and also the lower animals, dance and gambol as by instinct.

Our early records, sacred and profane, make mention of dancing, and in most of the ancient nations it was a constituent part of their religious rites and ceremonies. They danced before their altars and round the statues of their gods. The Greek chorus, 'in the oldest times, consisted of the whole population of the city, who met in the public place (*choros*, the market-place), to offer up thanksgivings to their country's god, by singing hymns and performing corresponding dances.' The Jewish records make abundant mention of dancing. Moses and Miriam danced to their song of triumph, when the Israelites passed through the Red Sea as on dry land; David danced before the Ark. It is certain that the primitive Christians danced at their religious meetings, though we have no mention of this in the New Testament. The Greeks made the art of dancing into a system expressive of all the different passions, the dance of the Eumenides, or Furies, especially, creating such terror, that the spectators seemed to see these dreaded deities about to execute Heaven's vengeance on earth. The most eminent Greek sculptors did not disdain to study the attitudes of the public dancers for their art of imitating the passions. In Homer, we read of dancing and music at entertainments. Aristotle ranks dancing with poetry, and says, in his *Poetics*, that there are dancers who, by rhythm applied to gesture, express manners, passions, and actions. In Pindar, Apollo is called the dancer; and Jupiter himself, in a Greek line, is represented as in the act of dancing. The Spartans had a law obliging parents to exercise their children in dancing from the age of five. This was done in the public place, to train them for the armed-dance. They were led by grown men, and all sang hymns and songs as they danced. The young men danced the Pyrrhic dance, in four parts, expressive of overtaking an enemy and of a mock-fight.

Dancing, as an entertainment in private society, was performed in ancient times mostly by professional dancers, and not by the company themselves. Among the sedate Romans, in fact, it was considered disgraceful for a free citizen to dance, except in connection with religion. Having professional dancers at entertainments is still the practice among Eastern nations. In Egypt there are dancing and singing girls, called Almé, who improvise verses as in Italy. They are highly educated, and no festival takes place without them. They are placed in a rostrum, and sing during the repast; then descend, and form dances that have no resemblance to ours. All over India there are Nautch girls or Bayaderes (q. v.), who dance at festivals and solemnities.

It is among savage nations that the passion for dancing is most strongly manifested. Their dances are mostly associated with religion and war; and the performers work themselves into a state of frantic excitement—a kind of mechanical intoxication. As civilization advances, dancing—amateur dancing, at least—assumes a more and more subdued character. As a social amusement and a healthful exercise, dancing has much to recommend it; the chief drawbacks are the ill-ventilated and overheated rooms in which it is generally performed. By many, it is unfavorably regarded in a moral point of view; but this seems a relic of that outburst of puritanism that characterized the 17th c., and which saw sin in every joyous excitement. Dancing is doubtless liable to abuse, but not more so than most other forms of social intercourse. Connected with the subject of dancing, see ACROBATS, BALLET, PANTOMIME, COUNTRY-DANCE, QUADRILLE, POLKA, &c.

DANCING MA'NIA, a form of epidemic disorder allied to hysteria (q. v.), and evidently the result of imitative emotions acting upon susceptible subjects, under the influence of a craving for sympathy or notoriety. There is little doubt that imposture entered to a considerable extent into all the epidemic forms of the dancing mania, which indeed were usually attended and followed by consequences that showed but too clearly the presence of impure motives; but there is also evidence that in many cases the convulsive movements were really beyond the control of the will, whatever may have been the original character of the motives that prompted them. Epidemics of this sort were common in Germany during the middle ages, and are formally described as early as the 14th c.; in Italy, a somewhat similar disease was ascribed to the bite of a spider called the Tarantula (see TARANTISM); and similar convulsive affections have been witnessed in Abyssinia, India, and even in comparatively modern times and in the most civilized countries in Europe, under the influence of strong popular excitement, especially connected with religious demonstrations. But the true dancing mania of the middle ages had its theater chiefly in the crowded cities of Germany.

In July 1374, there appeared at Aix-la-Chapelle assemblies of men and women, who, excited by the wild and frantic, partly heathenish, celebration of the festival of St. John, began to dance on the streets, screaming and foaming like persons possessed. The attacks of this mania were various in form, according to mental, local, or religious conditions. The dancers, losing all control over their movements, continued dancing in wild delirium, till they fell in extreme exhaustion, and groaned as in the agonies of death; some dashed out their brains against walls. When dancing, they were insensible to external impressions, but haunted by visions, such as of being immersed in a sea of blood, which obliged them to leap so high, or of seeing the heavens open, and the Saviour enthroned with the Virgin Mary. The frenzy spread over many of the towns of the Low Countries. Troops of dancers, inflamed by intoxicating music, and followed by crowds, who caught the mental infection, went from place to place, taking possession of the religious houses, and pouring forth imprecations against the priests. The mania spread to Cologne, Metz, and Strasbourg, giving rise to many disorders, impostures, and profligacy. These countries were generally in a miserable condition; and arbitrary rule, corruption of morals, insecurity of property, and low priestcraft, prepared the wretched people, debilitated by disease and bad food, to seek relief in the intoxication of an artificial delirium. Exorcism had been found an efficacious remedy at the commencement of the outbreak; and in the beginning of the 16th c., Paracelsus, that great reformer of medicine, applied immersion in cold water with great success. At the beginning of the 17th c., the St. Vitus's Dance, as the affection was called (see CHOREA), was already on the decline; and we now hear of it only in single cases as a sort of nervous affection. A detailed account of the phenomenon is given in Hecker's *Epidemics of the Middle Ages*. See CONVULSIONARIES.

Dandelion:
a, leaves, scape, and head of flowers; *b*, head of ripe fruit with pappus.

DANDELI'ON (*Leontodon taraxacum*, or *Taraxacum officinale*), a plant of the natural order *Compositæ*

sub-order *Cichoraceæ*, common throughout Britain and the whole of Europe, in pastures and by way-sides, and now also so perfectly naturalized in many parts of North America, as to be there one of the most familiar spring-flowers. The names D. and Leontodon (Fr. and Gr. lion's-tooth) both have reference to the form of the leaves. The whole plant abounds in a milky juice, containing a peculiar crystalline principle called *Taraxacin;* has a bitter taste; and is tonic, deobstruent, and diuretic. D. root is employed in medicine, in the form of infusion, decoction, and extract, chiefly in diseases of the liver and chronic affections of the digestive organs. It contains resin, inulin, sugar, &c. When roasted and ground, it is also sometimes used as a substitute for coffee: *D. coffee*, however, is usually a mixture of ordinary coffee and the powder or extract of D. root; and *D. chocolate* is composed of one part of common chocolate and four parts of the powder of D. root. The young leaves, when blanched, are a good salad, resembling lettuce or endive.

DA'NDOLO, a famous Venetian family, which has given four doges to the republic. The most illustrious of its members was Enrico D., born about 1110 or 1115 A.D. Eminent in learning, eloquence, and knowledge of affairs, he ascended from one step to another, until, in 1173, he was sent as ambassador to Constantinople, and in 1192 was elected doge. In this latter capacity, he extended the bounds of the republic in Istria and Dalmatia, defeated the Pisans, and (in 1201) marched at the head of the Crusaders. He subdued Trieste and Zara, the coasts of Albania, the Ionian Islands, and Constantinople (17th July 1203). When the Emperor Alexius, who had been raised to the throne by the exertions of D., was murdered by his own subjects, D. laid siege to Constantinople, and took it by storm, 13th April 1204. He then established there the empire of the Latins, and caused Count Baldwin of Flanders to be chosen emperor. By the treaty of partition which he concluded with the other leaders of the crusade, Venice obtained possession of some of the islands of the Ionian Sea, and of the Archipelago, several harbors and tracts of land on the Hellespont, in Phrygia, the Morea, and Epirus, an entire quarter of Constantinople, and also, by purchase, the island of Candia. Soon after this, D. died (June 1, 1205), in Constantinople, and was buried in the Church of St. Sophia. His monument was destroyed by the Turks at the taking of Constantinople in 1453.

DA'NEBROG, ORDER OF, the second of the Danish orders, was instituted by King Waldemar in 1219. The word *brog* in old Danish signifies 'cloth,' and thus D. is equivalent to the cloth or banner of the Danes. The order is a sort of glorification of the old national flag of Denmark, which long floated, like the oriflamme of France, at the head of the army. It is meant to recompense services rendered to the state, whether civil or military, and irrespective of age or rank. The decoration of the order consists in a cross of gold *pattée*, enamelled with white, and suspended by a white ribbon, embroidered with red.

DA'NEGELT, or DANEGOLD, a tribute, first of 1*s*., and afterwards of 2*s*., levied on every hide of land by the Anglo-Saxons, for the purpose of meeting the outlay requisite for defending the country against the Danes. The tax was continued after the Conquest, as one of the rights of the crown, till the time of Stephen.

DA'NE-LAGE, or DANE-LAW. After the overthrow of the Danes under Guthrun at Ethandune by King Alfred (878 A.D.), a treaty was concluded between the two, in virtue of which the entire kingdom of Wessex, from Somerset to Kent, was evacuated by the Danes, who were, however, allowed to retain the greater part of the east coast of England, including the whole of Northumbria. The district was called Danelagh or Dane-law (which name it retained down to the Norman Conquest), because the inhabitants were ruled by Danish and not by English law.

DA'NIEL, a Hebrew prophet, who flourished about 600 B.C. He was a contemporary of Ezekiel, and was carried captive to Babylon in the fourth year of Jehoiakim. He was one of the youths selected to be brought up for future service at the court of the conqueror, and received instruction in the learning of the Chaldæans. His skill in the interpretation of dreams procured for him the royal favor. He rose to be governor of the province of Babylon under Nebuchadnezzar; and under Darius, the Mede, to be first president of the whole Medo-Persian empire, a dignity only inferior to that of Darius himself. The time and the place of his death are alike unknown. He was alive, however, in the first year of the reign of Cyrus, but did not return to Judæa with his countrymen on their release from captivity. Epiphanius and others affirm that he died at Babylon; but the common tradition is, that he expired at Susa or Shusan in Persia, when upwards of ninety years of age; and at the present day, a tomb bearing his name is the only standing building among the ruins of that ancient city. D. was the only one of the Hebrew prophets who enjoyed a high degree of worldly prosperity. Ezekiel mentions him as a model of wisdom and piety.—The Book of D. consists partly of historical notices of D., and partly of visions and prophecies, some of which are written in Chaldee. The genuineness of the book, in its present form, has been much disputed in recent times.

DANIEL, SAMUEL, an English poet, was the son of a music-master, and was born in 1562, near Taunton, in Somersetshire; entered Magdalen Hall, Oxford, in 1579, but quitted the university without taking a degree. For some time he acted as a tutor to Anne Clifford, daughter of the Earl of Cumberland. In 1603, he was appointed master of the queen's revels, and inspector of the plays to be represented by the juvenile performers. Subsequently, he held other offices about the royal household. Towards the close of his life, he retired to a farm which he possessed at Beckington, in his native county, where he died, October 14, 1619. D. is an elegant, if not a great poet. His writings are pervaded by a moral thoughtfulness and purity of taste which are very remarkable, but lack that vital energy of movement and memorableness of expression which result from genuine inspiration. The 'well-languaged Daniel' is therefore not the most interesting of the Elizabethans, although his style is quite modern. His works include sonnets, epistles, masks, and dramas; but his chief production is a poem in eight books, entitled a *History of the Civil Wars between York and Lancaster*.

DA'NIELL, JOHN FREDERICK, D.C.L., a distinguished English savant, was born in London, March 12, 1790. He was a pupil of Professor Brande, along with whom he made several scientific tours; was elected a fellow of the Royal Society in 1814, and in 1816 started, in connection with Professor Brande, the *Quarterly Journal of Science and Art*. From this period, D. devoted almost the whole of his time to the subjects of chemistry and meteorology.

In 1823, he published his *Meteorological Essays*, which is still the standard-work on meteorology; and in 1824 the Horticultural Society awarded him their silver medal for his *Essay on Artificial Climate*. In 1831, he was appointed Professor of Chemistry in King's College, London; and in 1839 published his *Introduction to Chemical Philosophy*. In 1843, he received the degree of D.C.L. from the university of Oxford. He also enjoyed the great honor of being the only person who ever obtained all the three medals in the gift of the Royal Society. Besides his professorship in King's College, D. also held the post of Lecturer at Addiscombe, and of Examiner in Chemistry to the university of London. He died March 13, 1845. D.'s *Meteorological Essays* was the first attempt to account, in a truly philosophical manner, for the known phenomena of the atmosphere. Besides the works mentioned, D. wrote a large number of interesting and valuable papers for the Royal Society. For an account of his new hygrometer, see HYGROMETER.

DANISH LANGUAGE AND LITERATURE. The Danish language, which, with slight modifications, is common to the three Scandinavian kingdoms, is a branch of the ancient Gothic, and has been retained almost in its original form in Iceland. The oldest memorials of the Danish are codes of laws, as the *Skaanske Lov*, and the old and new *Sjællandske Lov*, promulgated by Valdemar the Great in 1162 and 1171; but these, no less than the writings of Harpestreng, canon of Roeskilde (1244), already show marked deviations from the Icelandic, in consequence of the intermixture of the Anglo-Saxon, English, and Norman elements, due to the Danish occupation of England, and the immigration of monks and artisans into Denmark from Britain. The influence of the English dialect was again modified towards the close of the 12th c. by the influx of Germans into the country. Saxo Grammaticus, the father of Danish history, who died in 1204, wrote, like almost all his ecclesiastical brethren at that day, in Latin, as did also his contemporary, the knight Svend Aagesen. The Danish *Kæmpeviser* are the richest poetical remains of the folk-lore of the middle ages in Europe, and consist—1. Of narratives and songs of giants, demigods, and other supernatural creatures of the Scandinavian mythology; 2. Of romantic songs and tales connected with these mythical beings; and, 3. Of historical verses, referring to a later period. The names of the writers are unknown, and these compositions seem rather to be the expression of the entire people, than the production of individual poets. Many have, from time immemorial, been associated with certain national melodies, which have secured them a permanent place in the hearts of the people, whose disposition leads them to dwell with fondness on the memory of by-gone times and events, and to seek in the glory of the past a compensation for the national humiliation and reverses of the present.

The first printed collection of the Kæmpeviser is due to the royal historiographer, Vedel, and appeared at Ribe, 1592; another edition (Copenh. 1695) by Peter Syv found its way to almost every peasant's cottage; but the most complete of any is probably that by Nyerup and Rabek, in 5 vols. (Copenh. 1810—1814). After the Reformation, the national literature was comparatively neglected, for the composition of poor theological treatises and

bald versions of the Psalms. Among the best of the writers in this department we may instance Christian Pedersen (born 1480), who, after having made a metrical version of the ancient national chronicles, devoted himself to the diffusion of the Lutheran faith, and made Danish translations of the New Testament, and the reformer, Hans Taussen (born 1494), who composed catechisms, and translated the Pentateuch into Danish. The Danish language acquired stability and new life by the translation of the whole Bible, which, by order of King Christian III., was effected in 1550 by Palladius and other professors of the university. The close of the 16th c. was memorable for the many admirable writers on history which it produced in Denmark. Among those who edited and annotated the ancient Danish and Icelandic historical chronicles we may mention Peder Claussen, A. S. Vedel, and Axil Hvitfeldt, whose respective works supply invaluable materials to the historical inquirer. These men were contemporaries of the great astronomer, Tycho Brahé, and, like him, experienced the caprices of court-favor. The 17th c. shows a large number of able writers, among whom were Longomontanus, the pupil of Tycho Brahé; the family of Bartholin, numbering seventeen in three generations, who were all known for the ability of their writings on medical, philosophical and mathematical subjects in Latin, German, and Danish; the family of the Pontoppidans, eleven in number, all of whom have left memorials of their proficiency in philology and history, and of their acquaintance with the theology and natural history of the times; Arreboe, the father of Danish poetry, who wrote on sacred subjects, and in his principal work, *Hexameron*, described in epic verse the events of the first six days of creation; Steno, the anatomist, and the lyrical poet, T. Kingo. A new era began with the genial and versatile Ludvig Holberg (born 1684), who wrote in Latin, French, German, and Danish, and has left very numerous works on history, biography, and topography, but whose fame among his countrymen will ever rest on his inimitable comedies, farces, and satirical compositions. His genius and his writings gave an impetus to the cultivation of the Danish language, which not all the studied neglect of the court-party, and their persistence in the use of German, could check. The 18th c. produced many good historical critics—as, for instance, Torfæus, Langebek, Schöning, and Suhm, Magnæus, the Icelandic scholar, Thorlacius, and Thorkelin, learned in ancient northern lore, and Rosenvinge, the jurist. Among the epic and dramatic poets of that age, Ewald stands foremost, whose national lyrics evince true poetic genius.

The close of the century was, however, unfavorable to mental development and freedom of thought; and the best writers, as in the case of Malte Brunn and the poet Heiberg, were either compelled to leave the country, or to abstain from giving expression to their opinions. Among the more recent writers, we may instance the poet Oehlenschläger—whose national tragedies and lyrical legends of Scandinavian mythology have rekindled all the long slumbering fire of Danish patriotism—Baggesen, Winther, Hauch, F. P. Müller, Heiberg, Hertz, H. C. Andersen, Rosenhoff, Holst, and Overskou. Ingemann, who stands first as a writer of historical novels, also wrote good lyrics, and his subjects were generally taken from the national history. Short tales or novellettes would seem, however, to be more congenial to the taste of the Danes, and most of their best writers of fiction have adopted this form—as, for instance, Blicher, Heiberg, Trane, Andersen, Winther, Carit Etlar, &c. The names of Oersted, Schouw, Forchhammer, Rask, Finn Magnussen, Worsaa, Grundtvig, Petersen, and Eschricht, sufficiently attest the stand that the physical sciences, philology and archæology, have attained in Denmark in the present day. Thorwaldsen, by the gift of his works to the nation, has created a taste and appreciation for sculpture and the arts generally among his countrymen, to which they were previously strangers, and has thus given a new direction to the mental culture of the Danes.

The Danish language is peculiarly soft, from the great number (ten) of distinct vowel-sounds which it contains, the absence of gutturals, and the softening of all the consonants. It may be said to bear the same relation to the ancient tongue, the *Norræna* or *Dönsk Tunga*, that Italian does to Latin, force and precise inflections having been sacrificed for melody and simplicity.

DANKALI', an independent state of Abyssinia, extending along the south-west border of the Red Sea, between lat. 13°—15° 30' N., a range of mountains running almost parallel to the coast, and about 50 miles distant from it, forming its boundary inland. D. is a sterile territory, being almost quite destitute of water. The heat is excessive, often reaching 110° F. The inhabitants are composed of various Arab tribes, and are indolent, treacherous, and cruel. They number about 70,000.

DA'NNECKER, Joh. Heinr. von, a German sculptor, was born at Waldenbuch, in the district of Stuttgart, 15th October 1758. His parents were in the humblest circumstances; but through the favor of the Duke of Würtemberg, he received a good education at the Military Academy at Ludwigsburg. His artistic talents were rapidly developed. In 1780, he obtained the prize for the best model of 'Milo of Croton destroyed by the Lion;' and in 1783 went to Paris, where he studied for two years under Pajou; after which, he proceeded to Rome, where he met with Goethe, Herder, and Canova, to the last of whom he was indebted for much valuable instruction in his profession. At Rome D. remained till 1790. Here he executed in marble his statues of 'Ceres' and 'Bacchus.' On his return to Germany, the Duke of Würtemberg appointed him Professor of Sculpture in the Academy at Stuttgart, in which city he resided til his death, 8th December 1841. D. was undoubtedly one of the best of modern sculptors.

His forte lay in expressing individual characteristics, in which respect he has not been surpassed. This gives a great value to his busts of distinguished persons such as Schiller, Lavater, Gluck, and the kings Frederick and William of Würtemberg. His perceptions of the beautiful and the delicate, especially in the female form, are also considered by his countrymen to be more exquisite and true than those of Canova himself. His earlier works are chiefly pagan in their subjects, while his later ones are Christian, and are pervaded by a pensive idealism. Of the former, besides those already mentioned, the principal are 'Sappho,' 'Love,' 'Psyche,' and 'Ariadne as the Bride of Bacchus riding on a Leopard (at Frankfurt);' of the latter, 'Christ,' 'John the Baptist,' and 'Faith.'

DA'NTÉ (properly, Durante) ALIGHIE'RI, one of the greatest poets of all time, and incomparably the greatest among the Italians, was born in Florence in 1265. The outward circumstances and fortunes of his life are involved for the most part in great uncertainty. His family was, by his own account, one of the most illustrious in the city. His father dying while D. was young, his education devolved upon his mother, Bella. In this duty, in which she displayed great fidelity and judgment, she seems to have been counselled and aided by the great statesman, scholar, and poet, Brunetto Latini. The elements of knowledge D. probably acquired in Florence; in riper years, he studied philosophy at Bologna and Padua. After his banishment, he pursued theology for a time at Paris, and, if Boccaccio were to be believed, even visited England. His studies, however, did not prevent him from discharging the public duties of a citizen. He fought in the successful battle with the Aretines at Campaldino in 1289, and was present at the taking of the fortress of Caprona, 1290. What civil offices he first held, we do not know, but it is certain that he was sent on several embassies, and at last, in 1300, rose to the highest dignity of the city, being chosen one of the Priori for two months an office which was the source of his subsequent unhappy fortunes. Florence, on the whole, belonged to the party of Guelphs (q. v.), but was divided into the two factions of the Neri and Bianchi (the *blacks* and *whites*). The Neri were the unconditional adherents of the pope, and this of course gave to the other faction a more Ghibelline leaning. See Guelphs and Ghibellines. A tumult in the city, occasioned by the heads of the ultra-Guelphic or *black* party, caused their temporary expulsion from Florence. They hurried to Rome, to lay their complaints before his Holiness. D., who belonged to the Bianchi, was sent by his party to Rome, to counteract their machinations; but Boniface VIII., in concert with the Neri, got Charles of Valois, brother of Philip IV. of France, to come to Florence and restore peace under the title of peacemaker. This explains the deadly enmity of D. to Boniface. The peace established by Charles of Valois consisted in recalling the banished leaders of the Neri, in giving up the houses and property of the Bianchi to be plundered, and banishing many of them, and among others Dante. D. never entered his native city again, and his whole subsequent life was unsettled, spent in various places, and under various protectors, at Arezzo, Verona, Padua, &c.

In 1304, the Bianchi made a final attempt to return to Florence by force of arms, which failed; and it was probably on this occasion that D. went to Paris. The march of Henry VII. to Rome in 1310 recalled him to Italy, and he endeavored, by addressing ardent letters to the Italian princes, to promote the cause of the empire, which had now become his own. It was probably with this view and at this time, that his work *De Monarchia* was written. The unsuccessful siege of Florence, and the death of the emperor, which followed in 1313, annihilated the last hopes of D., and he spent the closing years of his life at Ravenna, under the protection of Guido Novello da Polenta. He went on a mission for this prince to Venice, returned sick, and died on the 14th September 1321.

As not unfrequently happens with distinguished men, an accidental circumstance in D.'s early youth had made an indelible impression on the soul of the poet, and, as he himself expresses it, awaked in him a 'new life.' At a family festivity, he had seen Beatrice Portinaci, then eight years old, the daughter of a rich citizen, and the love that sprang up in the heart of the nine years' old boy became the fountain of the poetical inspiration of his life. How pure, chaste, and tender this love was, is testified by the *Vita Nuova*, his first work, which appeared about 1300. It is a

collection of poems or canzoni, bearing upon this youthful love, and along with each piece is given a history of its origin and a minute analysis. The best edition of this collection is that prepared by the Marquis Trivulzio (Mil. 1827). Beatrice married a nobleman, Simone de Bardi, and died young about 1290. D. himself afterwards married a lady named Gemma, of the powerful House of Donati.

His immortal work, the *Divina Commedia*, depicts a vision, in which the poet is conducted first by Virgil, the representative of human reason, through hell and purgatory; and then by Beatrice, the representative of revelation; and finally by St. Bernard, through the several heavens, where he beholds the triune God. The name *Commedia* was given to the work by the poet himself—because, beginning with the horrible, it ends cheerfully; and because, in respect of style, it is lowly, being written in the vulgar tongue. The epithet *Divina* was added by the admiration of after-times. Hell is represented in the poem as a funnel-shaped hollow, formed of gradually contracting circles, the lowest and narrowest of which is at the earth's center. Purgatory is a mountain rising solitary from the ocean on that side of the earth that is opposite to us; it is divided into terraces, and its top is the terrestrial paradise, the first abode of man. From this, the poet ascends through the seven planetary heavens, the heaven of the fixed stars, and the 'primum mobile,' to the empyrean, or fixed seat of God. In all parts of the regions thus traversed, there arise conversations with noted personages, for the most part recently deceased. At one time, the reader is filled with the deepest sorrow, at another, with horror and aversion; or the deepest questions of the then philosophy and theology are discussed and solved; and the social and moral condition of Italy, with the corruptions of church and state, are depicted with a noble indignation.

Fifty-two years after the poet's death, the republic of Florence, at the instigation of Boccaccio, set apart an annual sum for public lectures to explain the *Divine Comedy* to the people in one of the churches, and Boccaccio himself was appointed first lecturer. The example was imitated in several other places of Italy. The works of these men are among the earliest commentaries on D. that we possess. The number of editions of the work amounts by this time to about 300. Only a few, in addition to the commentaries above mentioned, deserve notice. They are: that printed at Fuligno in 1472—the earliest of all; the Nidobeatine edition at Milan (1478); the first Aldine edition (1502); the first Cruscan edition (1695); that of Volpi (1727); of Venturi (1732); of Lombardi (1791), and with additions and illustrations in 1815, 1821, and 1822; of Dionisi (1795); of Ugo Foscolo (Lond. 1842—1843). A reprint of the Fuligno edition above mentioned, together with those printed at Jesi (1472), at Mantua (1472), and at Naples by Francisco del Tuppo (about 1478), appeared at London, in 1858, under the superintendence of Sir Antonio Panizzi, and at the expense of Lord Vernon.

The *Divina Commedia* has been translated into almost all European languages. Two translations of the whole into Latin have been printed, one by Carlo d'Aquino (1728), and lately by Piazza (1848). In French, there are a number of translations both in prose and verse. The earliest, by Grangier, in 1596, is still the nearest to the original in form, but none is good. The German translations are numerous, and such as no other modern language can equal in faithfulness. Kannegiesser has translated the whole in the measure and rhyme of the original (4th edition, Leip. 1843); King John of Saxony's translation is said by some to be the best. The chief English translations are Boyd's (1785) and Cary's (1814), in blank verse (see 'Chandos Classics' London, Warne and Co.); Wright's (1833), in triple rhymes; Cayley's, in the original ternary rhyme (the *Inferno*, 1851, the *Purgatory*, 1853, the *Paradiso* in 1854, with notes in 1855); Dr. John Carlyle's the *Inferno*, in prose, with commentary (1849); Fred. Pollock's, in blank verse (1854); H. W. Longfellow's (1867), in blank verse, with D.'s ternary arrangement of lines. D. wrote other works.

DANTON, GEORGES-JACQUES, was born at Arcis-sur-Aube, 28th October 1759. At the outbreak of the French Revolution, he was practising as an advocate in Paris, but did not enjoy much reputation, on account of his dissolute habits. The fierce half-savage nature of the man, however, immediately found a fitting sphere for its action in the chaos in which France then fell. Mirabeau quickly detected his genius, and hastened to attach D. to himself. President of the district of the Cordeliers, D. ruled it at his will. Along with Marat, and Camille Desmoulins, he instituted the Cordeliers' Club, an exaggerated copy of that of the Jacobins. It soon became the rallying-point of all the hotter revolutionists. There the tall brawny man, with harsh and daring countenance, terrible black brows, and a voice of enormous power, thundered against the aristocrats, till the passions of the populace rose into ungovernable fury. It was not, however, till after the flight of Louis that the political rôle of D. commenced. On the 17th July 1791, he and others assembled the people of Paris in the Champ-de-Mars, and goaded them on by furious declamation to sign a petition for the deposition of the king. Some time after, he became *procureur-substitut* for the city of Paris. The court, which found that it could not frighten D., now attempted to bribe him. It is not certain that he proved venal, but the evidence undoubtedly leaves a strong suspicion of his venality on the mind. Be that as it may, he soon broke off his secret intercourse with the royalist agents, and became more the implacable enemy of the monarchy than before. It was D. who excited to action the wild sanguinary rabble that, on the 10th of August 1792, stormed the Tuileries, and butchered the faithful Swiss. The reward of his fatal eloquence was the office of Minister of Justice, and here the gigantic personality of the man seemed to overshadow all the surrounding figures. He stood forth as the incarnate spirit of the Revolution, manifesting alike its heroic audacity in the presence of danger from without, and its maniacal terror in the presence of danger from within. The advance of the Prussians seemed for a moment to inspire France with a panic. On the 2d of September, D. mounted the tribune, and addressed the Legislative Assembly in a speech of power, probably the most effective delivered during the whole of the Revolution. It closed with these words regarding the enemies of France: 'Pour les vaincre, pour les atterrer, que faut-il? De l'audace, encore de l'audace et toujours de l'audace.' France quivered to its core with enthusiasm. 'In a few weeks, fourteen republican armies stood on the field of battle, and repelled with unexampled bravery the aggressions of the allied forces.' But unhappily that 'audacity,' by which alone D. thought it possible for France to save herself, required for its perfection the immolation of the imprisoned royalists. On the very evening when D. spoke, the frightful September Massacres began. D. publicly thanked the assassins, 'not as the Minister of Justice, but as the Minister of the Revolution.' Elected by the city of Paris one of its deputies to the National Convention, he resigned his judicial function, and zealously hurried on the trial of the king. As a proof of his ferocious decision of character when pressed by difficulties, it is recorded that one of his friends having pointed out that the Convention could not *legally* try the king, 'You are right,' instantly replied Danton. 'So, we will not try him; *we will kill him!*' In the meantime, D. was sent on a mission to the army of the north, commanded by Dumourier, with whom he was soon on very close terms of intimacy—too much so, indeed, for the suspicious soul of his old friend Marat. The defection of Dumourier was the signal for Marat to give vent to his suspicions. It therefore became necessary for D. to throw himself again into the van of the revolutionary movement. On the 10th March 1793, he established the 'extraordinary criminal tribunal,' which was at liberty to make what arrests it pleased, and from whose deadly decisions there was no appeal. He also became president of the 'Committee of Public Safety.' D. now set himself to crush the Girondists, or moderate party, alleging, with singular candor, that 'in a revolution the authority ought to belong to the greatest scoundrels.' In this he was supported by Robespierre, now gliding into power swiftly and silently like a serpent. After he had effected his purpose, however, a species of remorse seems to have seized him. He objected to the institution of the guillotine. This trait of moderation lost him the favor of the Jacobins or Mountain party, whose murderous instincts led them to select Robespierre as a chief, on the permanence of whose cruelty more reliance might be placed. Several other indications of returning humanity lessened his influence still more, and at the close of 1793, D. felt that a crisis was approaching. A fruitless attempt was made to reconcile Robespierre and him. They had an interview, but parted on worse terms than ever. It was now a struggle for life between them; but D., sick of the Revolution, and conscious that it was rapidly becoming a *sham* (a thing which D., with all his faults, could not abide), gave himself up to a sort of reckless apathy, which enabled the sleepless Robespierre to ruin him. His friends endeavored to rouse him. 'I would rather be guillotined than guillotine,' he answered. Blinded by the consciousness of his own inherent power, he also declared that his enemies 'would not dare' to lift their finger against him. But men of the stamp of Robespierre—though essentially cowards, and incapable of facing danger with honest straightforwardness—have a certain furtive audacity that emboldens them to attack a greater than themselves, if circumstances are favorable. So Robespierre sprang at D., and so the great anarch perished. On the night of the 30th March 1794, he was arrested, and brought before that Revolutionary Tribunal which he himself had established, summarily condemned, and, along with Camille Desmoulins and others, was guillotined on the 5th of April. He predicted the fate of Robespierre, calling him 'an infamous poltroon,' and immediately added, 'I was the only person who could have saved him.' D. was an atheist—not a calm, thoughtful dispassionate disbeliever in the existence of God, but one who, by his own vices, and the general godlessness of the times in which he lived, had been robbed of the spirit and power of faith in the Unseen. When formally interrogated regarding

his name and dwelling, he replied: 'My dwelling-place will soon be annihilation, and my name will live in the Pantheon of history.'

DA'NUBE (Ger. *Donau*), the second of European rivers, inferior only to the Volga, has its origin in the Brege and Brigach, two mountain-streams rising in the eastern part of the Black Forest, in Baden, at an elevation of 2850 feet above sea-level, in lat. 48° 6′ N., and in long. 8° 9′ E. The total length of the D. is about 1750 miles; the area which it drains is estimated at 250,000 square miles, comprising countries widely varying in climate and productions. The average fall of the D. is 18 inches per mile. At Ulm, it attains a breadth of 108 feet, and before its junction with the Sereth the mean breadth is 6000 feet, and the depth, which at Ulm is 6 feet, and at Passau 16, is here on an average 20 feet. The D. is joined in its course by sixty navigable rivers, and falls into the Black Sea, pouring into it a volume of water nearly equal to that of all the other rivers that empty themselves there. From its source, it flows in a north-easterly direction through Würtemberg and Bavaria. Passing Ulm, at which point the river becomes navigable for vessels of 100 tons, it receives from the south the Lech and the Iser, with some unimportant streams from the north; flows rapidly past Ingolstadt, and onwards to Regensburg (Ratisbon); then suddenly altering its course, it proceeds in a south-easterly direction, passing Straubing and Passau, where it enters the Austrian dominions. With little variation of course, the D. flows eastward from Passau to Presburg, receiving from the south the Inn and the Ens, and from the north the March or Morava, through a tract of country rich in minerals, well peopled, and highly cultivated. Near Linz, and also in the picturesque neighborhood of Vienna, the waters of the D. frequently divide, and enclose large tracts of soil, forming islands, among which are the Great and Little Schütt, called also the 'Golden Gardens.' Hurrying past Presburg, the D. alters its course to south-east, and such is its velocity here, that barges can only navigate it downwards. Passing Pesth, and flowing directly south, it enters upon the Hungarian plain, a vast sandy and alluvial flat, in which it is continually forcing new channels and silting up old ones, sometimes sweeping away towns, or capriciously removing its waters to a distance of several miles from such as were formerly built upon its banks. Here it receives from the north the Waag and the Gran, while the Drave from the west adds considerably to its volume. After this accession, the river turns towards the east, and joined by the waters of the Theiss and Temes from the north, sweeps past Belgrade, forming the boundary between Servia and Hungary. Still flowing eastward, the D., leaving Orsova, passes the famous 'Iron Gate,' a broad plateau of rock 1400 yards wide, over which the water formerly rushed with an overpowering noise.

This rapid, which was followed by a series of whirlpools, eddies, and shallow falls, formed an effectual bar to the upward progress of vessels, no craft drawing more than 2½ feet of water being able to pass it. In 1847—1849, however, the obstruction formed by the 'Iron Gate' was to some extent removed by blasting, so that now vessels of eight, and even nine feet draught, can pass at certain seasons of the year, although the majority of vessels engaged on this part of the river draw no more than four feet of water. A few miles further on, it enters a plain, and proceeding uninterruptedly, forms the boundary between Walachia and Bulgaria. From the Carpathians it receives the Schyl and the Aluta, and from Mount Balkan the Morava. Increased by these rivers and by numberless streams, it progresses through a district fertile indeed, but badly cultivated and thinly peopled, occasionally broadening like a sea, as at Hirsova, and encircling many islands. After being joined by the Sereth and the Pruth from the north, and after dividing into several branches forming deltoid islands, it flows eastward into the Black Sea. The principal mouth is the Sulina, by which the greater number of ships enter. The D., which is the chief natural highway for European commerce, is, throughout the greater part of its course, surrounded by picturesque and impressive scenery—at one time flanked with lofty mountains, again having on each side, dense and far-extending forests. At the peace of Paris in 1856, the navigation of the Danube was declared free to all nations, and its management was intrusted to two commissions, one representing the European powers, another named by the states on the banks of the river. At the Berlin Congress of 1878, it was stipulated that no ships of war should navigate the D. below the Iron Gates. The Danube Steam Navigation Company, which has done much to increase the commerce, possesses upwards of 150 steamers and 600 tow-boats.

DANU'BIAN PRINCIPA'LITIES. See MOLDAVIA and WALACHIA.

DA'NZIG (Polish *Gdansk*), an important seaport of Prussia, and fortress of the first rank, in the province of Prussia, is situated on the left bank of the western branch of the Vistula, about 3½ miles from its mouth in the Baltic. D. is an ancient place, having been in existence at least as early as the 10th c., and its possession was long an object of ambition to the Danes, Swedes, Pomeranians, and Teutonic knights, the last of whom obtained, and held it for a considerable period. In 1454, it became a free city under Poland, and remained so until 1793, when it fell under the dominion of Prussia, in whose hands, except during the years 1807—1814, when it existed as a separate dukedom under Napoleonic rule, it has since continued. D. is surrounded by ramparts and wet ditches, and is otherwise strongly fortified, and the garrison possesses the means of laying the surrounding country under water on three sides.

The city is traversed by the Motlau and Radaune, tributaries of the Vistula, the former of which is deep enough to admit vessels of eight or nine feet draught up to the town. The principal port, however, is at Neufahrwasser, at the mouth of the Vistula, which river cannot be entered by large vessels on account of the sand-bars across it. Many of the streets of D. are narrow and crooked, but the principal street, intersecting it from east to west, abounds in fine specimens of antique architecture, and has altogether a most picturesque appearance. Among the most noteworthy buildings are the cathedral, a fine structure, commenced in 1343, but not finished until 1503, and possessed of a noble and widely celebrated picture of the 'Last Judgment' (the painter of which is unknown), the Church of St. Catharine, Trinity Church, the fine old Town-hall (which has lately been restored at a cost of 60,000 thalers), the Exchange, &c. D. was at one time a prominent member of the Hanseatic League, and is still one of the chief commercial cities of Northern Europe. To provide for its immense trade in grain, it has enormous granaries, capable of containing 500,000 quarters of corn, and built on an island forming one of the parts of the town where, in order to prevent fire, no person is permitted to live, nor lights allowed. In 1880, 105,034 tons (of 1000 kilos.) of wheat and other grain were exported, of which 39,939 tons went to Great Britain. The value of timber exported in 1879 was £573,755; and in 1880, £808,800; the largest quantity going to Great Britain. Besides grain and timber, there are some minor articles of export, as black beer, amber, spirits, &c. The annual value of the exports is about £3,000,000 or more; of the imports about twice as much. In 1880, 1894 vessels entered, and 1876 cleared the harbor. The inhabitants of D., of whom the majority are Protestants, numbered in 1880, 108,551.

DAOUDNU'GUR, a town in the province of Behar in India, stands on the right bank of the Sone. D. is about 90 miles to the east of Benares, being in lat. 25° 3′ N., and long. 84° 27′ E. It is a wretched-looking place, most of its thoroughfares being mere passages. It possesses, however, a considerable trade, manufacturing coarse fabrics both of wool and cotton. Pop. (1871) 10,058.

DAOU'RIA, a country of Asia, partly in the Russian government of Irkutsk, and partly belonging to the Chinese territory of Mantchuria. Its limits are not exactly defined. The Daourian mountains, offsets of the Yablonoi mountains, traverse it from north-east to south-west, and separate it from the region of Lake Baikal. The mountains are fertile in minerals.

DA'PHNÉ, a magnificent grove and sanctuary in ancient times, near Antioch (q. v.). The grove was finely laid out in walks of cypress and bay trees, and as the chief resort of all the dissolute persons in the city, became the scene of the greatest debauchery. In the center, surrounded by the luxuries of nature and art, glorious gardens, fountains, baths, colonnades, stood the temple of Apollo and Diana, which was invested with the privileges of an asylum, and became for centuries a place of heathen pilgrimage. The progress of Christianity gradually revived in the Antiochenes the purer instincts of virtue and decorum, and the grove was finally abandoned. Julian the Apostate, in his vain endeavor to resuscitate the lifeless corpse of paganism, visited D., and made the altars of the temple smoke once more with incense; but on his departure, they were again neglected, until one night the altars and the statues were discovered to be in flames. They were consumed to ashes; and so perished forever the gods of Daphne.

D. owed its origin to Seleucus Nicator. He planted the grove, built the temple, and gave the place a mythological history in connection with the river Peneus and the nymph Daphne, who was here turned into a laurel or bay tree, whence the grove of D. receives its name. Modern travelers are not agreed as to its site. Pococke and Richter decided in favor of *Beit-el-Maa*, about five miles from Antioch; while Forbiger and Kinneir consider Babylas the true position.

DAPHNE, a genus of plants of the natural order *Thymeleaceæ*, having a 4-cleft, funnel-shaped perianth, the throat of which is destitute of scales, eight stamens, and a one-seeded succulent fruit. All the species are shrubs or small trees, some having deciduous, and some having evergreen leaves, all of them possessing in all their parts a more or less considerable acridity, which in some is so great, that they are even caustic; and the berries are poisonous, whilst, however, the flowers of some are deliciously

fragrant. To this genus belongs the DAPHNE MEZEREON, well known both for the fragrance of its flowers and for its medicinal uses, naturalized in some places in England. The GAROU bush (*D. gnidium*), a native of the south of Europe, less hardy than the mezereon, has the same medicinal properties and uses, which is also in some measure the case with many other species. The only species certainly a native of Britian is the SPURGE LAUREL (*D. laureola*), an evergreen shrub, 3—4 feet high, with obovate-lanceolate leaves, which grow in tufts at the end of the branches, and give it a remarkable appearance. It grows well under the shade of trees. It is naturalized, rather than a native of Scotland.—*D. Japonica*, a species recently introduced from Japan, has exquisitely lemon-scented leaves. From the bark of some species of D., and of the most nearly allied genera, paper is made in different parts of the East, particularly *Nepaul paper* from that of *D. cannabina*.

Slips of the inner bark are boiled in a lye of wood-ashes for half an hour till quite soft, are then reduced to a homogeneous pulp by beating with a wooden mallet in a mortar, churned with water into a thin paste, and poured through a coarse sieve upon a cloth stretched on a frame. The paper is subsequently polished by friction, with a shell or a piece of hard-wood, and is remarkable for its toughness, smoothness and durability. Most of the paper used in Tibet is made from the bark of different species of D. and allied genera, particularly of *Edgeworthia Gardneri*, a beautiful shrub, with globes of waxy, cowslip-colored, deliciously fragant flowers, growing on the Himalaya, at an elevation of 6000—7000 feet. The bark of *Dais Madagascariensis* is also made into paper in Madagascar, and that of *Gnidia daphnoides* into ropes.

Daphne Mezereon.

DA'PHNIA. See WATER-FLEA.

DA'PHNINE is a bitter, astringent, crystalline substance present in different species of *Daphne*. It is analogous to asparagine. See ASPARAGUS.

DARABGHE'RD, or DARA'B, a town of Persia in the province of Farsistan, lat. 29° N., long. 54° 30′ E. It is situated on a small river in the midst of an extensive plain, and is surrounded by lemon and orange groves. At one time it was a place of great extent and importance, but most of it is now in ruins, and its population is not more than 15,000 or 20,000.

D'ARBLAY, MADAME. See BURNEY, DR. CHARLES.

DARAGU'NJ, a town of British India on the left bank of the Ganges, opposite to Allahabad. Pop. 9000.

DARBU'NG, a mountain-torrent of Bussahir, Hindustan, with a course of only 27 miles, rises about 15,000 feet above the sea, in lat. 31° 57′ N., and long. 78° 25′ E., and loses itself in the Sutlej, the most easterly of the five rivers of the Punjab, in lat. 31° 43′ N., and long. 78° 35′ E. About 7 miles above the point of confluence —having already descended 6000 feet in 20 miles—the D. is crossed by a wooden bridge of 33 feet in length; and even somewhat further up, it is bordered by several villages. Its source has been described as a scene of terrific desolation, consisting of fields of snow and ice half-hid under stones and rubbish.

DARDANE'LLES (ancient *Hellespont*), a narrow channel separating Europe from Asia, and uniting the Sea of Marmora with the Grecian Archipelago. It extends from north-east to south-west, between lat. 40°—40° 30′ N., and long. 26° 10′—26° 40′ E., having a length of about 40 miles, and a breadth varying from less than 1 to 4 miles. From the Sea of Marmora, a strong current runs through the strait to the Archipelago. To prevent an attack on Constantinople from the Archipelago, the D. is strongly fortified on both sides, with many guns of immense calibre. A treaty concluded between the five great powers and Turkey in 1841 arranged that no ship of war belonging to any nation save Turkey should pass the D. without the express consent of Turkey; all merchant ships being also required to show their papers to the Ottoman authorities. These provisions were confirmed at London in 1871 and at Berlin in 1878. The D. is celebrated in ancient history on account of Xerxes and Alexander having crossed it, the former in 480 B.C., to enter Europe; and the latter in 334 B.C., to enter Asia. The point at which Xerxes crossed, by two separate bridges, was in the neighborhood of Abydos, on the Asiatic shore, opposite to Sestos. Alexander crossed at nearly the same place; and here also young Leander nightly swam across to visit Hero—a feat performed in modern times by Lord Byron for 'glory.'

DARFU'R, a country of Africa, east of Sudan, is generally said to be situated in lat. 10°—16° N., and in long. 22°—28° E., but its limits are not very clearly defined. D. towards the south is hilly, the principal elevation being a mountainous ridge called Marrah, which traverses the country longitudinally, and is the source of numerous streams. Towards the north, D. is level, sandy, and almost destitute of water. During the rainy season, which commences in June, and continues till September, it exhibits a rich vegetation. The principal products are wheat, millet, rice, maize, and sesame. Tobacco, which is used by the natives in every form, abounds. Water-melons, also, are abundant during the rainy season. Among the fruits are tamarinds and dates. The minerals are chiefly copper and iron. The wealth of the inhabitants of D. consists chiefly in cattle. Horses, sheep, camels, and game abound. D. carries on a considerable trade with Egypt, Mecca, and the inland countries of Africa; it was once a notorious center of the slave-trade. The Furani are an intelligent, well-built race, and have long been Mohammedans. Their numbers are variously estimated at from three to four millions, the former estimate being that of the Egyptian governor-general. D. was annexed to Egypt in 1874–75, and the organization of the country into four provinces (Umshanga, Fasher, Dara, and Kakkabia) is now complete. The residence of the governor is Fasher, whence a regular postal service conveys letters to Khartum in 10 days. Kobe is the chief trading town.

DA'RGAN, WILLIAM, was born about the beginning of the present century in county Carlow, Ireland, where his father was a large farmer. D. received, when young, a good education, and after spending some time in the office of a surveyor, where he acquired a high reputation for integrity and assiduous industry, he went to England, and was employed under Telford, who was then constructing the Holyhead Road. Inspired perhaps by the example of that great engineer, D. now resolved to carve out a similar path for himself in his own country, and having returned to Ireland, obtained some small 'jobs,' the beginnings of a career crowned with the most splendid success—for he became one of the first capitalists in Ireland. It was D. who contracted for the first railway ever executed in Ireland (the Dublin and Kingstown), and he was afterwards connected with most of the great undertakings in that country, such as the making of railways, canals, tunnels, and embankments. He was also an extensive holder of railway stock, a steam-boat proprietor, flaxgrower, and farmer. He planned the Industrial Exhibition of Dublin (1853), with the view of developing more vigorously the material resources of his native country; and as a help towards its realization, placed £20,000 in the hands of a working-committee. This sum was gradually increased to about £100,000. The Exhibition was opened on the 12th of May 1853, by the Lord-lieutenant; and was visited by the Queen and Prince Albert, when the honor of knighthood was offered to D., but was declined. In so far as the Industrial Exhibition was a *personal* speculation on the part of D., it was a failure, for he lost, it is said, £20,000 by it; but in every other respect it was highly gratifying to him, and to every genuine lover of his country. William D. was not one of those sham-patriots with whom Ireland has been too often afflicted. He died, February 7, 1867.

DARIEN, the name of a gulf on the northern coast of S. America, and of the isthmus connecting the grand northern and southern divisions of the new world.—1. Gulf of D., the most southerly portion of the Caribbean Sea, about 70 miles in length from north to south, and 25 from east to west. The shores are in most places steep, and are in many places fringed with shoals. The southernmost part of the gulf is called the Bay of Choco, into which the considerable river Atrato debouches.—2. The Isthmus of D. is a term commonly used as interchangeable with that of Isthmus of Panama (q. v.), now the more usual name. D. was also the name given to a province in the republic of New Granada, corresponding to what is now the state of Panama in Columbia. One of the earliest Spanish settlements on the mainland was in D., the region being then called also by the Spaniards *Castilla de Oro* ('the Golden Castile') and forming the best known part of their *Tierra Firma*. In 1513, the conquistador Balboa, governor of the Darien settlement, crossed the isthmus with 290 men, and on 26th September first caught sight of the Pacific Ocean.

As early as 1528 the idea of a ship canal across the isthmus was entertained; in 1826 a line for such a canal was traced between Panama and Portobello; and between 1843 and 1874 repeated surveys have been made by French, English, and American engineers with the same view. The Interoceanic Canal Congress which met at Paris in 1879, under the auspices of M. Lesseps, ap-

proved a route nearly parallel to the railway. A company was formed in 1880, under the auspices of M. Lesseps, to make the canal; and operations were commenced in 1881. The work is a level cutting, without locks, and the estimated cost is £33,000,000. For the railway from Aspinwall to Panama, see PANAMA. The principal ports on the north shore are Chiriqui, Colon or Aspinwall on Limon Bay, Portobello, San Blas, and Puerto Escoces, on Caledonia Bay.

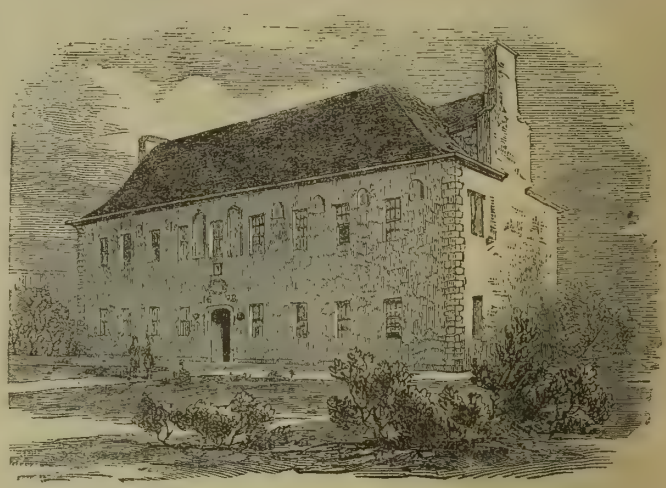
DARIEN SCHEME, THE, one of the most disastrous speculations on record, and one which caused an unprecedented excitement in Scotland from 1695—in which year the Darien Company was established by act of the Scottish parliament, sanctioned by royal authority—till 1701, when the last of the disappointed adventurers returned home. The D. S. was projected by William Paterson, the founder of the Bank of England. Its object was to plant a colony on the Atlantic side of the Isthmus of Panama, and so form a commercial entrepôt between the eastern and western hemispheres. An entire monopoly of the trade of Asia, Africa, and America, for a term of thirty-one years, was granted to the Company. At that time, the foreign trade of Scotland had been ruined by the English navigation act of 1660, which provided that all trade with the English colonies should be conducted in English ships alone, so that when Paterson opened his subscription-list, the nobility, the gentry, the merchants, and people, royal burghs, and public bodies in Scotland all hastened to subscribe. £400,000 were immediately put down on paper, of which £220,000 were actually paid up. Deputies in England received subscriptions to the amount of £300,000; and the Dutch and Hamburgers subscribed £200,000. The English parliament, however, actuated by a feeling of national antipathy, and the jealous clamors of trading corporations, gave its unequivocal condemnation to the scheme. The British resident at Hamburg, probably with the concurrence of the king (William III.), also made various insinuations against it. The result of this interference was the almost total withdrawal of the Dutch and English subscriptions. It must now be admitted, even by a Scotsman, that there *was* one fatal objection to the scheme—viz., the danger of settling on ground claimed by Spain, without coming to a proper understanding with that country beforehand. Unable, however, to see any sort of obstacles, incited by the vehement eloquence of Paterson, and dazzled by the magnificent proportions of the scheme, the Scotch hurried forward their arrangements. Five ships, with 1200 men on board, set sail from Leith for Panama on the 25th July 1698.

They reached their destination in four months, and having bargained with the natives for a country which they called New Caledonia, the colonists fixed the site of what was to be their capital city, New Edinburgh, and built a fort in its vicinity, which they named New St. Andrews. Having thus constituted their colony, they issued a proclamation of perfect freedom of trade, and universal toleration in religious matters to all who should join them. According to the act which established their company, all goods imported by them, with the exception of foreign sugar and tobacco, were free from all duties and impositions for 21 years; and thus on the whole, they seemed for the first few months to be on the highway to success. But the climate, which was tolerable in winter, became unbearable in summer, and many sickened under it; their supplies also failed before they could derive a return from the soil; and on sending to the British colonies in America for provisions, they learned with the deepest indignation and despair that the British American colonies, having been informed that King William had not given his sanction to the expedition, had resolved to hold no intercourse with the new colony at Panama.

Sickly and desponding, they waited long for supplies from the mother-country; but the Company at home were not aware of their wretched condition, and none came. At length having waited eight months for assistance, the colony broke up. In the meantime, 1300 colonists, including 300 Highlanders from the estate of Captain Campbell of Finab, who had charge of the expedition, had set sail from Scotland, but ere they arrived, the pioneers had fled. A Spanish force of 1500 men, and a squadron of 11 ships, immediately threatened the new comers. Captain Campbell marched by night with a body of 200 men upon the Spanish camp, which he broke, and completely dispersed. On returning to the fort, however, he found it invested by the Spanish squadron. The ammunition of the colonists had now become exhausted, and they were obliged to capitulate, the Spaniards granting honorable terms to all except Captain Campbell, who, however, escaped, and reaching New York, obtained a passage to Scotland. The remainder of the colonists, too weak to weigh the anchor of the vessel which was to carry them home, had to be assisted in their departure by the Spaniards. Not more than 30, among whom was Paterson, who was rendered for a time lunatic by his dreadful misfortunes, ever reached Scotland.

Of Paterson, who has been regarded by some writers as a swindler, Lord Macaulay, in his fifth volume of the *History of England*, says: 'There is not the least reason to believe that he was dishonest. Indeed, he would have found more difficulty in deceiving others, had he not begun by deceiving himself. His faith in his own schemes was strong even to martyrdom; and the eloquence with which he illustrated and defended them had all the charms of sincerity and enthusiasm.'

In Edinburgh, as the head-quarters of the D. S., a building was erected to accommodate the officials, and carry on the business of



Scottish India House.

the Company. Known as the Scottish India House, this building, now removed, recently existed in connection with the establishment for the poor of the city—a melancholy memorial of a disconcerted national enterprise. The books and other documents which had belonged to the Company are contained in the Advocates' Library, where they are shown as a curiosity. The most complete account of the D. S. is that by Mr. J. H. Burton, printed by the Bannatyne Club.

DARI'US, or DAREIUS, is the name of several Persian kings, and, like the Egyptian word Pharaoh, is *titular* and not *personal*.—DARIUS I., the son of Hystaspes, a Persian noble, leagued himself with six other nobles to murder Smerdis, the Magian, who had usurped the throne on the death of Cambyses. The conspirators were successful in their plot, and having, after some discussion, fixed on the monarchical as the proper form of government, D. contrived to be elected king, 521 B.C. His position at first was very insecure, but his caution, skill, and energy enabled him to govern his vast dominions for thirty-six years. To strengthen himself, he married the daughter of Otanes, who had been the head of the conspiracy, and likewise took three wives from the royal house—viz., two daughters of Cyrus, and one of Cyrus's son, Smerdis. He then divided his empire into twenty satrapies, and determined the exact amount of taxation to be borne by each. In some of the remoter provinces, great confusion seems to have prevailed after the death of Smerdis, the Magian; and a proof of how little D. could effect at first is afforded by the conduct of Orœtas, the governor of Sardis, who for some time was quite defiant of his authority.

Babylon next revolted, and D. besieged the city unsuccessfully for two years. At last, however, it was taken by an extraordinary stratagem of his general Zophyrus, 516. In 513, D., with an army of 700,000, crossed the Bosporus by a bridge of boats, marched through what is now known as European Turkey, to the mouths of the Danube, crossed and advanced against the Scythians. The expedition proved a failure. D. retreated, but detached from his main force an army of 80,000 men under Megabyzus, to conquer Thrace, while he himself returned to Persia, where he extended his authority in the East as far as the Indus. The assistance given by the Athenians and Eretrians to the Ionic states, when they ventured to throw off the Persian yoke, and the part which they took in the burning of Sardis, determined D., who was also influenced thereto by the banished Hippias, to attempt the subjugation of the whole of Greece. In 495, he sent Mardonius with an army into Thrace and Macedonia, and at the same time despatched a fleet against the islands. The former was routed by the Brygi in Thrace, the latter was shattered and dispersed by a storm when rounding the promontory of Mount Athos. In 490, he renewed his attempt. His fleet committed great ravages in the Cyclades, but his army was entirely defeated at Marathon by the Athenians, under Miltiades, the 'tyrant' of the Chersonese. In the midst of his preparations for a third expedition, D. died 485 B.C.

DARIUS II., called, before his accession to the throne, *Ochos*,

and after his succession, *Nothos* ('the Bastard') was one of the seventeen bastard sons of Artaxerxes I. Longimanus. When Sogdianus, another of the bastards, had murdered the rightful king, Xerxes II., and assumed for himself the royal power, Ochos declared war against him, slew him, and secured the diadem for himself, 424—423 B.C. He now called himself *Darius*. His reign was ignoble. He showed himself to be completely under the control of his eunuchs and his cruel step-sister and spouse Parysatis. Rebellions were constantly breaking out among his satraps, all of which, however, were crushed except that of Amyrtæus, satrap of Egypt, who made himself independent in 414. It was during the life of D., and chiefly through the craft of Tissaphernes, satrap of Asia Minor, and of his successor Cyrus the Younger, son of the king, that the Persians exercised so great an influence over the affairs of Greece in the last years of the Peloponesian War. D. died 405—404 B.C.

DARIUS III., great-grandson of D. II., called before his accession, *Codomannus*, was a monarch noted for his mild disposition, handsome person, and courageous spirit. He was raised to the throne through the help of Bogoas, after the murder of Arses, 336 B.C. But in spite of his superior qualities, he could offer no solid opposition to the advance of the Macedonians. At the battle of the Issus, in 333, his mother, wife, and three children fell into the hands of Alexander; the victory of Gaugamela, in 331, opened to the latter the way to Susa and Persia Proper. D. now fled to Ecbatana, in Media; and, on the approach of his opponent, to the northern provinces, where he was seized by Bessus, satrap of Bactria.

Alexander, in a fit of generosity, hurried to deliver Darius. Bessus then prepared for flight, but D., refusing to follow, was stabbed by the barbarian, and left. The scouts of Alexander's cavalry, found D. dying, and administered to his last necessities. Thanking the Grecian king for his magnanimity, and commending his family to his care, he expired (330). Alexander sent the dead body to Sisygambis, mother of D., to be interred in the tomb of the Persian kings. With him, the Persian empire, that had so long overshadowed Asia, came to a close.

DARJEEL'ING, a sanitary station of British India, capital of a district in the Sikkim Himalaya. It is situated at an elevation of 7400 feet above the sea, on a narrow ridge between deep valleys. The Lieutenant-governor of Bengal spends some months here in summer. Forest-covered mountains rise above it, where the rhododendrons of the Himalaya grow in great luxuriance. It commands a magnificent view of the snowy ranges of the Himalaya to the north and west. Notwithstanding frequent heavy rains, and a very great annual rainfall, the climate is very salubrious. It was obtained by the British government from the Rajah of Sikkim in 1835. Tea culture has been extensively introduced.

DARKHA'N, MOUNT, a lofty granite mountain in Mongolia, in lat. 47° 36′ N., long. 110° 10′ E. It is interesting as the place whither annually repair large numbers of Mongolians, to do honor to the memory of Genghis Khan (q. v.), to whom a monument has been erected here.

DA'RLING, GRACE, a name famous in the annals of heroism, was the daughter of William Darling, light-house keeper on Longstone, one of the Farne Islands, and was born at Bamborough, 24th November 1815. On the morning of the 7th September 1838, the *Forfarshire*, which, with 63 persons on board, had been wrecked among the Farne Islands, was seen by Darling from his light-house, lying broken on the rocks. At the solicitation of his daughter, then in her 22d year, he put off through the storm to the wreck, his only companion the noble girl who prompted the generous act. By wonderful strength and skill, they brought their boat to where the sufferers (nine in number) crouched, in momentary expectation of a watery grave, rescued them, and bore them safely to Longstone. Such an undertaking, so daring in itself, and so successfully carried out, filled every one with the warmest admiration. The light-house at Longstone, no longer solitary and peaceful, was visited by many of the wealthy and the great. Presents, testimonials, and money were heaped at the feet of the heroine; but she did not long survive her change of circumstances. She died of consumption, after a year's illness, on Oct. 20, 1842. See *Grace Darling*, by E. Hope (1876).

DA'RLING, a name derived from a governor of New South Wales, and applied to a district, a mountain-range, and a river in Australia.—1. The Darling Downs district includes an extensive tract near the Dividing Range in the south of Queensland. The district has an area of about 6000 square miles, and is watered by the Condamine, Weir, and Moonie rivers.

It is the richest pastoral district in the colony, and comprises a vast extent of fine agricultural land.—2. A mountain-range, running N. and S., about 250 miles long, lying wholly in West Australia. It terminates in the direction of the sea at Point d'Entrecasteaux. Its culminating summit is not less than 3000 feet above the sea-level.—3. The river Darling, in New South Wales, aptly characterized as 'mysterious,' demands special attention, not only in itself, but also in connection with some of the most striking peculiarities of the country. From the western declivities of the almost continuous ridge that skirts the eastern coast, innumerable torrents pour down into the vast plains, which gradually slope away towards the interior. The more northerly of these torrents converge in a central 'basin of clay,' on the 30th parallel of S. lat., where, within a comparatively narrow space, meet the Maraona, the Condamine, the Dumaresque, the Gwydir, the Naomi, the Castlereagh, the Macquarie, and the Bogan. In this region, the channels undergo many transformations, sometimes losing themselves in wide marshes, and sometimes presenting an inextricable labyrinth of bifurcations and junctions. After parting with a large proportion of their volume, under the combined influences of evaporation and absorption, the united streams, now distinguished as the D., pursue a journey of 600 miles to the Murray, through plains which are habitable only on the immediate verge of the water-course. Through this immense reach, the D. receives not a single affluent; nay, on the contrary, it sends out many an offset, to bury itself in some stagnant lagoon. It may be added, that none of the so-called rivers of this region of Australia, with the solitary exception of the Murray itself, is really entitled to the name. Between lofty banks of bare earth, they exhibit at times an inundating flood, at times a mere series of detached pools of every size and shape.

DA'RLINGTON, or DA'RNTON, a burgh in the south of Durham county, in a rich tract, on a hill-slope, on the banks of the Skerne, near its junction with the Tees, 18 miles south of Durham city. It consists of a square market-place, from which branch several streets called gates. Pop. in 1881, 35,102, many belonging to the Society of Friends. The chief manufactures are woollen yarns, for imitation Indian shawls, Brussels carpets, &c.; flax, optical glasses, brass and iron wares. Near D. was the seat of George Allen the antiquary. St. Cuthberts, the beautiful parish church, was built in the 12th c., and has three carved stone stalls, and a tower 180 feet high. At Oxen-le-field, three miles from D. are curious cavities of unknown origin, called Hell Kettles.

DA'RMSTADT, a town of Germany, capital of the grand-duchy of Hesse-Darmstadt, residence of the grand duke, and seat of government, is situated on the river Darm, 15 miles south of Frankfurt-on-the-Maine. It consists of an old and new town, both of which are surrounded by walls and ditches. The streets of the former are narrow and squalid, but those of the latter exhibit many imposing specimens of architecture. D. has five public squares, from the center of one of which a fine Doric column rises to the height of 134 feet, and is surmounted by a statue of the Grand Duke Louis, who founded the new town. Besides the arsenal, the barracks, and the various religious edifices, one of which is crowned by a dome supported upon 28 large columns, D. has two palaces; one of these, the old ducal palace, contains the museums of painting—comprising 700 pictures, some of them by the most famous of the old masters—and natural history, in which are shown fossil remains of the deinotherium. The palace contains also a public library consisting of 380,000 vols. D. is more dependent upon its ducal court and the government, which holds its seat there, than upon its commerce or manufactures; but these are now becoming more important. Pop., with suburb (1880), 48,153.

DA'RNEL (*Lolium temulentum*), a grass of the same genus with the valuable RYEGRASS (q. v.), an annual, common in cornfields in England and many parts of Europe. It has no tufts of leaves from the root, the glumes are as long as the spikelets, or longer, the spikelets contain 5—7 florets which are awned. This grass has from ancient times been reputed to have a narcotic poisonous seed, to which many bad effects were ascribed, which, in years of bad harvest, were observed to ensue upon the eating of bread or the feeding of horses upon oats. Even Lindley, in his *Medical and Œconomical Botany*, published in 1849, ascribes narcotic and acrid qualities to D. seed, and speaks of fatal consequences as produced by it when mixed with flour, saying that it 'is the only authentic instance of unwholesome qualities in the order of the Grasses.' On the other hand, it is asserted that very recent researches on the continent have completely established the perfect harmlessness of this grass and of its seed; and the effects which have been ascribed to it must therefore be regarded as proceeding from grain injuriously affected in some way by bad weather.

Darnel.

DARNETAL, a town of France, in the department of Seine-Inférieure about 2½ miles east of Rouen. It is well built, and has two Gothic churches. Situated at the top of a narrow valley, and intersected by two streams, D. possesses unusual facilities for carrying on cloth and other woollen manufactures. Pop. (1876) 5618.

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